

# How To: Extend the Ed-Fi ODS / API - Student Transcript Example

In this example, the Ed-Fi Extensions needed by the organization are for a student transcript. The steps below are a continuation of the How-To articles described in the Ed-Fi Data Standard v2.2 documentation, [XML Schema - Extensions Framework Guide](#).

The steps can be summarized as:

- [Step 1. Author Ed-Fi Core Schema Extensions](#)
- [Step 2. Author a Custom Interchange Schema](#)
- [Step 3. Author Database Schema Extensions](#)
- [Step 4. Author API Metadata Extensions](#)
- [Step 5. Author Interchange Order Metadata Extensions](#)
- [Step 6. Configure Security](#)
- [Step 7. Run Code Generation and Verify Changes](#)

Detail on each step follows.

## Step 1. Author Ed-Fi Core Schema Extensions

Create an Extension to the Ed-Fi Core Schema, called **EXTENSION-Ed-Fi-Core.xsd**, and place it in the **C:\Ed-Fi-ODS-Implementation\Extensions\Schemas** folder.

More information about how the Ed-Fi Core schema Extensions are created can be found in the following series of How-To articles in the Ed-Fi Data Standard v2.2 documentation:

- [How To: Extend the Ed-Fi XML Schema \(Part 1\)](#)
- [How To: Extend the Ed-Fi XML Schema \(Part 2\)](#)
- [How To: Extend the Ed-Fi XML Schema \(Part 3\)](#)
- [How To: Extend the Ed-Fi XML Schema \(Part 4\)](#)

The resulting XML Schema file is shown below. It is important to note that core schema Extension file must be able to resolve the reference to the Ed-Fi Core Schema file (i.e., in the `schemaLocation` attribute).

### EXTENSION-Ed-Fi-Core.xsd

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns="http://ed-fi.org/0220" xmlns:ann="http://ed-fi.org/annotation" xmlns:altova="http://www.altova.com/xml-schema-extensions" targetNamespace="http://ed-fi.org/0220" elementFormDefault="qualified" attributeFormDefault="unqualified">
  <xs:include schemaLocation="..\..\..\Ed-Fi-ODS\Application\schemas\codegen\Ed-Fi-Core.xsd" />
  <xs:annotation><xs:documentation>==== Ed-Fi 2.2 Extensions =====</xs:documentation></xs:annotation>
  <xs:annotation><xs:documentation>==== Domain Entities =====</xs:documentation></xs:annotation>
  <xs:complexType name="EXTENSION-PostSecondaryOrganization">
    <xs:annotation><xs:appinfo><ann:TypeGroup>Domain Entity</ann:TypeGroup></xs:appinfo></xs:annotation>
    <xs:sequence>
      <xs:element name="NameOfInstitution" type="NameOfInstitution"/>
      <xs:element name="InstitutionLevel" type="EXTENSION-InstitutionLevelType"/>
      <xs:element name="InstitutionControl" type="EXTENSION-InstitutionControlType"/>
      <xs:element name="AcceptanceIndicator" type="xs:boolean"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="EXTENSION-StudentAcademicRecordExtension">
    <xs:annotation><xs:appinfo><ann:TypeGroup>Domain Entity</ann:TypeGroup></xs:appinfo></xs:annotation>
    <xs:complexContent>
      <xs:extension base="EXTENSION-StudentAcademicRecordRestriction" />
    </xs:complexContent>
  </xs:complexType>
  <xs:sequence>
    <xs:element name="ClassRanking" type="EXTENSION-
```

### Downloads

The following link is a ZIP archive containing source files for this extensibility sample.

[Student Transcript Source Files](#)

```

ClassRankingExtension"/>
    <xs:element name="SubmissionCertification" type="
EXTENSION-SubmissionCertificationType"/>
    <xs:element name="PostSecondaryOrganizationReference"
type="EXTENSION-PostSecondaryOrganizationReferenceType"/>
    </xs:sequence>
  </xs:extension>
</xs:complexContent>
</xs:complexType>
<xs:complexType name="EXTENSION-StudentAcademicRecordRestriction">
  <xs:annotation><xs:appinfo><ann:TypeGroup>Domain Entity</ann:
TypeGroup></xs:appinfo></xs:annotation>
  <xs:complexContent>
    <xs:restriction base="StudentAcademicRecord">
      <xs:sequence>
        <xs:element name="CumulativeEarnedCredits" type="
Credits" minOccurs="0"/>
        <xs:element name="CumulativeAttemptedCredits" type="
Credits" minOccurs="0"/>
        <xs:element name="CumulativeGradePointsEarned" type="
GPA" minOccurs="0"/>
        <xs:element name="CumulativeGradePointAverage" type="
GPA" minOccurs="0"/>
        <xs:element name="GradeValueQualifier" type="
GradeValueQualifier" minOccurs="0"/>
        <xs:element name="AcademicHonor" type="AcademicHonor"
minOccurs="0" maxOccurs="unbounded"/>
        <xs:element name="Recognition" type="Recognition"
minOccurs="0" maxOccurs="unbounded"/>
        <xs:element name="ProjectedGraduationDate" type="xs:
date" minOccurs="0"/>
        <xs:element name="SessionEarnedCredits" type="Credits"
minOccurs="0"/>
        <xs:element name="SessionAttemptedCredits" type="
Credits" minOccurs="0"/>
        <xs:element name="SessionGradePointsEarned" type="GPA"
minOccurs="0"/>
        <xs:element name="SessionGradePointAverage" type="GPA"
minOccurs="0"/>
        <xs:element name="Diploma" type="Diploma" minOccurs="
0" maxOccurs="unbounded"/>
        <xs:element name="StudentReference" type="
StudentReferenceType"/>
        <xs:element name="EducationOrganizationReference"
type="EducationOrganizationReferenceType"/>
        <xs:element name="SchoolYear" type="SchoolYearType"/>
        <xs:element name="Term" type="
TermDescriptorReferenceType"/>
        <xs:element name="ReportCardReference" type="
ReportCardReferenceType" minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:restriction>
  </xs:complexContent>
</xs:complexType>
<xs:annotation><xs:documentation>==== Extended Reference ====</xs:
documentation></xs:annotation>
  <xs:complexType name="EXTENSION-PostSecondaryOrganizationReferenceType"
>
    <xs:annotation><xs:appinfo><ann:TypeGroup>Extended Reference</ann:
TypeGroup></xs:appinfo></xs:annotation>
    <xs:complexContent>
      <xs:extension base="ReferenceType">
        <xs:sequence>
          <xs:element name="
PostSecondaryOrganizationIdentity" type="EXTENSION-
PostSecondaryOrganizationIdentityType" minOccurs="0"/>
        </xs:sequence>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>
<xs:complexType name="EXTENSION-PostSecondaryOrganizationIdentityType">

```

```

        <xs:annotation><xs:appinfo><ann:TypeGroup>Identity</ann:TypeGroup><
/xs:appinfo></xs:annotation>
        <xs:sequence>
            <xs:element name="NameOfInstitution" type="
NameOfInstitution" />
        </xs:sequence>
    </xs:complexType>
    <xs:annotation><xs:documentation>==== Common ====</xs:documentation><
/xs:annotation>
    <xs:complexType name="EXTENSION-ClassRankingExtension">
        <xs:annotation><xs:appinfo><ann:TypeGroup>Common</ann:TypeGroup><
/xs:appinfo></xs:annotation>
        <xs:complexContent>
            <xs:extension base="ClassRanking">
                <xs:sequence>
                    <xs:element name="SpecialEducationGraduationStatus"
type="EXTENSION-SpecialEducationGraduationStatusType" />
                </xs:sequence>
            </xs:extension>
        </xs:complexContent>
    </xs:complexType>
    <xs:annotation><xs:documentation>==== Enumeration ====</xs:
documentation></xs:annotation>
    <xs:simpleType name="EXTENSION-InstitutionControlType">
        <xs:annotation><xs:appinfo><ann:TypeGroup>Enumeration</ann:
TypeGroup></xs:appinfo></xs:annotation>
        <xs:restriction base="xs:token">
            <xs:enumeration value="Public" />
            <xs:enumeration value="PrivateNonProfit" />
            <xs:enumeration value="PrivateForProfit" />
        </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="EXTENSION-InstitutionLevelType">
        <xs:annotation><xs:appinfo><ann:TypeGroup>Enumeration</ann:
TypeGroup></xs:appinfo></xs:annotation>
        <xs:restriction base="xs:token">
            <xs:enumeration value="Four Year" />
            <xs:enumeration value="Two To Four Year" />
            <xs:enumeration value="Less Than Two Year" />
        </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="EXTENSION-SpecialEducationGraduationStatusType">
        <xs:annotation><xs:appinfo><ann:TypeGroup>Enumeration</ann:
TypeGroup></xs:appinfo></xs:annotation>
        <xs:restriction base="xs:token">
            <xs:enumeration value="Completion of IEP and Reached Age 22" />
            <xs:enumeration value="Completion of IEP and Access to
Services, Employment, or Education" />
            <xs:enumeration value="Completion of IEP and Demonstrated Self-
Help Skills" />
        </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="EXTENSION-SubmissionCertificationType">
        <xs:annotation><xs:appinfo><ann:TypeGroup>Enumeration</ann:
TypeGroup></xs:appinfo></xs:annotation>
        <xs:restriction base="xs:token">
            <xs:enumeration value="Official" />
            <xs:enumeration value="Unofficial" />
        </xs:restriction>
    </xs:simpleType>
</xs:schema>

```

## Step 2. Author a Custom Interchange Schema

Create a custom interchange file, called **EXTENSION-Interchange-HSGeneratedStudentTranscript.xsd**, and place it in the **C:\Ed-Fi-ODS-Implementation\Extensions\Schemas** folder. More information about how this file is created can be found in [How To: Extend the Ed-Fi XML Schema \(Part 5\)](#).

The resulting custom interchange schema file is found below. It is important to note that the `schemaLocation` should be a valid reference to the schema file that contains the Extension definition (i.e., the `EXTENSION-Ed-Fi-Core.xsd` file created in the previous step).

#### EXTENSION-Interchange-HSGeneratedStudentTranscript.xsd

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns="http://ed-fi.
org/0220" targetNamespace="http://ed-fi.org/0220" elementFormDefault="
qualified" attributeFormDefault="unqualified">
  <xs:include schemaLocation="EXTENSION-Ed-Fi-Core.xsd"/>
  <xs:annotation>
    <xs:documentation>==== High School Generated Student Transcript
Exchange Model =====</xs:documentation>
  </xs:annotation>
  <xs:element name="InterchangeHSGeneratedStudentTranscript">
    <xs:annotation>
      <xs:documentation>This "concrete" exchange standard is to load
a student transcript generated by a high school for a postsecondary
institution, containing the following information:
Student identification and contact information
Standard NCLB demographics, omitting any details on disabilities.
K-12 enrollment history indicating the various schools attended
Academic record showing semester and final grades and credits earned for
each secondary course taken
Scores for the yearly state standardized tests (summary scores only)
Yearly and final credits earned and grade point average (GPA)
Graduation plan and date graduated
The student transcript interchange should indicate whether it is an
official or unofficial submission
Postsecondary Institution(s) that the student is attending
</xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:choice maxOccurs="unbounded">
        <xs:element name="Student" type="Student"/>
        <xs:element name="StudentSchoolAssociation" type="
StudentSchoolAssociation"/>
        <xs:element name="StudentAcademicRecord" type="EXTENSION-
StudentAcademicRecordExtension"/>
        <xs:element name="CourseTranscript" type="CourseTranscript"
/>
        <xs:element name="ReportCard" type="ReportCard"/>
        <xs:element name="Grade" type="Grade"/>
        <xs:element name="StudentSectionAssociation" type="
StudentSectionAssociation"/>
        <xs:element name="Section" type="Section"/>
        <xs:element name="CourseOffering" type="CourseOffering"/>
        <xs:element name="Course" type="Course"/>
        <xs:element name="StudentAssessment" type="
StudentAssessment"/>
        <xs:element name="School" type="School"/>
        <xs:element name="PostSecondaryOrganization" type="
EXTENSION-PostSecondaryOrganization"/>
      </xs:choice>
    </xs:complexType>
  </xs:element>
</xs:schema>
```

### Step 3. Author Database Schema Extensions

Create an Extension SQL script called `0001-Extensions.sql` and place it in the `C:\Ed-Fi-ODS-Implementation\Database\Structure\EdFi` folder. This script defines the database schema for the Extension.

**0001-Extensions.sql**

```

IF NOT EXISTS (SELECT 1 FROM sys.schemas WHERE name = 'extension')
BEGIN
    EXEC('CREATE SCHEMA [extension] AUTHORIZATION dbo')
END
GO
--
*****
--      InstitutionControlType
--
*****
CREATE TABLE extension.InstitutionControlType(
    InstitutionControlTypeId int IDENTITY(1,1) NOT NULL,
    CodeValue nvarchar(50) NOT NULL,
    [Description] nvarchar(1024) NOT NULL,
    ShortDescription nvarchar(450) NOT NULL,
    Id uniqueidentifier NOT NULL,
    LastModifiedDate datetime NOT NULL,
    CreateDate datetime NOT NULL,
    CONSTRAINT PK_InstitutionControlType PRIMARY KEY CLUSTERED
(InstitutionControlTypeId ASC)
)
ALTER TABLE extension.InstitutionControlType ADD CONSTRAINT
[InstitutionControlType_DF_Id] DEFAULT (newid()) FOR [Id]
ALTER TABLE extension.InstitutionControlType ADD CONSTRAINT
[InstitutionControlType_DF_LastModifiedDate] DEFAULT (getdate()) FOR
[LastModifiedDate]
ALTER TABLE extension.InstitutionControlType ADD CONSTRAINT
[InstitutionControlType_CreateDate] DEFAULT (getdate()) FOR [CreateDate]
GO
--
*****
--      InstitutionLevelType
--
*****
CREATE TABLE extension.InstitutionLevelType(
    InstitutionLevelTypeId int IDENTITY(1,1) NOT NULL,
    CodeValue nvarchar(50) NOT NULL,
    [Description] nvarchar(1024) NOT NULL,
    ShortDescription nvarchar(450) NOT NULL,
    Id uniqueidentifier NOT NULL,
    LastModifiedDate datetime NOT NULL,
    CreateDate datetime NOT NULL,
    CONSTRAINT PK_InstitutionLevelType PRIMARY KEY CLUSTERED
(InstitutionLevelTypeId ASC)
)
ALTER TABLE extension.InstitutionLevelType ADD CONSTRAINT
[InstitutionLevelType_DF_Id] DEFAULT (newid()) FOR [Id]
ALTER TABLE extension.InstitutionLevelType ADD CONSTRAINT
[InstitutionLevelType_DF_LastModifiedDate] DEFAULT (getdate()) FOR
[LastModifiedDate]
ALTER TABLE extension.InstitutionLevelType ADD CONSTRAINT
[InstitutionLevelType_CreateDate] DEFAULT (getdate()) FOR [CreateDate]
GO
--
*****
--      SpecialEducationGraduationStatusType
--
*****
CREATE TABLE extension.SpecialEducationGraduationStatusType(
    SpecialEducationGraduationStatusTypeId int IDENTITY(1,1) NOT NULL,
    CodeValue nvarchar(50) NOT NULL,
    [Description] nvarchar(1024) NOT NULL,
    ShortDescription nvarchar(450) NOT NULL,
    Id uniqueidentifier NOT NULL,
    LastModifiedDate datetime NOT NULL,

```

```

        CreateDate datetime NOT NULL,
        CONSTRAINT PK_SpecialEducationGraduationStatusType PRIMARY KEY
CLUSTERED (SpecialEducationGraduationStatusTypeId ASC)
)
ALTER TABLE extension.SpecialEducationGraduationStatusType ADD CONSTRAINT
[SpecialEducationGraduationStatusType_DF_Id] DEFAULT (newid()) FOR [Id]
ALTER TABLE extension.SpecialEducationGraduationStatusType ADD CONSTRAINT
[SpecialEducationGraduationStatusType_DF_LastModifiedDate] DEFAULT
(getdate()) FOR [LastModifiedDate]
ALTER TABLE extension.SpecialEducationGraduationStatusType ADD CONSTRAINT
[SpecialEducationGraduationStatusType_CreateDate] DEFAULT (getdate()) FOR
[CreateDate]
GO
--
*****
****
--      SubmissionCertificationType
--
*****
CREATE TABLE extension.SubmissionCertificationType(
    SubmissionCertificationTypeId int IDENTITY(1,1) NOT NULL,
    CodeValue nvarchar(50) NOT NULL,
    [Description] nvarchar(1024) NOT NULL,
    ShortDescription nvarchar(450) NOT NULL,
    Id uniqueidentifier NOT NULL,
    LastModifiedDate datetime NOT NULL,
    CreateDate datetime NOT NULL,
    CONSTRAINT PK_SubmissionCertificationType PRIMARY KEY CLUSTERED
(SubmissionCertificationTypeId ASC)
)
ALTER TABLE extension.SubmissionCertificationType ADD CONSTRAINT
[SubmissionCertificationType_DF_Id] DEFAULT (newid()) FOR [Id]
ALTER TABLE extension.SubmissionCertificationType ADD CONSTRAINT
[SubmissionCertificationType_DF_LastModifiedDate] DEFAULT (getdate()) FOR
[LastModifiedDate]
ALTER TABLE extension.SubmissionCertificationType ADD CONSTRAINT
[SubmissionCertificationType_CreateDate] DEFAULT (getdate()) FOR
[CreateDate]
GO
--
*****
****
--      PostSecondaryOrganization
--
*****
CREATE TABLE extension.PostSecondaryOrganization(
    [NameOfInstitution]          nvarchar(75)          NOT NULL,
    [InstitutionLevelTypeId]     int                  NOT NULL,
    [InstitutionControlTypeId]   int                  NOT NULL,
    [AcceptanceIndicator]        bit                   NOT NULL,
    [Id]                          uniqueidentifier NOT NULL,
    [LastModifiedDate]           datetime             NOT NULL,
    [CreateDate]                 datetime             NOT NULL,
    CONSTRAINT PK_PostSecondaryOrganization PRIMARY KEY CLUSTERED
(NameOfInstitution ASC)
)
ALTER TABLE extension.PostSecondaryOrganization ADD CONSTRAINT
[PostSecondaryOrganization_DF_Id] DEFAULT (newid()) FOR [Id]
ALTER TABLE extension.PostSecondaryOrganization ADD CONSTRAINT
[PostSecondaryOrganization_DF_LastModifiedDate] DEFAULT (getdate()) FOR
[LastModifiedDate]
ALTER TABLE extension.PostSecondaryOrganization ADD CONSTRAINT
[PostSecondaryOrganization_CreateDate] DEFAULT (getdate()) FOR
[CreateDate]
GO
ALTER TABLE [extension].[PostSecondaryOrganization] ADD CONSTRAINT
[FK_PostSecondaryOrganization_InstitutionLevelTypeId] FOREIGN KEY
([InstitutionLevelTypeId])
REFERENCES [extension].[InstitutionLevelType] ([InstitutionLevelTypeId])

```

```

GO
ALTER TABLE [extension].[PostSecondaryOrganization] ADD CONSTRAINT
[FK_PostSecondaryOrganization_InstitutionControlTypeId] FOREIGN KEY
([InstitutionControlTypeId])
REFERENCES [extension].[InstitutionControlType]
([InstitutionControlTypeId])
GO

--
*****
****
--      StudentAcademicRecordExtension
--
*****
CREATE TABLE [extension].[StudentAcademicRecordExtension](
    [StudentUSI]                int                NOT NULL,
    [EducationOrganizationId]    int                NOT NULL,
    [SchoolYear]                 smallint       NOT NULL,
    [TermDescriptorId]           int                NOT NULL,
    [NameOfInstitution]          nvarchar(75)   NOT NULL,
    [SubmissionCertificationTypeId] int           NOT NULL,
    CONSTRAINT [PK_StudentAcademicRecordExtension] PRIMARY KEY CLUSTERED
([StudentUSI], [EducationOrganizationId], [SchoolYear], [TermDescriptorId])
)
GO
ALTER TABLE [extension].[StudentAcademicRecordExtension] ADD CONSTRAINT
[FK_StudentAcademicRecordExtension_NameOfInstitution] FOREIGN KEY
([NameOfInstitution])
REFERENCES [extension].[PostSecondaryOrganization] ([NameOfInstitution])
GO
ALTER TABLE [extension].[StudentAcademicRecordExtension] ADD CONSTRAINT
[FK_StudentAcademicRecordExtension_SubmissionCertificationTypeId] FOREIGN
KEY([SubmissionCertificationTypeId])
REFERENCES [extension].[SubmissionCertificationType]
([SubmissionCertificationTypeId])
GO
ALTER TABLE [extension].[StudentAcademicRecordExtension] ADD CONSTRAINT
[FK_StudentAcademicRecordExtension_StudentAcademicRecord]
FOREIGN KEY ([StudentUSI], [EducationOrganizationId], [SchoolYear],
[TermDescriptorId])
REFERENCES [edfi].[StudentAcademicRecord]([StudentUSI],
[EducationOrganizationId], [SchoolYear], [TermDescriptorId])
go

--
*****
****
--      StudentAcademicRecordClassRankingExtension
--
*****
CREATE TABLE [extension].[StudentAcademicRecordClassRankingExtension](
    [StudentUSI]                int                NOT NULL,
    [SchoolYear]                 smallint       NOT NULL,
    [TermDescriptorId]           int                NOT NULL,
    [EducationOrganizationId]    int                NOT NULL,
    [SpecialEducationGraduationStatusTypeId] int           NOT NULL,
    CONSTRAINT [PK_StudentAcademicRecordClassRankingExtension] PRIMARY KEY
CLUSTERED ([StudentUSI], [SchoolYear], [TermDescriptorId],
[EducationOrganizationId])
)
GO
ALTER TABLE [extension].[StudentAcademicRecordClassRankingExtension] ADD
CONSTRAINT
[FK_StudentAcademicRecordClassRankingExtension_StudentAcademicRecordExtensi
on]
FOREIGN KEY ([StudentUSI], [EducationOrganizationId], [SchoolYear],
[TermDescriptorId])
REFERENCES [extension].[StudentAcademicRecordExtension]([StudentUSI],
[EducationOrganizationId], [SchoolYear], [TermDescriptorId])

```

```

go
ALTER TABLE [extension].[StudentAcademicRecordClassRankingExtension] ADD
CONSTRAINT
[FK_StudentAcademicRecordClassRankingExtension_SpecialEducationGraduationSt
atusTypeId] FOREIGN KEY([SpecialEducationGraduationStatusTypeId])
REFERENCES [extension].[SpecialEducationGraduationStatusType]
([SpecialEducationGraduationStatusTypeId])
GO

```

## Step 4. Author API Metadata Extensions

Create an Extension API metadata file called **DomainMetadata-Extension.xml** and place it in the **C:\Ed-Fi-ODS-Implementation\Extensions\Metadata** folder. This file will define the new types and domain entities, and ensure the code generation process will process the entity.

### DomainMetadata-Extension.xml

```

<?xml version="1.0" encoding="utf-8" ?>
<AggregateExtensions>
  <Aggregate root="InstitutionControlType"><Entity table="
InstitutionControlType" schema="extension" />
  </Aggregate>
  <Aggregate root="InstitutionLevelType">
  <Entity table="InstitutionLevelType" schema="extension" />
  </Aggregate>
  <Aggregate root="SpecialEducationGraduationStatusType">
  <Entity table="SpecialEducationGraduationStatusType" schema="extension" />
  </Aggregate>
  <Aggregate root="SubmissionCertificationType">
  <Entity table="SubmissionCertificationType" schema="extension" />
  </Aggregate>
  <Aggregate root="PostSecondaryOrganization">
  <Entity table="PostSecondaryOrganization" schema="extension" />
  </Aggregate>
</AggregateExtensions>

```

## Step 5. Author Interchange Order Metadata Extensions

Create an Extension API metadata file called **InterchangeOrderMetadata-Extension.xml** and place it in the **C:\Ed-Fi-ODS-Implementation\Extensions\Metadata** folder. This file defines the position of the new custom interchange in the load order, ensuring that the interchange loads correctly.

### InterchangeOrderMetadata-Extension.xml

```

<?xml version="1.0" encoding="utf-8"?>
<!--
  Order of the Interchange elements and the Element elements is important.
  This metadata will list all aggregate types that are part of the
interchange.
  This extension metadata will replace the core metadata and contain all
interchanges and elements for the implementation.
-->
<Interchanges>
  <Interchange name="Descriptors" order="1">
    <Element name="GradeLevelDescriptor"/>
    <Element name="AcademicSubjectDescriptor"/>
  </Interchange>
  <Interchange name="Standards" order="2">
    <Element name="LearningStandard"/>
    <Element name="LearningObjective"/>
  </Interchange>

  <Interchange name="EducationOrganization" order="3">
    <Element name="StateEducationAgency"/>

```



```
<Element name="EducationServiceCenter"/>
<Element name="LocalEducationAgency"/>
<Element name="School"/>
<Element name="EducationOrganizationNetwork"/>
<Element name="AccountabilityRating"/>
<Element name="Location"/>
<Element name="ClassPeriod"/>
<Element name="Course"/>
<Element name="Program"/>
<Element name="FeederSchoolAssociation"/>
<Element name="EducationOrganizationPeerAssociation"/>
<Element name="EducationOrganizationNetworkAssociation"/>
</Interchange>
<Interchange name="EducationOrgCalendar" order="4">
  <Element name="CalendarDate"/>
  <Element name="GradingPeriod"/>
  <Element name="AcademicWeek"/>
  <Element name="Session"/>
</Interchange>
<Interchange name="MasterSchedule" order="5">
  <Element name="CourseOffering"/>
</Interchange>
<Interchange name="StaffAssociation" order="6">
  <Element name="Staff"/>
</Interchange>
<Interchange name="Student" order="7">
  <Element name="Student"/>
</Interchange>

<Interchange name="Parent" order="8">
  <Element name="Parent"/>
</Interchange>

<Interchange name="AssessmentMetadata" order="9">
  <Element name="AssessmentFamily"/>
  <Element name="Assessment"/>
  <Element name="AssessmentItem"/>
  <Element name="ObjectiveAssessment"/>
</Interchange>
<Interchange name="StudentCohort" order="10">
  <Element name="Cohort"/>
  <Element name="StudentCohortAssociation"/>
  <Element name="StaffCohortAssociation"/>
</Interchange>
<Interchange name="StudentAssessment" order="11">
  <Element name="StudentAssessment"/>
</Interchange>
<Interchange name="StudentIntervention" order="12">
  <Element name="Intervention"/>
  <Element name="StudentInterventionAssociation"/>
  <Element name="EducationContent"/>
  <Element name="InterventionPrescription"/>
  <Element name="InterventionStudy"/>
</Interchange>
<Interchange name="StudentTranscript" order="13">
  <Element name="StudentAcademicRecord"/>
  <Element name="CourseTranscript"/>
</Interchange>
<Interchange name="StudentProgram" order="14">
  <Element name="StudentProgramAssociation"/>
  <Element name="RestraintEvent"/>
  <Element name="StudentSpecialEducationProgramAssociation"/>
</Interchange>
<Interchange name="StudentEnrollment" order="15">
  <Element name="GraduationPlan"/>
</Interchange>
<Interchange name="StudentDiscipline" order="16">
  <Element name="DisciplineIncident"/>
  <Element name="StudentDisciplineIncidentAssociation"/>
  <Element name="DisciplineAction"/>
</Interchange>
```

```

<Interchange name="PostSecondaryEvent" order="17">
  <Element name="PostSecondaryEvent" />
</Interchange>
<Interchange name="StudentAttendance" order="18">
</Interchange>
<Interchange name="StudentGrade" order="19">
  <Element name="Grade" />
  <Element name="ReportCard" />
  <Element name="CompetencyObjective" />
  <Element name="LearningObjective" />
  <Element name="StudentCompetencyObjective" />
</Interchange>
<Interchange name="StudentGradebook" order="20">
  <Element name="GradebookEntry" />
</Interchange>

<Interchange name="Finance" order="21">
  <Element name="Account" />
  <Element name="Budget" />
  <Element name="ContractedStaff" />
  <Element name="Budget" />
  <Element name="Actual" />
  <Element name="Payroll" />
</Interchange>
<Interchange name="HSGeneratedStudentTranscript" order="22">
  <Element name="Student" />
  <Element name="StudentSchoolAssociation" />
  <Element name="StudentAcademicRecord" />
  <Element name="CourseTranscript" />
  <Element name="ReportCard" />
  <Element name="Grade" />
  <Element name="StudentSectionAssociation" />
  <Element name="Section" />
  <Element name="CourseOffering" />
  <Element name="Course" />
  <Element name="StudentAssessment" />
  <Element name="School" />
  <Element name="PostSecondaryOrganization" />
</Interchange>
</Interchanges>

```

## Step 6. Configure Security

The Ed-Fi ODS / API is secure by default. One implication of this design principle is that new entities and elements may not be accessed until an authorization strategy is applied. This prevents accidental release of confidential information, but does require active steps on the part of system developers to enable access to Extensions.

PostSecondaryOrganization has no relationship to people or education organizations and therefore has no authorization strategy that can be applied to it. In effect, it is a standalone table and will need an authorization strategy of "NoFurtherAuthorizationRequired" for API requests to be made against it. If security is desired, another authorization strategy could be implemented to handle this entity.

To enable NoFurtherAuthorizationRequired, first create a security SQL script called **0001-PostSecondaryOrganization\_No\_Further\_Auth\_Required.sql** and place it in the C:\Ed-Fi-ODS-Implementation\Database\Data\EdFiSecurity folder (Create 'EdFiSecurity' folder if it does not exist). Copy the contents of the following SQL DML script into the newly created file and save.

## 0001-PostSecondaryOrganization\_No\_Further\_Auth\_Required.sql

```
DECLARE @AuthorizationStrategyId INT
DECLARE @ResourceClaimId INT

SELECT @AuthorizationStrategyId = AuthorizationStrategyId
FROM AuthorizationStrategies
WHERE AuthorizationStrategyName = 'NoFurtherAuthorizationRequired'

SELECT @ResourceClaimId = resourceclaimid
FROM ResourceClaims
WHERE ResourceName = 'postSecondaryOrganization'

INSERT INTO ResourceClaimAuthorizationMetadatas
SELECT ActionId,
       @AuthorizationStrategyId,
       @ResourceClaimId,
       NULL
FROM Actions a
WHERE NOT EXISTS (SELECT 1
                  FROM ResourceClaimAuthorizationMetadatas
                  WHERE Action_ActionId = a.ActionId
                  AND
                  AuthorizationStrategy_AuthorizationStrategyId = @AuthorizationStrategyId
                  AND ResourceClaim_ResourceClaimId =
                  @ResourceClaimId)
```

## Step 7. Run Code Generation and Verify Changes

Re-run the code generation steps outlined in the Getting Started Guide (i.e., from a PowerShell prompt run the `Initialize-PowershellForDevelopment.ps` script, followed by the `initdev` command). Then run the application and view the Ed-Fi ODS / API using Swagger. The following new API resource should be visible:

The screenshot shows the Swagger API documentation. The top section is for the `/studentAcademicRecords` endpoint, which is a GET operation that retrieves resources based on paging capabilities. Below this, there is a section for `postSecondaryOrganizations` with a list of operations:

- `GET /postSecondaryOrganizations`: Retrieves resources based on paging capabilities (using the "Get All" pattern).
- `GET /postSecondaryOrganizations`: Retrieves a specific resource using the values of the resource's natural key (using the "Get By Key" pattern).
- `POST /postSecondaryOrganizations`: Creates or updates resources based on the natural key values of the supplied resource.
- `GET /postSecondaryOrganizations/{id}`: Retrieves a specific resource using the resource's identifier (using the "Get By ID" pattern).
- `PUT /postSecondaryOrganizations/{id}`: Updates an existing resource based on the resource identifier.
- `DELETE /postSecondaryOrganizations/{id}`: Deletes an existing resource using the resource identifier.