The Case for Unity

How Community Responsiveness is Shaping the Future: Part 2
Introductions

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Where we Start

• SIF 2
  • Active successful implementations in all 50 states
  • Over 6000 School Districts
  • Over 20,000,000 Students
  • 139 use case developed object
  • 20 years of
    • Building
    • Refining
    • Mapping
    • Community Experience
    • Vendor Products
    • Ecosystems Begging for Modernization
Unity = One

- One common global architecture
  - SIF Infrastructure Specification
  - Many supported typologies
  - A standard-of-standards
Architecture

The Global SIF Infrastructure wraps data in an API for movement across a network.

The SIF Implementation Specification defines architecture requirements and communication protocols for software components and the interfaces between them; it makes no assumption of specific hardware or software products needed to develop SIF-enabled applications and middleware implementations, other than their ability to support technologies leveraged as the foundation for SIF.

Every SIF Specification release consists of two major components:

- The **Data Model** which includes the set of JSON & XML schemas that define the payload formats of educational “objects” as they are exchanged between SIF-compliant applications.

- The **Infrastructure** which defines the transport and messaging functionality of the secure and robust “wire” over which those payloads are securely exchanged.
Simple to Complex
PESC Compliant JSON

- Clean, consistent, and friendly JSON
- JSON Examples
  - In the Specification
  - Alongside the API
- JSON Schema
  - With the OpenAPI files
- JSON Conversion
  - Scripts
  - File to power native implementations
Unity = One

• One common global architecture
  • SIF Infrastructure Specification
  • Many supported typologies
  • A standard-of-standards

• One Style of Documentation
  • Classic Data Models
  • Modern APIs
Common Uses for Unity...

- **Library**: Access and Fines
- **Lunch System**: Access and Account Status
- **Transportation**: The perfect address for every situation
- **Reporting**: Federal and often by State
- **Attendance**: By period or as a summary
- **Assessments**: Administration, recording and between app movement
• Reduce development time
  ➢ More familiar and useful for people used to developing REST APIs
  ➢ Combines multiple aspects of Unity
  ➢ Build solutions based on one resource

• Ready for your technical team's analysis!
Unity = One

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• One Style of Documentation
  • Classic Data Models
  • Modern APIs

• One Data Model per Locale
  • Maximizing backwards compatibility
  • Combining new Use Cases
Comprehensive Data Model

• Started in 1997
• Continually building
• Found in all 50 states
• Tracking gaps in Unity
  • Most also in CEDS
• Extended Elements
  • Try things
  • Support localization
  • Contribute back
Remote Learning Support

- Solid administration of
  - In-person Learning
  - Remote Learning
  - Hybrid Learning

- Through adding
  - Remote Learning Profile
  - Instructional Delivery Mode
  - Expectations Met

- Nine objects modified to maximize flexibility
Unity
Bringing it all together!
Resources

- **OpenAPI Code Generation**: [https://swagger.io/tools/swagger-codegen/](https://swagger.io/tools/swagger-codegen/)
- **PESC Compliant JSON**: [https://www.pesc.org/pesc-approved-standards-1.html](https://www.pesc.org/pesc-approved-standards-1.html)
- **Student Data Privacy Consortium (SDPC)**: [https://privacy.a4l.org/](https://privacy.a4l.org/)
- **Unity Adoption Guidebook**: [https://www.a4l.org/resource/collection/7C6E2370-9264-4E10-B6C9-9DAD9B6D8608/Unity_Adoption_Guidebook.pdf](https://www.a4l.org/resource/collection/7C6E2370-9264-4E10-B6C9-9DAD9B6D8608/Unity_Adoption_Guidebook.pdf)
CEDS
Common Education Data Standards
What is CEDS?

CEDS is an education data management initiative whose purpose is to streamline the understanding of data within and across P–20W institutions and sectors.

The CEDS initiative includes:

- a common **vocabulary**
- **data models** that reflect that vocabulary
- **tools** to help education stakeholders understand and use education data
- an assembly of **metadata** from other education data initiatives,
- a **community** of education stakeholders who discuss the uses of CEDS and the development of the standard
Aligned to the 9s

- Unity brought with it many CEDS alignments.
- Unity has an EDFacts alignment via CEDS.
- Unity updated the xPress Roster CEDS alignments.
- The A4L Community is working to try and provide many of the new elements from the POD to a new CEDS Privacy Domain.
- The A4L Community is committed to considering each CEDS release for new alignments and elements that should be included in the Unity Data Model.
Why Align CEDS & SIF?

• Data insights continue to pass us by
• The technology we need for better-informed decision making is already here
• If we’re going to be ready, we need a foundation for how data will:
  
  Travel  
  Be Accessed  
  Be Protected
• States already have **highly effective** interoperability frameworks in place with SIF
• Unity provides an Infrastructure Standard that is **future-ready**
• Separate Infrastructure and Data Models enable **agility**
• CEDS provides an open and flexible framework to make data available for insights

• CEDS embraces modern data architectures for moving past siloed data

• Alignment between Unity and CEDS allows data to serve both operational and informational functions
• Unity provides **durable** privacy and security obligations that travel with the data

• Unity’s flexible design means the obligations are maintained, *regardless of the data model* employed

• Alignment with CEDS ensures smooth transit from operational to informational – a **robust privacy model** ensures the simplicity of transit does not lead to an abandonment of security
Unity to CEDS Alignment

Review of ongoing work on Unity to CEDS data alignment
Common Education Data Standards (CEDS)

- CEDS Elements
  - ‘[is] an education data management initiative whose purpose is to streamline the understanding of data within and across P-20W institutions and sectors. CEDS includes a common vocabulary complete with standard element names, definitions, and option sets’

- CEDS Integrated Data Store (IDS)
  - ‘factors the complete set of CEDS elements, entities and attributes with standard technical syntax and 3rd normal form database normalization’

- CEDS Data Warehouse
  - ‘implements star schema data warehouse normalization techniques for improved query performance [for longitudinal storage and reporting of P-20W data]’
Generate

- A software application that states can obtain to better understand and even automate federal reporting (e.g. EdFacts)
- Based on CEDS
  - ETL Checklist
    - Identifies reporting domains
    - Identifies CEDS data elements used by each domain
  - State aligns their SLDS at the element level
    - Develops procedures to populate Staging tables (one per domain)
- Application
  - Populates a CEDS IDS from Staging tables
  - EdFacts coordinator
    - Uses the application to validate data in the IDS and report submissions
Alignment with SLDS

- **Element Level**
  - CEDS Element
    - K12 -> K12 Student -> Disability -> Primary Disability Type
    - CEDS Element ID: 000218
  - SLDS Element
    - Student -> Special Ed Student -> Primary Disability

- **Option Set Level**
  - CEDS
    - AUT, DB, DD, EMN, HI, ID, MD, OI, OHI, SLD, SLI, TBI, VI
      - [https://ceds.ed.gov/element/000218](https://ceds.ed.gov/element/000218)
  - SLDS
    - AT, BI, CD, DB, DD, ED, HI, HL, LD, MU, OI, SL, VI
Alignment with Unity

• Element Level
  • CEDS Element
    • K12 -> K12 Student -> Disability -> Primary Disability Type
    • CEDS Element ID: 000218
  • Unity Element
    • /StudentSpecialEducationSummary/PrimaryDisabilityCode
    • Better choice may have been
      • /StudentParticipation/ExceptionalityCategories/ExceptionalityCategory/Code

• Option Set Level
  • CEDS
    • https://ceds.ed.gov/element/000218
  • Unity
    • https://ceds.ed.gov/element/000218
Alignment with Unity

- **Element Level**
  - CEDS Element
    - K12 -> K12 Student -> Disability -> Primary Disability Type
    - CEDS Element ID: 000218
  - Unity Element
    - `/StudentSpecialEducationSummary/PrimaryDisabilityCode`
    - Better choice may have been
      - `/StudentParticipation/ExceptionalityCategories[1]/ExceptionalityCategory/Code`

- **Option Set Level**
  - CEDS
    - https://ceds.ed.gov/element/000218
  - Unity
    - https://ceds.ed.gov/element/000218
CEDS IDS is an 3-NF Data Model
Unity is a nested (i.e. object) model

<StudentParticipation @RefId="030337AF720C40DD8DAF4565B0BE1695" @StudentPersonalRefId="FC78EC5DC06D4360B1AB1F5AA2E70EBB">
  <ExceptionalityCategories>
    <ExceptionalityCategory> <Code>2121</Code>
    <ExceptionalityPriority>Primary</ExceptionalityPriority>
  </ExceptionalityCategory>
</StudentParticipation>

<StudentPersonal RefId="FC78EC5DC06D4360B1AB1F5AA2E70EBB">
  <StateProvinceId>99996666</StateProvinceId>
</StudentPersonal>
Use ORM to Objectise CEDS

- Person
- PersonDisabilities
- PersonIdentifiers
- PersonDisability
- RefDisabilityType
- Code
- PersonIdentifier
- Identifier
- RefPersonIdentifierSystem
- Code

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Alignment is a Path Mapping

- /Person/PersonDisabilities/PersonDisability/RefDisabilityType/Code ➔
  /StudentParticipation/ExceptionalityCategories/ExceptionalityCategory/Code

- /Person/PersonIdentifiers/PersonIdentifier/Identifier ➔
  /StudentPersonal/StateProvinceId
<Person>
	<PersonIdentifiers>
		<PersonIdentifier>
			<Identifier>33230889</Identifier>
			<RefPersonIdentificationSystem>
				<Code>State</Code>
			</RefPersonIdentificationSystem>
		</PersonIdentifier>
	</PersonIdentifiers>
	<PersonDisabilities>
		<PersonDisability>
			<RefDisabilityType>
				<Code>AU</Code>
			</RefDisabilityType>
		</PersonDisability>
	</PersonDisabilities>
</Person>
Deserialize CEDS objects in an IDS

Diagram with arrows pointing from Unity to IDS.
SQL views to populate Staging

Diagram showing the flow from Unity to IDS and then to RDS through a SQL view process.
The Other Direction: moving CEDS

- Move CEDS data using Unity infrastructure
  - Reverse mapping from CEDS objects to Unity objects
  - OR-
  - Directly as CEDS objects over payload agnostic infrastructure