Overview of Proposed Changes Under Data Standard 2.1a

Prepared for 2017 Ed-Fi Technical Congress

Last update: April 14, 2017

Purpose of this Material

- This material was prepared to help Ed-Fi technical community members - and especially members with Ed-Fi implementations - evaluate proposed changes under RFC 5 – Data Standard 2.1a to the Ed-Fi Data Standard and Unified Data Model (UDM).

- The document groups changes by impact, but we expect that actual impact will vary according to field implementation details. Ed-Fi implementations and other stakeholder are advised to review all changes under RFC 5 if possible.

Minor			Medium			Major						
Documentation/Annotations	Types/Descriptors	Additions	Assessment	Education Content	Staff	School Year Context	Course and Transcript	Section	Session/Term	Calendar & BellSchedule	Dates in Primary Keys	Education Organization Identifier
DATASTD-1000	DATASTD-642	DATASTD-329	DATASTD-158	DATASTD-820	DATASTD-840	DATASTD-678	DATASTD-149	DATASTD-891	DATASTD-996	DATASTD-914	DATASTD-908	DATASTD-972
DATASTD-741	DATASTD-709	DATASTD-631	DATASTD-864	DATASTD-881	DATASTD-876	DATASTD-967	DATASTD-797	DATASTD-989	DATASTD-1015	DATASTD-948	DATASTD-916	
DATASTD-743	DATASTD-802	DATASTD-957	DATASTD-926		DATASTD-877			DATASTD-993		DATASTD-974	DATASTD-917	
DATASTD-768	DATASTD-803	DATASTD-995	DATASTD-1018		DATASTD-924					DATASTD-1017	DATASTD-978	
DATASTD-805	DATASTD-804	DATASTD-739			DATASTD-940							
DATASTD-806	DATASTD-837	DATASTD-981			DATASTD-946							
DATASTD-883	DATASTD-846	DATASTD-983										
	DATASTD-867	DATASTD-1012										
	DATASTD-884											
	DATASTD-885											
	DATASTD-912											
	DATASTD-928											
	DATASTD-929											
	DATASTD-939											
	DATASTD-971											
	DATASTD-984											
	DATASTD-1013											

Groupings of data model changes – see Ed-Fi Tracker for details on tickets listed.

Categories

- Minor Changes
    - Documentations and Annotations
    - Types and Descriptors
    - Additions
- Medium Changes
    - Assessment
    - Education Content
    - Staff
- Major Changes
    - School Year Context
    - Courses
    - Section
    - Session
    - Calendar
    - Dates on Natural Keys
    - Education Organization Identifier

Minor		
Documentation /Annotations	Types /Descriptors	Additions
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DATASTD-741	DATASTD-709	DATASTD-631
DATASTD-743	DATASTD-802	DATASTD-957
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	DATASTD-912	
	DATASTD-928	
	DATASTD-929	
	DATASTD-939	
	DATASTD-971	
	DATASTD-984	
	DATASTD-1013	

Minor Changes

Current Ed-Fi adopters have encountered numerous smaller inconsistencies in the Ed-Fi Unified Data Model. These inconsistencies have been reported to the Alliance and resulted in Data Standard tickets in Ed-Fi Tracker.

This category of proposed modifications are generally minor changes which will not break nor impact current implementations. Many provide clarification on the data model, or make other minor tweaks.

Documentation and Annotations

Issue	Description
DATASTD-1000	Remove version lineage from Ed-Fi-Core.xsd
DATASTD-741	BellSchedule.MeetingTime annotation may need clarification
DATASTD-743	DisciplineAction.AssignmentSchoolReference annotation may need clarification
DATASTD-768	Spelling Error: In DisciplineIncident Annotation
DATASTD-805	Annotation - Extended Reference Types - Propose using consistent pattern for annotation of Identity / Lookup child elements
DATASTD-806	Annotation - Identity Child Elements and Lookup Child Elements - Propose using consistent pattern for annotation
DATASTD-883	Add default namespaces to relevant Grand Bend Sample data

Types and Descriptors

Issue	Description
DATASTD-642	Follow up on model issues with Citizenship type
DATASTD-709	Extending AssessmentReportingMethodType
DATASTD-802	ProgramSponsorType enumeration--add "State and Federal"
DATASTD-803	ProgramCharacteristicMapType enumeration--add enumeration values
DATASTD-804	Annotation - Descriptor Map Types - propose using a consistent pattern
DATASTD-837	Level of education Type Missing enumeration for 'No degree'
DATASTD-846	2.0 beta ODS disability descriptors have little connection to Ed-Fi 2.0 schema
DATASTD-867	Namespace Mismatch for SectionCharacteristicDescriptor
DATASTD-884	Missing Referenced PerformanceLevel Descriptor

Types and Descriptors

Issue	Description
DATASTD-885	Mismatched Namespace in DisciplineIncident Sample Data
DATASTD-912	Add Staff Classification Core Type of System Administrator
DATASTD-928	Expand LanguageMapTypes
DATASTD-929	Change default RaceType for "American Indian - Alaskan Native"
DATASTD-939	Typo on LanguageDescriptor causing vendor an error when posting thru API
DATASTD-971	Change StudentBirthCountryDescriptor to use a Type instead
DATASTD-984	Recommend adding additional types to RelationType
DATASTD-1013	Staff Credential Level Descriptor Type

Additions

Issue	Description
DATASTD-329	Program Organization Feature
DATASTD-631	Data sensitivity tagging for telephone numbers (and possibly other directory info)
DATASTD-957	Consider tracking Primary Night Time Residence in Data Standard
DATASTD-995	Add Language to Parent entity
DATASTD-739	For Review: Student.ProfileThumbnail could be expanded
DATASTD-981	DisciplineAction.DisciplineActionLength (and ActualDisciplineActionLength) is int...make it decimal
DATASTD-983	Remove implied default status from definition on StudentSchoolAssociation.PrimarySchool
DATASTD-1012	ClassPeriodName Element

Medium		
Assessment	**Education Content**	**Staff**
DATASTD-158	DATASTD-820	DATASTD-840
DATASTD-864	DATASTD-881	DATASTD-876
DATASTD-926		DATASTD-877
DATASTD-1018		DATASTD-924
		DATASTD-940
		DATASTD-946

Medium Changes

Medium changes may require changes to implementations, but these changes are believed to have limited ecosystem impact due to low use of the entities and associations modified, or because these changes are mostly additive. Additive changes are, however, non-trivial and should be benchmarked against important community use cases.

There are three "medium" areas:

- Modifications submitted by field implementations around Assessments are being included to help support assessment reporting.
- The Staff domain has been expanded to capture more information.
- Education content has been enhanced to better support learning resources and resolve implementation issues from field work.

Assessments

- One significant change is proposed, but the model is otherwise only tweaked. However several core issues continue to emerge. This domain is one that is likely to evolve in future iterations.
  - The means to capture the concept of related assessments ("families") is changed under 2.1a, with AssessmentFamily proposed for removal from the UDM and a more lightweight system for modeling "test families" proposed
  - Likewise the best natural key of Assessment remains a community question. Data Standard 2.1a takes minimal action (DATASTD-916), but backlog tickets are relevant, including DATASTD-979.
  - The issue of marketplace diversity can be seen in issues like DATASTD-709

Assessment

Issue	Description
DATASTD-158	Expand the data capture on AssessmentItem
DATASTD-864	Unify Concept of assessment version and content standard version in Data Model
DATASTD-926	Remove AssessmentFamily from the model and APIs
DATASTD-1018	Cardinality of StudentLearningObjective.StudentSection does not permit use cases where LearningObjective preformance is derived from multiple sections

Staff Domain

- Staff domain changes are mostly additive. However they are significantly additive.

  – An important new association (StaffEdOrgContactAssociation) is proposed for capturing directory-style contact information. This entity begins to draw a distinction in the UDM between capture of private and more personal vs public organizational information

  – Absence and Leave events for staff are separated into separate entities under Data Standard 2.1a

  – Credentialing entities are further expanded

Staff

Issue	Description
DATASTD-840	Staff Unable to capture UNKNOWN HispanicLatinoEthnicity
DATASTD-876	Generalized annotation for Recognitions and Achivement
DATASTD-877	Credential ProfessionalCertificateOrLicenseNumber element needed.
DATASTD-924	Modify LeaveEvent to accomodate periods of time, instead of single dates
DATASTD-940	Use Case to support promoting Staff.Credential to Domain Entity StaffCredential
DATASTD-946	Add the ability to store a Staff email address for each associated Education Organization

Education Content

Issue	Description
DATASTD-820	EducationContent choice uses inline sequence of elements
DATASTD-881	XSD Identities for EducationContent's Author and DerivativeSourceEducationContentSource too big for SQL Server

Major						
School Year Context	Course and Transcript	Section	Session /Term	Calendar & BellSchedule	Dates in Primary Keys	Education Organization Identifier
DATASTD-678	DATASTD-149	DATASTD-891	DATASTD-996	DATASTD-914	DATASTD-908	DATASTD-972
DATASTD-967	DATASTD-797	DATASTD-989	DATASTD-1015	DATASTD-948	DATASTD-916	
		DATASTD-993		DATASTD-974	DATASTD-917	
				DATASTD-1017	DATASTD-978	

Major Changes

Major changes are those expected to require code or other significant changes to most – if not all – implementations. These are generally "pervasive breaking" changes.

Seven of these changes have been identified. Some of these changes represent groups of related modifications to a domain model, and some of the changes surface in multiple Tracker tickets.

School Year Context

- With the increased adoption of the Ed-Fi Data Standard and the need to support more diverse use cases in the education domain, there has been increased demand to represent and store multiple years of data in a single repository.

- The current Ed-Fi model explicitly requires school year context for some entities and associations between entities. However this design is not implemented consistently across the model. This gap in the current model has forced adopters to extend those needed to satisfy specific requirements.

- Such a "year-context" model also tends to force dates into entity composite keys, which is concerning as many dates are not reliable identifying properties.

- While only two Data Standard tracker tickets capture this need, multiple other community discussions, artifacts (e.g. RFPs) and implementations (e.g. field extensions to support "AsOfDate" type logic) suggest a larger context for multi-year data.

School Year Context – Sample Use Case

- The Brennan Local Education Agency desires to utilize the Ed-Fi Framework to source prior school year data and current school year data in a single repository. They wish to track school year specific official responsibility by students to support the following:
  - Explicitly associate the student's entity level information by school year
  - Track the student's assessment administration specific to the school year in context

  Utilizing the current Ed-Fi Data Standard 2.0 UML model propose the necessary changes to support the Brennan Local Education Agency use case.

School Year Context – Use Case – Artifacts
Model
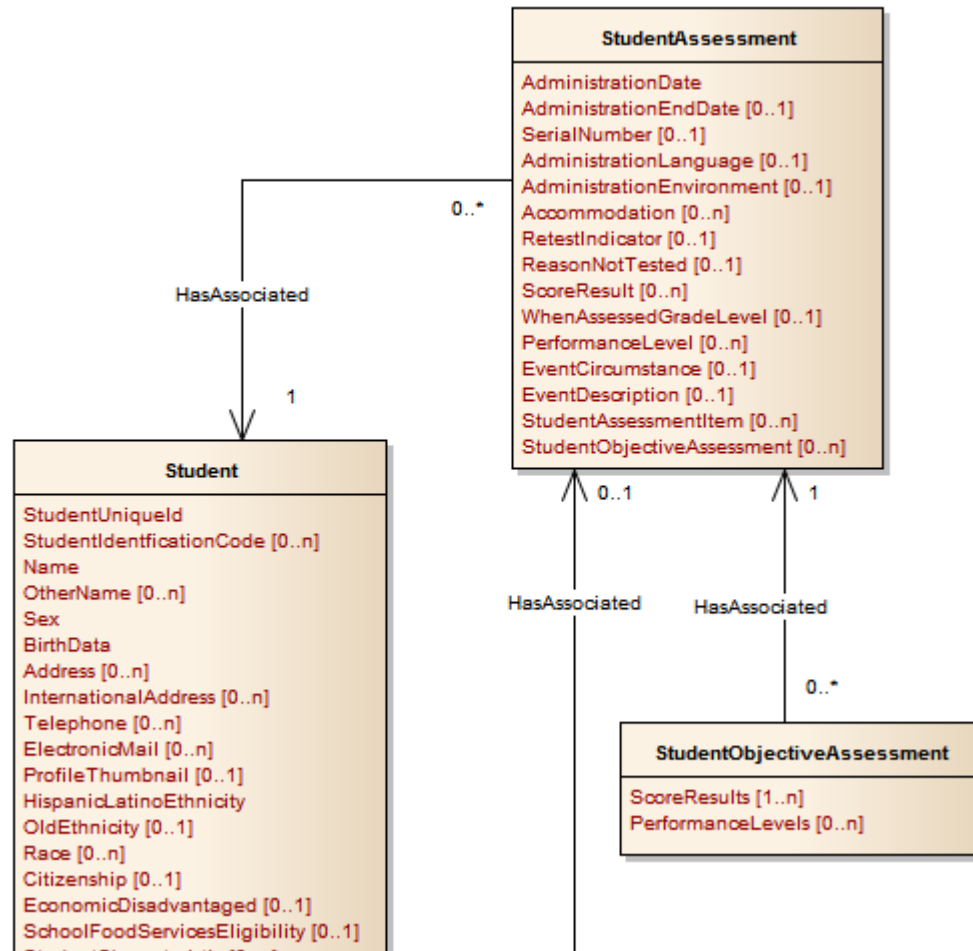
School Year Context – Use Case – Artifacts
Model
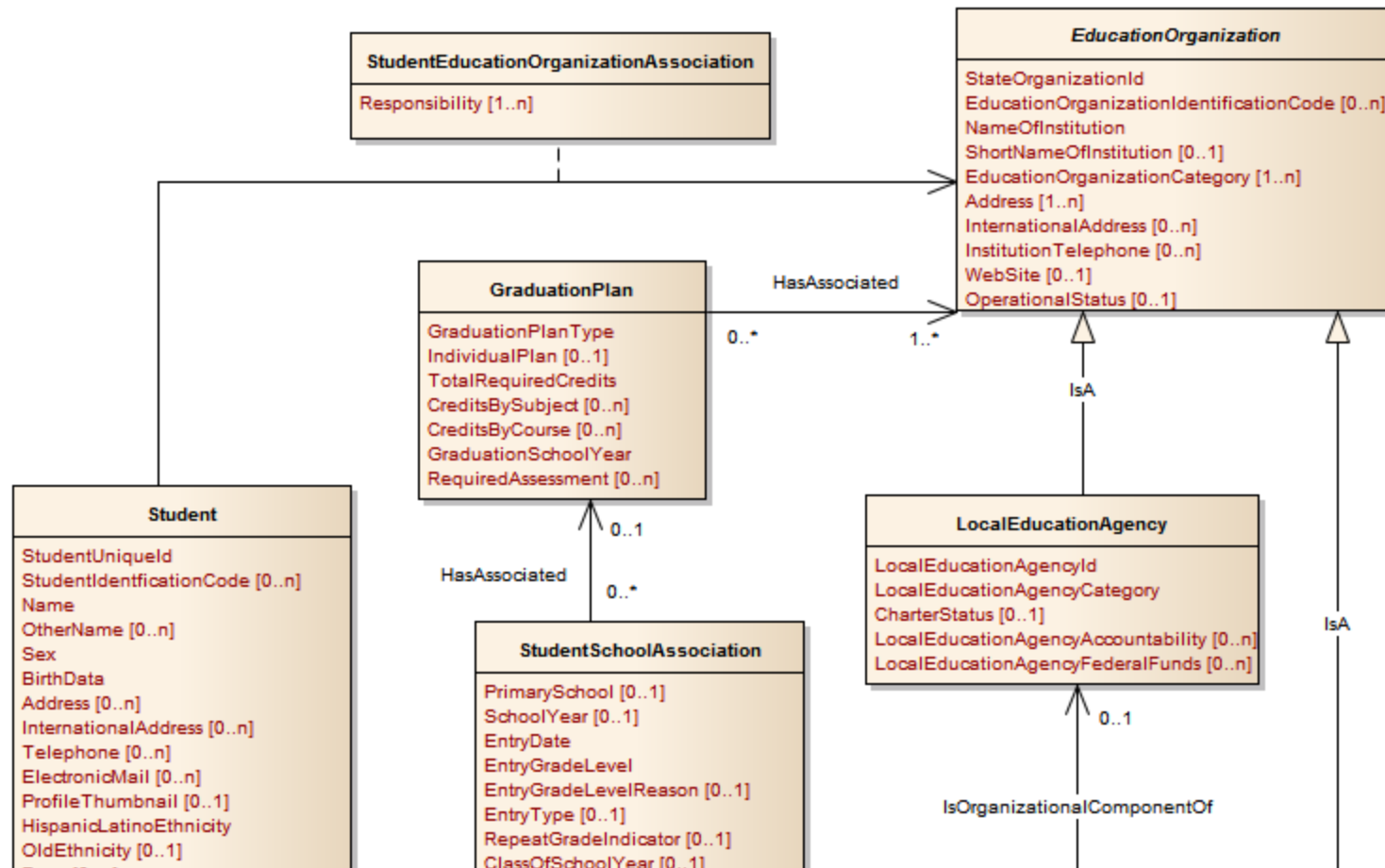
School Year Context

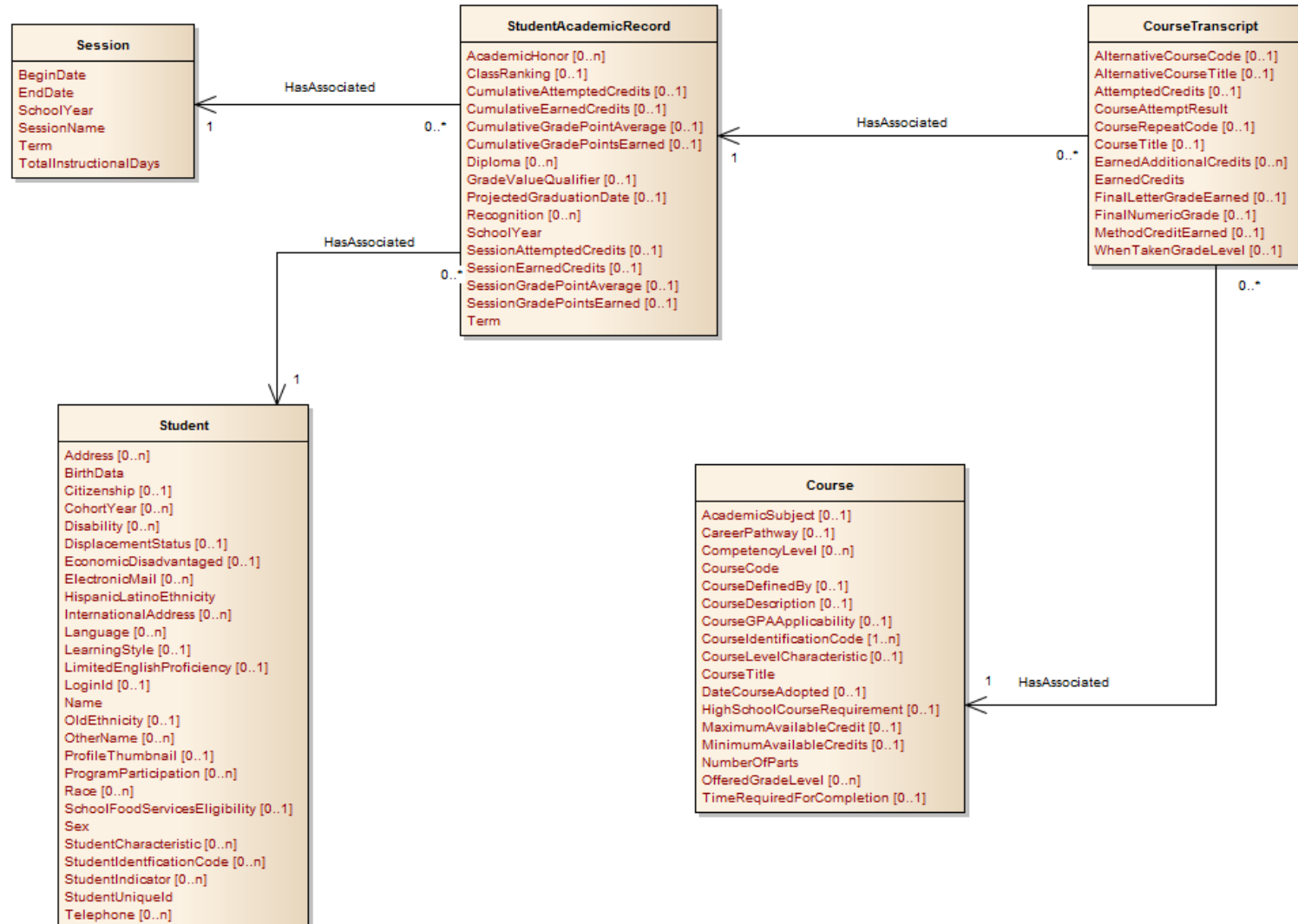| Issue	Description
DATASTD-678	Assessment School Year
DATASTD-967	Add date support to StudentEducationOrganizationAssociation

Course and Transcript

- The Student Academic Record domain represents various kinds of student performance reporting related to grades and credits. A student transcript consists of a StudentAcademicRecord associated with each Session which has a CourseTranscript for each course taken.

- The main issue reported for Data Standard 2.0 revolves around maintaining a transcript model that has a high degree of referential integrity and yet can handle use cases where only partial external or historical transcript information is known (e.g. the transcript of a transfer student). A highly referential model poses challenges in such cases, as implementers do not have sufficient information to create and populate required associations (e.g. the Course referenced from CourseTranscript)

- There are various solutions, including relaxing the required referential integrity to create more of a "data warehouse" type model, or of allowing for both a strong and weak referential model to coexist (the approach proposed in Data Standard 2.1a).

Course and Transcript – Sample Use Case

The Brennan Local Education Agency is located in the border of Texas and Oklahoma. This agency reports their mobility rate between states and the border agencies within and out of state is very high. Students obtain credits towards graduation from all these deferent education organizations.

Utilizing the current Ed-Fi Data Standard 2.0 UML model propose the necessary changes to support the Brennan Local Education Agency use case.

Course and Transcript – Use Case – Artifacts
Model

Course and Transcript

Issue	Description
DATASTD-149	Course designation indicating whether a student can take it multiple times for credit
DATASTD-797	Course references in CourseTranscript

Section

The Teaching and Learning domain represents the student's class enrollments in Section and Teacher(s) assigned to that Section. The model is based upon three levels of definition, as follows:

- A **Course** represents the definition of the course, its characteristics and its mapping to LearningStandards or LearningObjectives. Course may be defined a State, LEA or School level.
- The **CourseOffering** is a Course that is offered by a School during a session.
- A school will have one or more **Sections** for each CourseOffering. Students are enrolled in specific Sections.

According to some vendor adopters and field implementations a few fundamental issues have been raised:

- The key to Section is volatile because it contains references to Location and ClassPeriod. Data Standard 2.1a proposes dropping these fields and adopting a "partial key surrogate" pattern, essentially relying on a Student Information System identifier for Section, and scoped other local context.
- The Section.ClassPeriod reference also seems to be overly limiting.

Section – Use Case

- Christina High School located in the Brennan Local Education Agency currently offers course sections that span multiple class periods.

- During the school year, some sections in a the high school are relocated in response changing needs (e.g. a CTE course is relocated to a facility with more advanced equipment). Further, students can participate in virtual courses via a state program, and these course have no stable physical location.
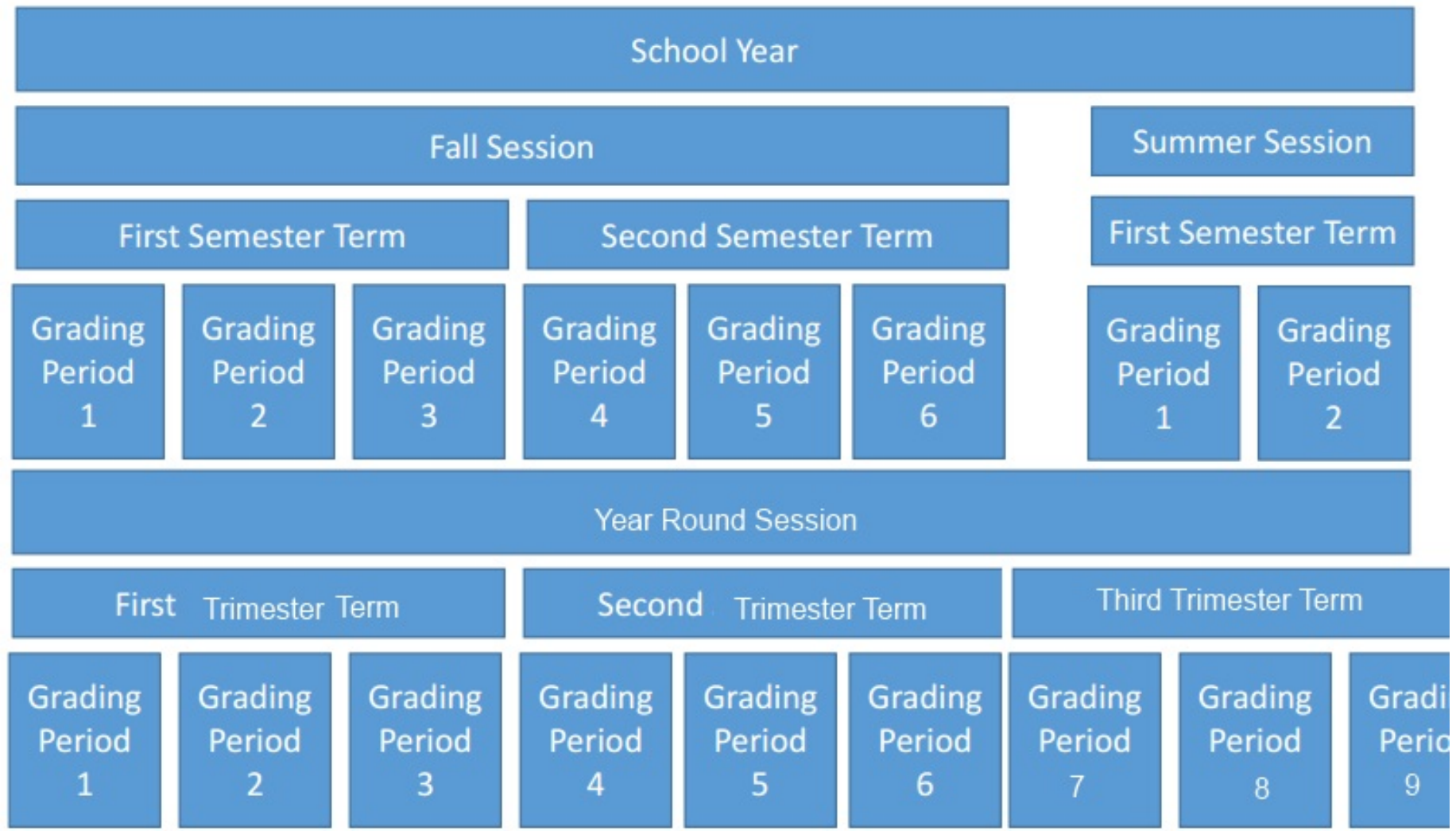
Section – Use Case – Artifacts
Model
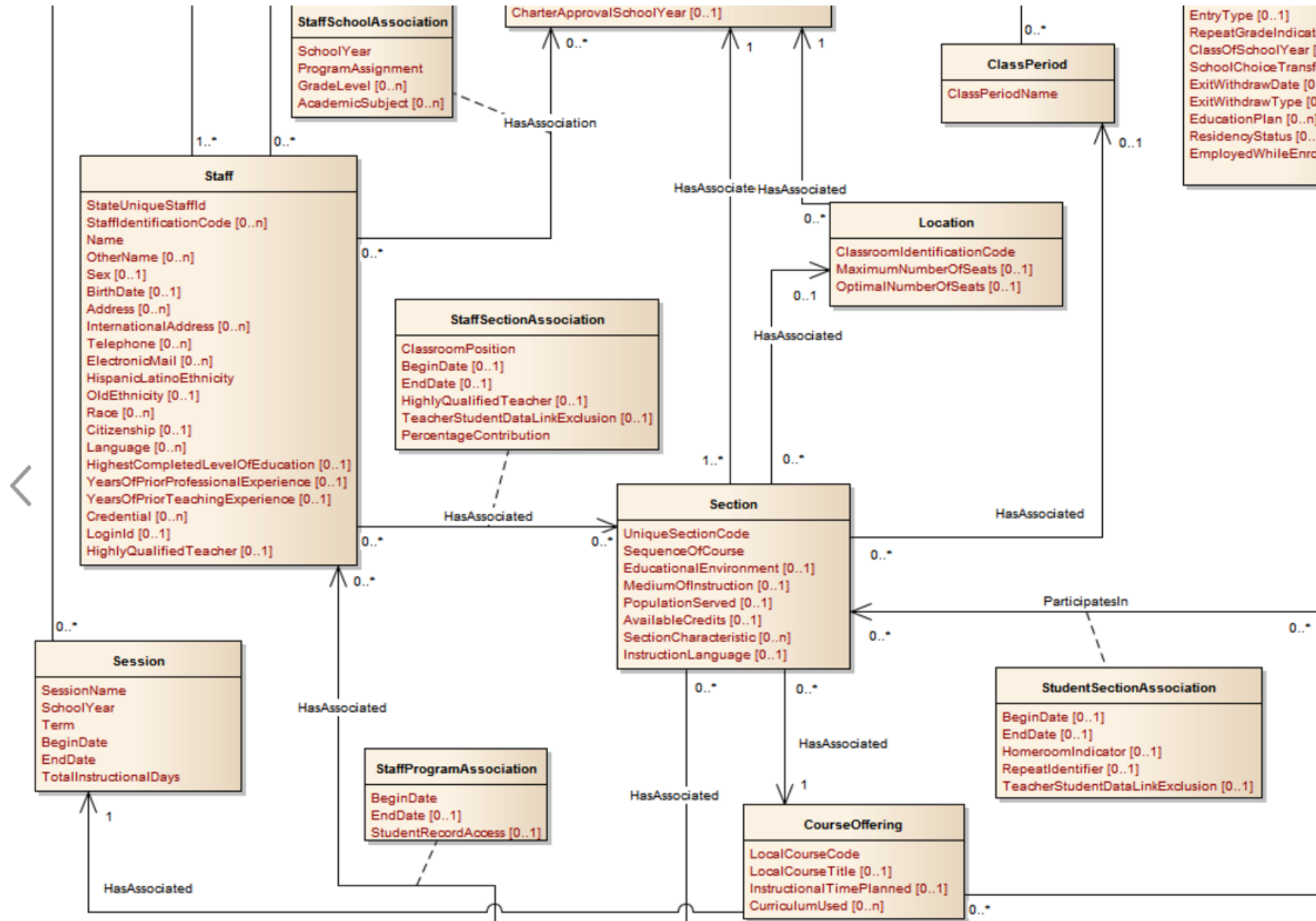
Section

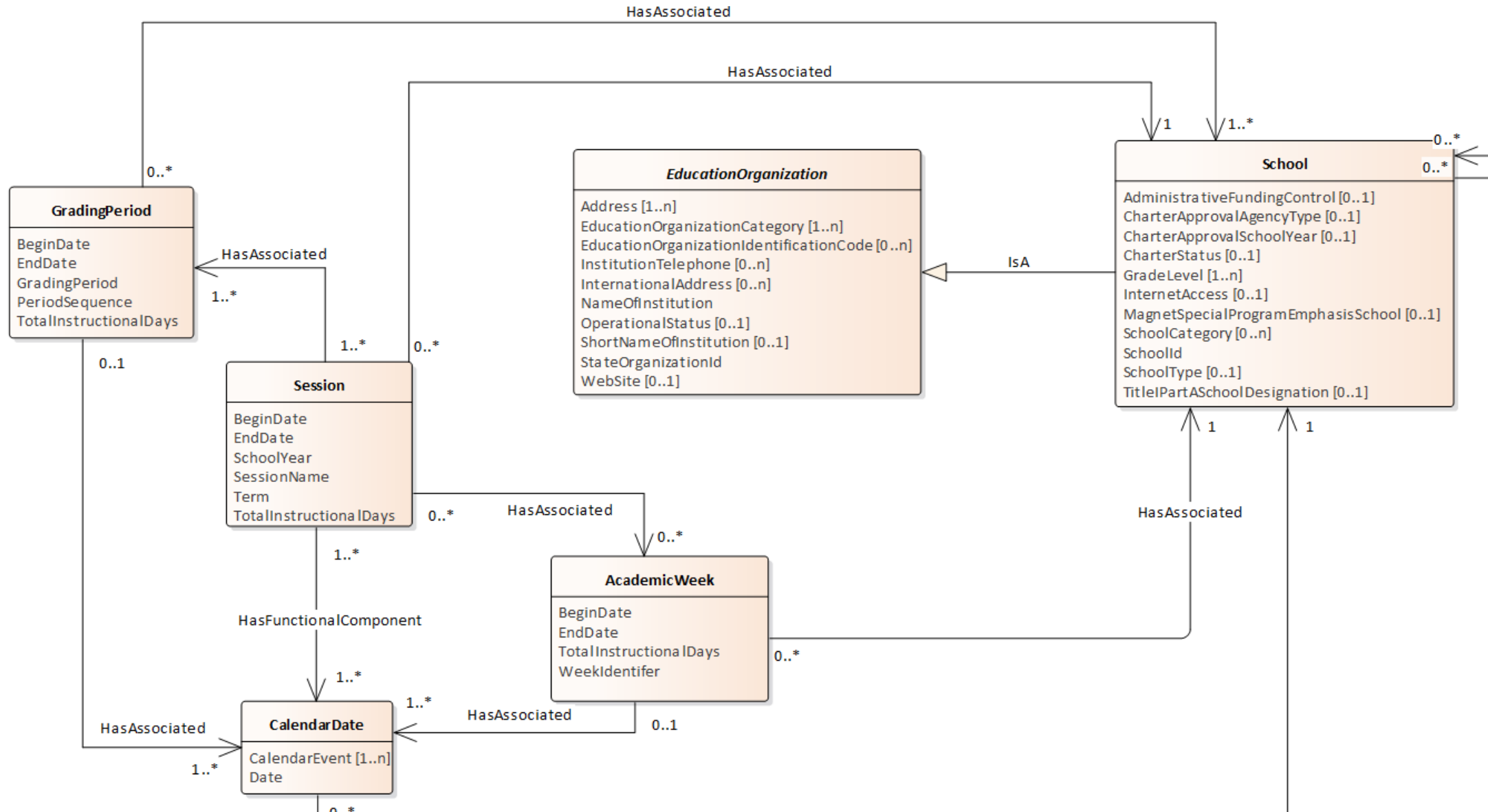| Issue	Description
DATASTD-891	Change Section entity natural key to make non-volatile
DATASTD-989	Relationship from Section to School Seems To Be Redundant
DATASTD-993	Allow Sections to have multiple ClassPeriodReferences

Session / Term

- A survey of district and school sites across many states found that the concepts of "session" and "term" are inherently confusing:
  - Some use term and session interchangeably
  - Some use terms being within sessions
  - Some only use one or the other (Summer Session vs Summer Term)
- The Ed-Fi UDM's use of these terms is also somewhat ambiguous, but suggests that Session and Term are distinct entities (for example, StudentAcademicRecord is associated with a Term, yet CourseOffering is associated with a Session).
- The need is to clarify the entities, definitions and usage.

Session / Term – Example of Divergent Field Definitions

Session / Term – Use Case – Artifacts
Mode

Session / Term

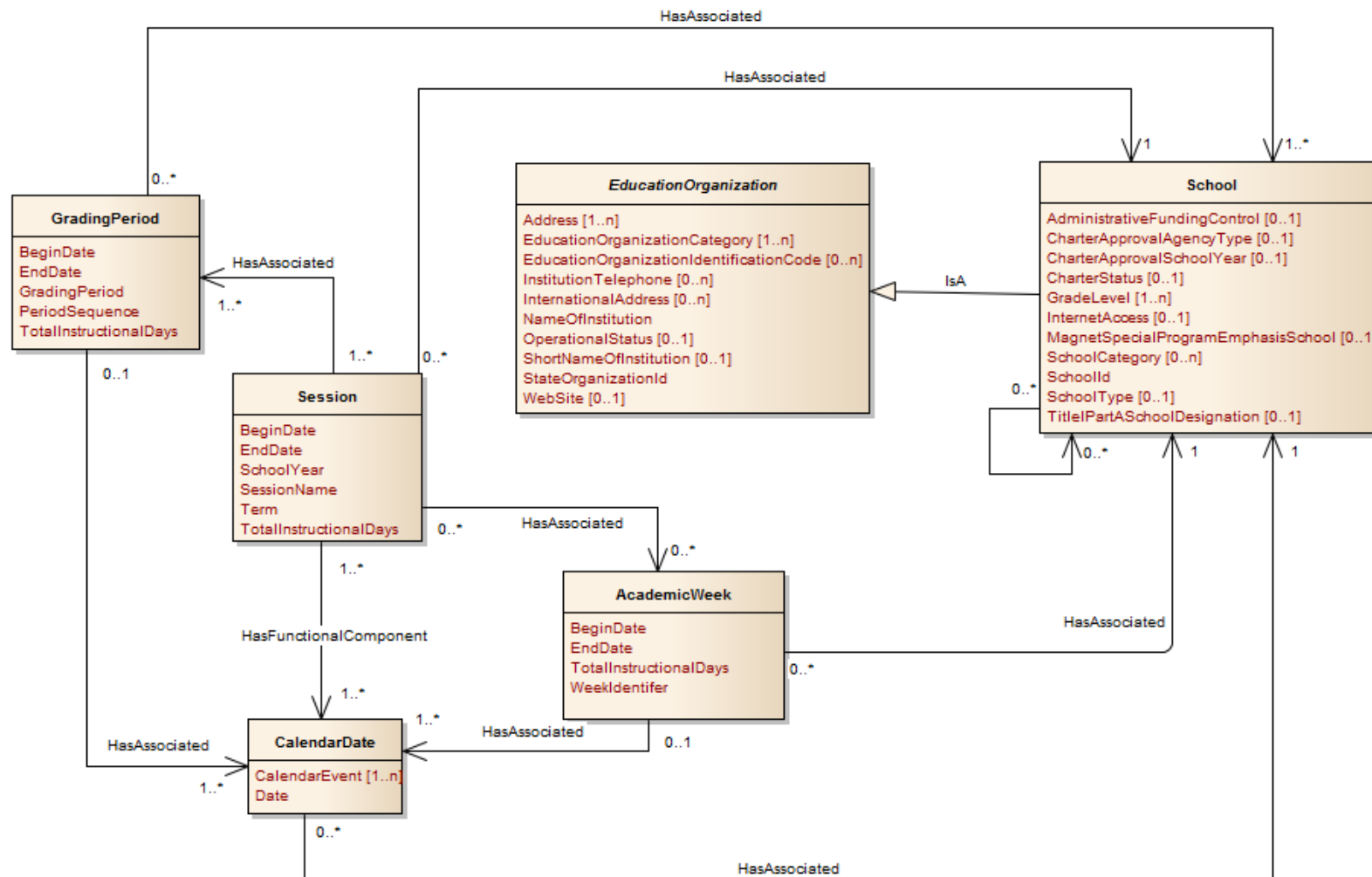| Issue	Description
DATASTD-996	Address inconsistency in Session.Term
DATASTD-1015	Student Academic Record Needs to Correctly Identity Session Reference

Calendar & Bell Schedule

- The School Calendar domain represents the instructional days, sessions, and grading periods defined for a school year.

- Current Ed-Fi field implementations have reported deficiencies in the current model, including the ability to represent grade level, individual (e.g. IEP), or program-based calendars.

- The proposed modifications (under Data Standard 2.1a) raise the question of if some designs are overly repetitive (e.g. calendar dates for an IEP repeat data on the core LEA calendar).

- In addition, a serious bug was found in the design of BellSchedule under Data Standard 2.0.

Calendar & Bell Schedule – Use Case

- Christina High School located in the Brennan Local Education Agency allows current Senior high school students to get out of school and graduate before the rest of the students enrolled in the school. Some of these students have individualized accelerated programs in which each student's instructional days can be different from the rest of the population.

- Utilizing the current Ed-Fi Data Standard 2.0 UML model propose the necessary changes to support Christina's High School Calendar use case.

Calendar – Use Case – Artifacts
School Calendar Model

Calendar & Bell Schedule

Issue	Description
DATASTD-914	Ed-Fi Data Standard 2.0 doesn't support Nebraska's field implementation
DATASTD-948	BellSchedule should have an array of CalendarDates
DATASTD-974	Removal of AcademicWeek
DATASTD-1017	Half Day Attendance

Grading Period / Dates in Primary Keys

- Several current entities include a date as part of the key. Many dates are by their very nature volatile and subject to mis-entry into systems, though arguably some dates are strongly governed.

- Following conversations with vendors with extensive experience developing Ed-Fi ODS API clients, the Alliance proposed removing BeginDate as part of the key to GradingPeriod, for fear that volatility would be a field challenge (such a change could cascade to many, many entities).

- However, in other places in the model, Data Standard 2.1a proposes to retain dates as a key field (and as an identifying property – e.g. StudentSchoolAssociation).

Grading Period / Dates in Primary Keys

Issue	Description
DATASTD-908	OpenStaffPosition primary key contains more columns than necessary to achieve unique identification - data standard analysis
DATASTD-916	Change Assessment entity natural key to make it non-volatile
DATASTD-917	Change GradingPeriod key to make non-volatile
DATASTD-978	Drop EventDate from RestraintEvent key

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Education Organization Identifier

- The Ed-Fi UDM 2.0 is anchored in SEA/state-provided identifiers, which may be overly limiting for LEA use cases where other Education Organization identifiers are more readily available (e.g. National Center for Education Statistics IDs).

- Further, these is concern around restricting IDs to numbers. Field work suggests that the EducationOrganization concept is broad and that the concrete classes of EducationOrganization will grow in diversity (e.g. community providers, juvenile centers, early learning centers, etc.)

- The current model also confusingly repeats identifiers, via having both a StateOrganizationID and a primary key ID (which are identical – it is suspected that surrogate key implementation work entered into the 2.0 UDM itself).
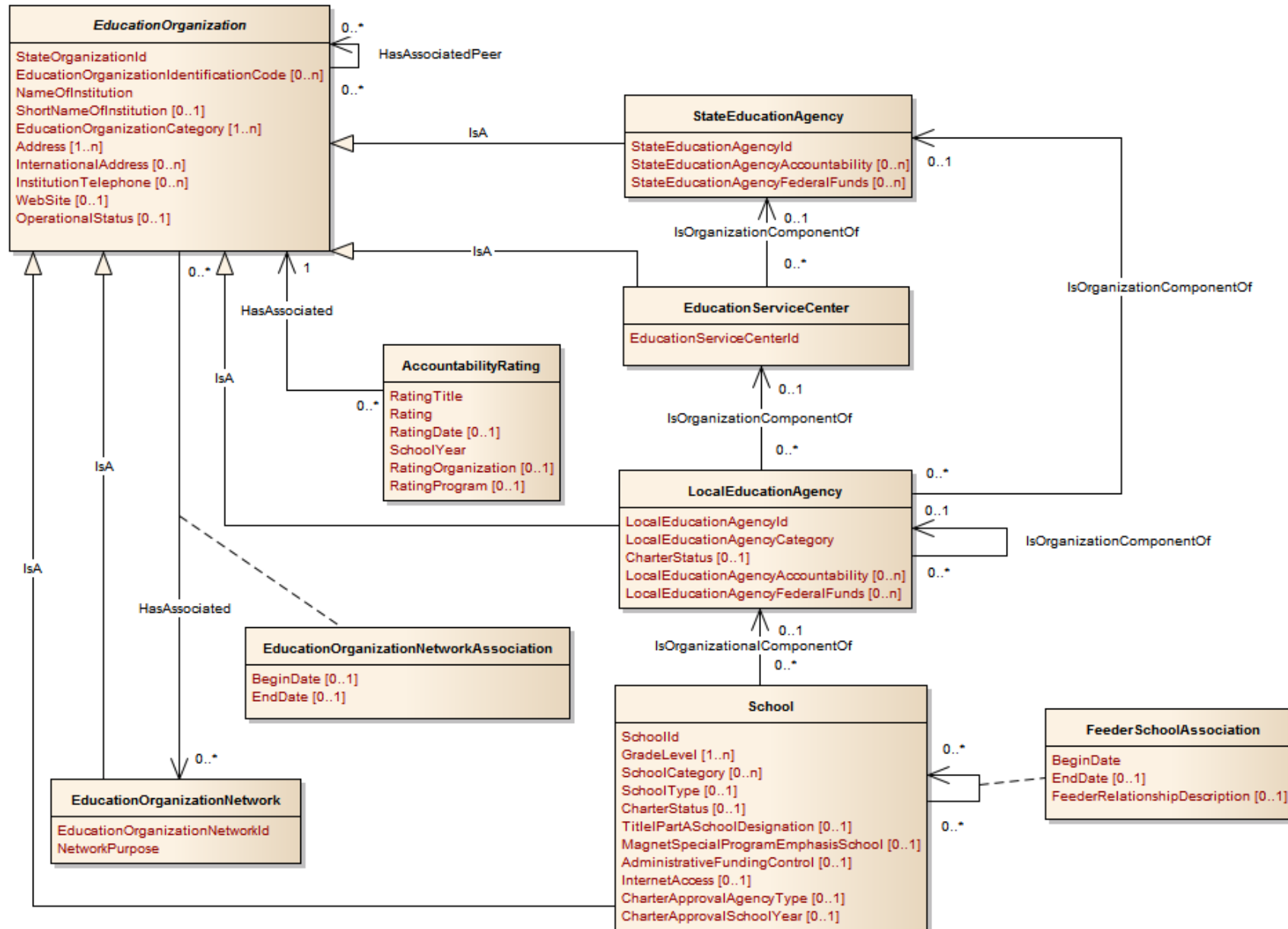
Education Organization Identifier – Use Case

Brennan Local Education Agency has a high rate of mobility in their student population. Since located between state borders students frequently bring out-of-state student transcripts. These requires the ingestion of external education organization identifiers. The current ambiguity and data type of the education organization identifiers creates implementation complexities for the Brennan Local Education Agency.

Utilizing the current Ed-Fi Data Standard 2.0 UML model propose the necessary changes to support the Brennan Local Education Agency use case.

Education Organization Identifier

Model

Education Organization Identifier

Issue	Description
DATASTD-972	Redesign EducationOrganizationID system to resolve and remove ambiguity and allow the ID system to support non-state/SEA use cases more easily.

Enumeration Changes and Future

- Most Descriptor/Type changes proposed under Data Standard 2.1a are minor
- However, there is evidence that community understanding of and practice around Descriptors and Types are not consistent. There are also questions about the ODS implementation
  - Should default UDM Descriptors be used? If so, in whose namespace?
  - What Type attribute matters – CodeValue or ShortDescription? Why do Types have attributes?
  - Is proliferation of local enumerations sustainable?
- This is an area where normative usage guidelines and a few implementation tweaks are needed

Data Modeling Breakouts
At Ed-Fi Technical Congress

- School Year Context / Multi-Year Data
  - Chris Moffatt, Ed-Fi Alliance
- Course and Transcript (incl. Session/Term)
  - Silvia Brunet-Jones, Placid
- Entity Keys: Grading Period and Section
  - Shannon Kerlick, Ed-Fi Alliance
- Calendar & Bell Schedule (incl. Session/Term)
  - Ed Comer, Certica Solutions

- Education Organization ID
  - Cy Jones, Ed-Fi Alliance
- Staff Domain
  - Bryan Potter, MSDF
- Assessment Domain
  - Jami O'Toole, MSDF
- Enumeration Changes and Future
  - Sayee Srinivasan, Ed-Fi Alliance

Resources Available on Event TechDocs Site

- This overview deck
- Visio and HTML versions of the Ed-Fi UDM 2.1a (with annotated changes)
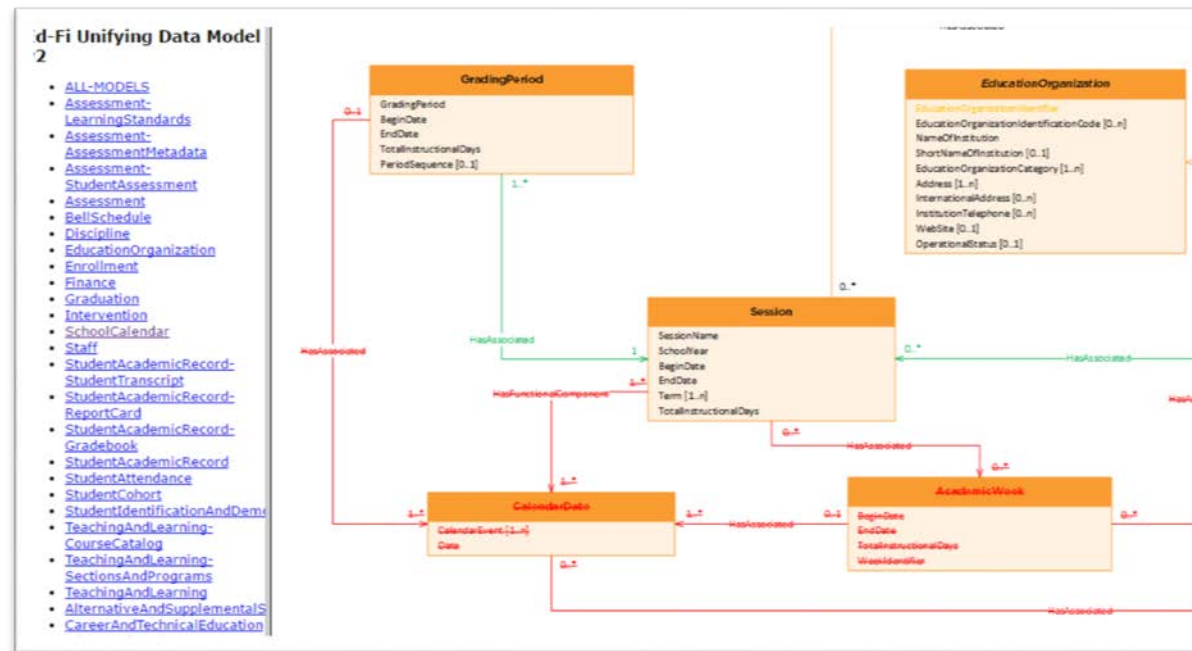
Related Issues

- Support for upgrades
  - Documentation
  - Tools
- Cycle for future changes
  - Annual
  - Major vs minor
- Documentation
  - Formats and availability: Visio UML and consolidated Handbook planned – other?