

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

In this example, the 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 v2.0 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. Run Code Generation and Verify Changes](#)

## Downloads

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

[Student Transcript Source Files](#)

## 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 v2.0 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/0200" xmlns:ann="http://ed-fi.org/annotation" xmlns:altova="http://www.altova.com/xml-schema-extensions" targetNamespace="http://ed-fi.org/0200" elementFormDefault="qualified" attributeFormDefault="unqualified">
  <xs:include schemaLocation="..\..\..\Ed-Fi-ODS\Application\schemas\codegen\Ed-Fi-Core.xsd"/>
  <xs:annotation><xs:documentation>==== Ed-Fi 2.0 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-ClassRankingExtension"/>
    <xs:element name="SubmissionCertification" type="EXTENSION-SubmissionCertificationType"/>
  </xs:sequence>
</xs:schema>
```

```

                <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 an 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"?>
<!-- (c)2015 Ed-Fi Alliance, LLC. All Rights Reserved. -->
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns="http://ed-fi.org/0200" targetNamespace="http://ed-fi.org/0200" 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"/>
  </Interchange>

```



```
<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>
<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. 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 interface. At the top, there is a section for `/studentAcademicRecords` with a `GET` method. Below it, there are sections for `Implementation Notes`, `Response Class`, and `Model`. The `studentAcademicRecord` class is defined with properties: `id` (string), `educationOrganizationReference` (EducationOrganizationReference), and `postSecondaryOrganizationReference` (PostSecondaryOrganizationReference). Below this, there is a section for `postSecondaryOrganizations` with a `Show/Hide` link and `List Operations`, `Expand Operations`, and `Raw` options. A list of operations is shown for `/postSecondaryOrganizations`:

- `GET /postSecondaryOrganizations`: Retrieves resources based with 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.