

The Information Systems and Services Brief Series is designed to provide regular information about CCSSO activities and address topics of interest and importance to the K-12 data and information systems environment.

ISS Brief 1: CEDS 2.0 Support, Adoption, and Implementation

Introduction

The Council of Chief State School Officers ([CCSSO](#)), on behalf of the states, has been actively engaged in efforts to ensure that states have the option to adopt voluntarily a set of common education data standard. The purpose of this brief is to give you an update on that work and to outline CCSSO's position on for the Common Education Data Standard Version 2.0 ([CEDS 2.0](#)) that will be released in January 2012.

CCSSO has worked with its members to determine strategic goals that build immediate and long-term capacity in state data and information systems. States have identified the need for systems that can:

1. Inform teaching and learning,
2. Automate federal and state reporting,
3. Support implementation of state accountability systems based on the newly proposed accountability principles, and
4. Inform each state's constituencies and communities (by automating resources like SchoolDataDirect, SchoolMatters, and others).

Background

Over the last several months, some thought-provoking and, often, ambiguous events related to K-12 data standards have taken place. There has been much discussion among participants at STATS-DC, among EIMAC members, and among others who have an interest in K-12 data.

The following list (incomplete as it might be) is offered as background to your understanding CCSSO's decision to clarify its position on the K-12 common education data standard:

- The National Center for Education Statistics ([NCES](#)) convened a new [CEDS Stakeholder Group](#) to replace the Technical Working Group that had facilitated the development of [CEDS 1.0](#). CCSSO is represented in the CEDS Stakeholder Group.
- The new CEDS Stakeholder Group has set an ambitious [timeline](#) for the development and publishing of CEDS 2.0 with a vastly expanded data dictionary and an accompanying data model.
- CCSSO has sponsored the development of the [State Core Model](#), which includes a set of data elements that have been and are being mapped to data systems in more than thirty states.
- NCES and CCSSO have negotiated the transfer of the State Core Model to the CEDS Stakeholder Group to inform the development of the CEDS 2.0 data model. The CEDS Stakeholder Group will determine the actual content of CEDS 2.0.

- The [CEDS Consortium](#) has tightened up its management structure to focus on action and products to address advocacy, communication, adoption, and implementation of CEDS 2.0. That focus will highlight specific mechanisms through which states can voluntarily adopt and implement CEDS 2.0. CCSSO and the State Higher Education Executive Officers ([SHEEO](#)) are the managing partners of the CEDS Consortium.
- Draft 1 of CEDS 2.0 Version 1 was released by the CEDS Stakeholder Group for [public review and comment](#).
- The Michael and Susan Dell Foundation ([MSDF](#)) released [Ed-Fi](#), a data model that includes specifications for dashboard applications. Ed-Fi includes elements defined in CEDS 1.0 but contains only a small extended subset of CEDS 2.0.
- CCSSO has facilitated meetings and conversations with [EIMAC](#) members, NCES staff, MSDF staff, staff at the Bill and Melinda Gates Foundation ([BMGF](#), which funds the CEDS Consortium work), and others to promote discussion of the broad data and information needs of states as well as the implementation of specific data models for the development of specific applications.
- CCSSO also has facilitated conversations with its business partners and others with regard to the need for a common education data standard across the K-12 and postsecondary data environments.

CSSO Support for CEDS 2.0 and Beyond

CCSSO believes that CEDS 2.0 is a solid foundation on which long-term data strategies can be built within each state to address each state's transformative educational goals and to facilitate the collective and collaborative efforts that states need.

CCSSO, along with states and other partners in many areas, will facilitate the development of mechanisms through which states may choose, voluntarily, to implement CEDS 2.0 and maintain it in the long-term. More information will be forthcoming in the near future and your input will be requested throughout the process.

Conclusion

I encourage you to investigate and adopt CEDS 2.0 as soon as it is released and as soon as satisfactory mechanisms can be identified for implementation. CCSSO recognizes that adoption and implementation of CEDS 2.0 is voluntary and, as such, you should consider all your options before making this informed – and important – decision.

ISS Brief 2: How States Can Plan to Implement CEDS 2.0

Introduction

The Common Education Data Standard Version 2.0 ([CEDS 2.0](#)) will be released in January 2012. The purpose of that standard is to provide a data dictionary and a basic data model through which states can build their own datasets that can be compatible with and comparable to the datasets in other states.

Many of you have worked with CEDS and the [State Core Model](#) over the last couple of years. You've seen the importance of the effort; however, it's been difficult to see how the standard might be implemented within your state's existing efforts around your statewide longitudinal data system (SLDS) and your other data and information system work.

This ISS Brief describes, in general terms, one mechanism for implementing CEDS 2.0 at the state level and gives some specific reasons for states to consider such an approach. As you think about the implementation mechanism described below, I hope you will also think about any numbers of variations that might work in your state – and as you do so, please consider benefits of creating a common set of meaningful data across states.

An attachment (PDF) accompanies this ISS Brief with illustrations and descriptions of the concepts.

Additional briefs will describe the details of this implementation mechanism as one way for states to adopt and implement CEDS 2.0. Fall 2011 EIMAC will be devoted almost entirely to the issues and opportunities around implementation of CEDS 2.0.

A Real Need to Implement CEDS 2.0

The major problem with [CEDS 1.0](#) was that it was not implementable. It was, however, the beginning of an important process for data systems in K-12 education. It became clear that CEDS was important and that an implementable version is needed.

When the [CEDS Stakeholder Group](#) began its work, its charge was to develop a standard that would serve the states' collective data needs and that could be logically and physically implemented based on those needs.

To help states, [CCSSO](#) and some of our partners have been working on a mechanism states can use to implement CEDS 2.0 and to meet their data and information system needs.

A Mechanism to Implement CEDS 2.0

Implementation of CEDS 2.0 in your state must start with several assumptions. Implementation of CEDS 2.0 must:

- (a) be voluntary, of course;
- (b) respect the investments you've already made in your state's data and information systems;
- (c) meet your state's comprehensive data needs for providing services to learners and other stakeholders;
- (d) provide data that can be used in collective and collaborative efforts with other states;
- (e) create a data system that can reduce your state's costs while improving services to learners and other stakeholders; and
- (f) adapt to evolving and emerging data tools, strategies, and needs.

The mechanism described in this brief (and the attachment) is an effective and efficient way to implement CEDS 2.0 to meet your state's growing data needs and to build a foundation for the development of cost-effective educational applications to meet those needs. Please refer to the attachment as you read through the descriptions of the components and processes below. (There are five slides in the attachment; each includes notes describing the content.)

When CEDS 2.0 is released in January 2012, it will include a comprehensive data dictionary with elements from early childhood, K-12, and postsecondary education. The K-12 elements will include the appropriate existing CEDS 1.0 elements and additional elements based on CCSSO's State Core Model and other sources, as determined by the CEDS Stakeholders Group. It is anticipated that CEDS 2.0 will define 3000-4000 data elements (many more than the original 161 elements in CEDS 1.0). (See Slide 2 in the attachment.)

CEDS 2.0 will also include a basic data model that will describe relationships between and among many of the data elements. It is anticipated that the CEDS 2.0 data model will incorporate many of the components of

CCSSO's State Core Model; however, there will be variations that may require some re-mapping in states that have already mapped their data systems to CCSSO's State Core Model.

Currently, most states have built their statewide longitudinal data systems (SLDSes) without regard for CEDS; after all, the CEDS effort did not begin until after many SLDS projects had already been funded and implemented. As a result, SLDSes do not provide a means of sharing data easily across states or of informing applications to support a state's needs.

In addition, most states' SLDSes do not contain all the data elements that will be defined in CEDS 2.0 – although some states have other datasets that contain many of the additional CEDS 2.0 elements. (See Slide 3 in the attachment.)

With those factors in mind, the proposed mechanism involves the following basic strategies for a state wanting to implement CEDS 2.0 for the purpose of creating a comprehensive data and information system to meet its data needs:

- (a) Work with districts to collect, at the state level, the CEDS 2.0 elements that are needed;
- (b) Build out the SLDS and other datasets that are needed;
- (c) Create an extract-transform-load (ETL) application that will pull data from the state's data systems and will convert those data formats and values as defined by CEDS 2.0; and
- (d) Load the transformed data into an operational data store (ODS) that will be the same in each state.
Note that this ODS is referred to as "The Blue Box." (See Slide 4 in the attachment.)

There are several reasons that this mechanism is worth considering:

- (a) Building the ETL application will be cheaper than converting existing SLDSes and other data systems;
- (b) The use of CEDS 2.0 to define the data that comes out of the ETL process ensures that each state has a dataset that will be compatible and comparable across states; and
- (c) The creation of the Blue Box in each state ensures that applications written for use in one state can also be used in other states – meaning states can take advantage of an Apps Store with applications that work universally on the state-owned Blue Boxes. (See Slide 5 in the attachment.)

As you think about ways your state could implement CEDS 2.0, you might consider the characteristics of the ETL application that your state might need and the physical nature of the Blue Box you might want to create. While this ISS Brief describes a mechanism for implementing CEDS 2.0 and creating the Blue Box, there are several ways in which both can be done.

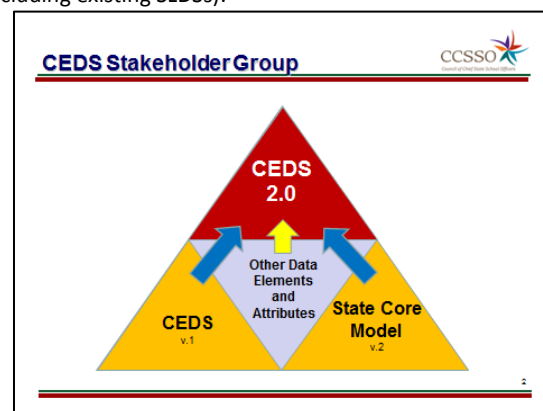
Conclusion

This ISS Brief has described, in very general terms, a mechanism by which states can implement CEDS 2.0 if they choose to do so.

Attached Slides



This presentation is designed to present a mechanism by which CEDS 2.0 can be implemented in each state without the costs associated with modifying existing data systems (including existing SLDSS).

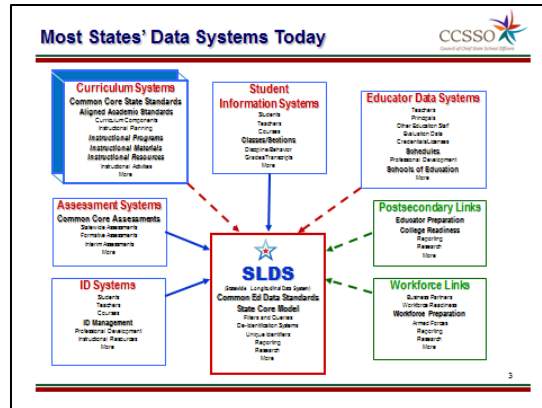


Previous efforts to create the common education data standard resulted in a data dictionary that defined 161 data elements minimally needed to complete parts of federal reporting. Those elements, referred to as CEDS Version 1 in the diagram above, did not and do not meet the states needs as identified by the chiefs.

CCSSO contracted with data experts to develop something called the State Core Model, which went into Version 2 in early 2011. The State Core Model expanded the data dictionary of CEDS 1.0 and added a data model based on approximately 4000 data elements that were being used commonly in states' data systems.

As planning began to expand CEDS 1.0 to be more comprehensive, NCES and CCSSO agreed that the State Core Model could be the foundation for the data model that was needed if CEDS 2.0 was to be implementable. CCSSO has provided the State Core Model to the CEDS Stakeholder Group, which is developing CEDS 2.0.

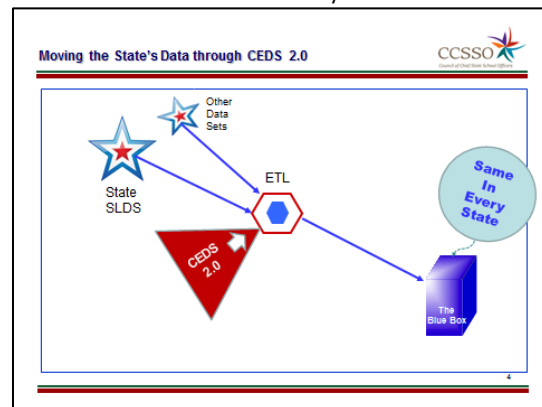
The CEDS Stakeholder Group, which represents the early childhood education, K-12, and postsecondary education environments plans to complete the comprehensive data dictionary and an accompanying data model by January 2012. As this slide indicates, the CEDS Stakeholder Group will integrate CEDS 1.0, the State Core Model, and other relevant data elements into CEDS 2.0. With the comprehensive CEDS 2.0 data dictionary and data model, states will be able to implement comprehensive data systems that can address their states individual and collective data needs based on the chiefs' strategic planning.



States current data systems look something like this, right now. There are silos of data and the concept of a “statewide longitudinal data system” is to bring all those silos together in appropriate ways so that data can be linked and can provide meaningful information.

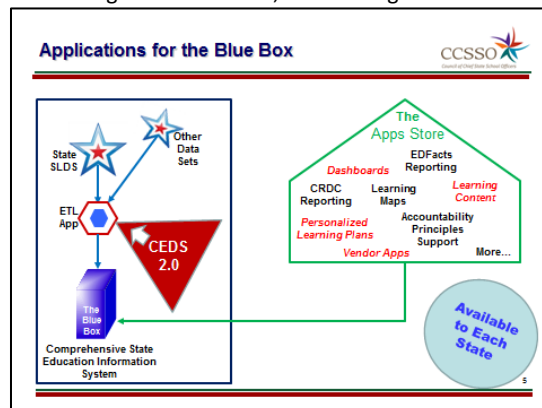
That’s the chiefs’ main goal for their data systems – to bring those together to form information systems that can actually inform them, inform educators, inform learning, inform parents, inform communities, and inform all other education stakeholders.

Current SLDSEs were built before the development of common education data standard. Those SLDSEs generally have some student information, ID systems, and some state assessment results. Other data systems within the SEAs may or may not be linked to the SLDSEs.



A state’s SLDS may contain specific data from some sources (SIS, for example) and another data set or sets may contain other data (formative assessment results, for example). The ETL process could link to both or several data sets to create a single, comprehensive set of data to go to the Blue Box.

This would let states move to the Blue Box, through CEDS 2.0, without changing the existing SLDSEs or the applications that run on those SLDSEs. Other data systems could be created alongside the existing SLDSEs and the ETL process could access each of those data systems, pulling the appropriate data elements, transforming those elements, and loading those to the Blue Box.



Imagine the benefits for states – and for software developers. If the Blue Box elements existed in each state – and those elements conformed to a common set of data standards, formats, and values – all types of software applications could be developed using the Blue Box.

One application written for VERMONT could go into an “Education Apps Store” and ILLINOIS could choose that app, if it worked for its teachers and learners – and that app would automatically work in ILLINOIS because that state’s Blue Box is the same as VERMONT’s.

The Blue Box provides each state with a “comprehensive state education information system” that contains the record-level data needed to meet the goals identified in the states’ strategic planning. Because the Blue Box is the same in every state (same format, same code sets, same values, same relationships – just different data),

- (1) An application written for one state could be used in another state;
- (2) A vendor/developer can write its applications once with the expectation that it will work in every state that has implemented the Blue Box;
- (3) An application written by a consortium of teachers in one district can work in other districts and in other states;
- (4) Innovation and entrepreneurship are encouraged and enabled; and
- (5) Applications can be made available to states (and their districts, schools, and classrooms) through an “Apps Store” in which developers can automate licensing, open source products can be available, and other resources can be shared.
- (6) Applications would be written with their own APIs so that platform APIs would not be restrictive in linking data or in restricting innovations in the use of the data.

ISS Brief 3: An ETL Application for Implementing CEDS 2.0

Introduction

An attachment (PDF) accompanies this ISS Brief with illustrations and descriptions of the concepts. That attachment contains three slides that may help as you read the following material.

States generally don’t want to change the structures of existing data systems. Such changes have a tendency to “break” stuff – links within the data system are sometimes lost, important applications quit working as needed, and other bad stuff happens. Also, such changes cost a lot.

That might be the case in your state if you tried to change your existing SLDS and other datasets so those could conform to the Common Education Data Standard ([CEDS 2.0](#)). At the same time, there is a real need for all states to implement CEDS 2.0 (I know implementation is voluntary – but I hope to convince you it’s absolutely essential) in order to meet their data needs and to reduce the costs of their data systems and applications.

In ISS Brief 2, I described a mechanism through which the data stored in your current SLDS and other datasets maintained at the state level could be transformed into a dataset that would be comprehensive enough to meet your state’s data needs (short- and long-term) and that would be compatible, comparable, and shareable as your state enters into collaborative efforts with other states. I also indicated that such a comprehensive dataset (referred to as the “Blue Box”) in each state could lead to an “application marketplace” from which states could access and use applications.

This ISS Brief describes, in general terms, an extract-transform-load (ETL) application through which your state and others can implement CEDS 2.0.

Before the ETL Application

An ETL application will look into your existing datasets, find the elements that are part of the CEDS 2.0 elements, and will extract those elements. The ETL will then convert those extracted elements to the CEDS 2.0 formats

and values. The CEDS 2.0 elements and values will then be converted to some storable format (say, XML) and then stored in your Blue Box.

Before that ETL process can be run, however, there are a few things that must be done:

- (a) You must collect the appropriate data elements from your state's districts and store those data in your SLDS and/or other accessible data sets;
- (b) The appropriate elements in your SLDS and other data sets must be "mapped" to the CEDS 2.0 standard; and
- (c) You must have a physical place in which to load the data that are extracted and transformed.

These topics will be discussed in more detail in later ISS Briefs. For now, let's assume these things have been done – so, let's talk about the ETL itself.

The ETL Application

The ETL process involves pulling data from your SLDS and other datasets, transforming those data to match exactly the definitions in CEDS 2.0, and storing the transformed data in your Blue Box. (See Slide 2 in the attachment to this ISS Brief.) That transformation of your data takes place in the ETL application.

In its most basic form, the ETL application would include the following functionality:

1. Look into your SLDS and other datasets, find the data elements you've identified through your mapping process, and extract those elements and their values into a logical data store;
2. Transform those elements to the CEDS formats and values – the result is a set of data elements that conform 100% to the CEDS requirements;
3. Further transforms those elements into an XML version of your datasets; and
4. Loads the XML data into your physical Blue Box.

(See Slide 3 in the attachment for a diagram of this description.)

In this basic ETL application, steps 1 and 2 would be unique in each state – because the SLDS (and other datasets) in each state are unique. Both of those steps rely on the data dictionary defined by CEDS 2.0 – first, to identify the elements to be extracted and, second, to know what those elements should be converted to (formats and values).

Steps 3 and 4 in this basic ETL application can be the same in every state – because the conversion to XML starts with the data that are now in CEDS 2.0 format. This means that the CEDS 2.0-to-XML part of the ETL application can be written once and shared with all states; it would then become part of the complete ETL application for each state.

Other Considerations about the ETL Application and the Blue Box

This ISS Brief describes one mechanism for implementing CEDS 2.0 and creating your Blue Box through an ETL application. You should note that this mechanism offers various ways to accomplish those goals. As examples:

- (a) A state may choose not to include some elements in the data it collects from its districts. That is possible and acceptable in the process; the ETL would simply create CEDS 2.0 elements and would leave those elements with null values (that is, empty). The output of Step 2 would include all the CEDS 2.0 elements, but those not wanted by the states would be empty.

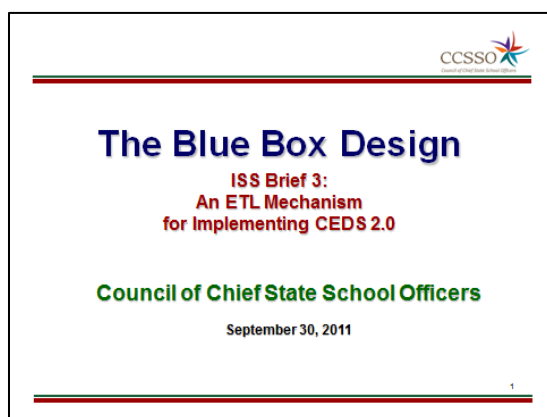
- (b) A state may choose to transform their data into a format other than XML and store those data in a separate operational data store (another dataset or database). That would be possible and acceptable – as long as that dataset or database could export the data in XML format to that state’s Blue Box. In that scenario, the state could have an interim stop for the data between the ETL application and its Blue Box. (There will be much more discussion of the Blue Box in ISS Brief 4.)

Because implementation of CEDS 2.0 is completely voluntary, you will want to consider all the possibilities and benefits as you develop strategies to implement (or not).

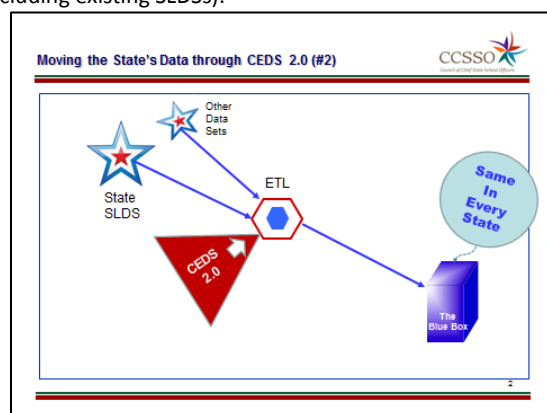
Conclusion

This ISS Brief has described, in very general terms, the ETL application through which states can implement CEDS 2.0 in order to create a comprehensive dataset that can be used to meet the goals that have been identified with regard to compatible, comparable, and shareable data. Don’t forget to refer to the attached set of slides as you think about implementing CEDS 2.0.

Attached Slides

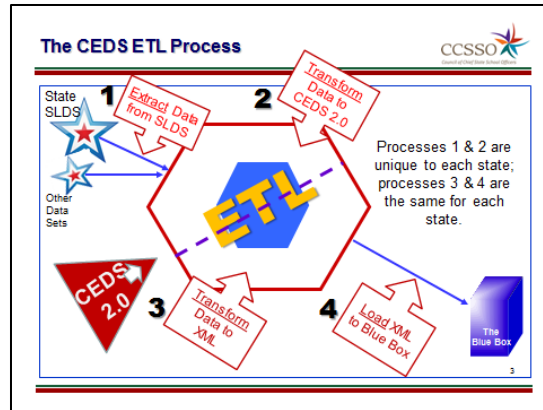


This presentation is designed to present a mechanism by which CEDS 2.0 can be implemented in each state without the costs associated with modifying existing data systems (including existing SLDs).



A state’s SLDs may contain specific data from some sources (SIS, for example) and another data set or sets may contain other data (formative assessment results, for example). The ETL process could link to both or several data sets to create a single, comprehensive set of data to go to the Blue Box.

This would let states move to the Blue Box, through CEDS 2.0, without changing the existing SLDs or the applications that run on those SLDs. Other data systems could be created alongside the existing SLDs and the ETL process could access each of those data systems, pulling the appropriate data elements, transforming those elements, and loading those to the Blue Box.



The state's ETL process would have four major tasks which would be divided into two parts:

- (1) The "upper" part of the ETL would extract data from the state's SLDS (and other data sets, as identified by the state) and would transform those data into formats with code sets defined in CEDS 2.0; this process would be unique for each state because each state's SLDS is unique; and
- (2) The "lower" part of the ETL would convert the CEDS 2.0 formats into an XML version of the data and would physically load the data into the state's Blue Box; this process would be the same for each state because it would start with the CEDS 2.0 version of the data and would convert those data to a standard XML format; this process could be developed once and made available to every state.

The entire ETL process, from extraction to loading into the Blue Box, could be integrated and automated in one ETL application for each state.

The Blue Box can exist in several ways: (1) Physically on the state's server farm; (2) hosted by a web service of the state's choice; (3) other strategies relevant to the state's policies and practices. More about the Blue Box in a later ISS Brief.

ISS Brief 4: The "Blue Box" for States' Data Needs

Introduction

When the Common Education Data Standard ([CEDS 2.0](#)) was first introduced, there was much discussion about "adoption and implementation" – adoption has a meaning different from implementation. As the discussions continued, it became clear that adoption was not a sufficient goal – if your state is to benefit from the standard, you must implement the standard in some operational way.

When CEDS 2.0 is released in January 2012, it will include a comprehensive data dictionary and a logical data model. When it is released, one of your first tasks will be to "map" your existing datasets to the elements in that standard. That mapping will give you a lot of information about your data and information systems – and it will define the way in which your state can build its ETL application for extracting data from your SLDS and other datasets (see ETL steps 1 and 2, as described in ISS Brief 3).

When your ETL application has extracted and transformed your data to the CEDS 2.0 formats and code set values, you will have "implemented" CEDS 2.0, in its logical form. But that is not all you need – you also need to store your data in a physical format that can be used by applications that do work and add value to your state's work. (Although the development of applications is outside the scope of implementing CEDS 2.0 and the Blue Box, a future ISS Brief will describe some of the possible applications that might sit on your state's Blue Box.)

The Blue Box (as described, generally, in ISS Brief 2) is one way your state can implement CEDS 2.0 in a physical way. By converting the logical version of your SLDS and other datasets to an XML version (as one format example) and storing those data in your state's Blue Box (ETL steps 3 and 4, as described in ISS Brief 3), you will create a physical copy of your data that can, then, be used for meaningful applications.

This ISS Brief describes the Blue Box, several ways your state might go about creating it, and some of the benefits that can come from creating it.

Reasons for the Blue Box

Physically implementing CEDS 2.0 is critical to meeting the goals that have been identified in the chiefs' 2011-2014 Strategic Plan. One of the six goals in that strategic plan is the transformation of data systems into information systems that can:

1. inform teaching and learning,
2. automate federal reporting,
3. support implementation of state accountability systems based on the newly proposed [accountability principles](#) and the ESEA flexibility guidelines, and
4. inform each state's constituencies and communities (by automating resources like [SchoolDataDirect](#), [SchoolMatters](#), and others).

If your state implements CEDS 2.0 through the Blue Box, your state's data will be stored in the same formats and with the same codes set values as the Blue Boxes in other states. You and your colleagues in other states will have created, then, a resource that can support collective and collaborative action across states as well as meeting your state's unique data needs.

In addition, you and your colleagues will have created a marketplace in which applications can be created to meet the goals listed above. If a "killer app" is created for a neighboring state that has its own Blue Box, it should work well in your state, without modification. The costs of sophisticated and compelling applications can be reduced significantly because of the marketplace you help create – and that means that even more sophisticated and compelling applications can be developed in less time and for less cost.

There will be more discussion, in a future ISS Brief, about the benefits of the Blue Box and about possible applications that can sit on your Blue Box. The following section is about creating the Blue Box for your state.

Creating the Blue Box in Your State

As indicated before, the Blue Box can be created through an ETL application that looks into your existing datasets, extracts the elements mapped to CEDS 2.0, converts those elements to CEDS 2.0 formats and values, and stores those converted elements in a physical dataset.

That physical data set can be managed in several ways, depending on your state's preference:

- Your ETL application (as described in ISS Brief 3) can convert your original data to the CEDS 2.0 formats and values, convert the CEDS 2.0 format to XML, and store the XML version in your Blue Box;
- Your ETL application can convert your original data to CEDS 2.0 formats and values and store those data in a relational database or some other data store that will export (through a query) those data as an XML version to your Blue Box;
- Your Blue Box can exist physically on a server or other storage device located within your existing data system;

- Your Blue Box can be hosted by a provider with whom your state has contracts for such purposes;
- Your Blue Box can be hosted in “the cloud” based on whatever policies, procedures, and practices are appropriate for your state; or
- Your Blue Box can be managed in other ways, based on your state’s needs and resources.

It is important to understand that a physical Blue Box is necessary if your state is to benefit from applications built for the Blue Box and from collaborative efforts across states. While there are many ways to manage your state’s Blue Box, there are three assumptions about the Blue Box that are constant:

1. Your Blue Box belongs to and is managed by your state and/or SEA.
2. CEDS 2.0 (and each subsequent version) defines the formats and code set values for your state’s Blue Box.
3. Your state’s Blue Box will look exactly like your neighboring states’ Blue Boxes.

From that set of assumptions and from the creation of your state’s Blue Box, K-12 education can change the way it does its business – from informing teaching and learning to automating federal reporting to creating meaningful accountability to informing each local community – and more. Your state’s Blue Box changes the educational landscape. Forever.

Conclusion

This ISS Brief has discussed, in very general terms, the Blue Box. Because the implementation of CEDS 2.0 is voluntary and because the Blue Box is defined by CEDS 2.0, the benefits of creating the Blue Box must be so compelling that your state will choose to implement CEDS 2.0. This ISS Brief has described options your state can consider in making your decisions about the Blue Box – and, thus, about CEDS 2.0.

ISS Brief 5: The Work of Implementing CEDS 2.0 and the Blue Box

Introduction

When the Common Education Data Standard ([CEDS 2.0](#)) is released in January 2012, it will include a comprehensive data dictionary, a logical data model, and a set of tools to help you understand your data systems in relation to CEDS. At that time, one of your first tasks will be to “map” your existing datasets to the elements in that data standard. One of the tools to be released with CEDS 2.0 will help you do that. Mapping your data elements to CEDS 2.0 will actually inform you in two important ways:

1. You will see which of the elements your state already collects are part of the common education data standard, and
2. You will see elements in the data standard that your state does not yet collect (emphasis on “yet”).

Both pieces of information are extremely important in developing a comprehensive data system that can meet your state’s data needs (see the introduction in ISS Brief 1) and in creating a Blue Box in your state that is compatible and comparable with the blue boxes in other states.

That mapping will be only one part of the work that will be needed for full implementation of CEDS 2.0 and the Blue Box (see ISS Brief 4 for a complete discussion of the Blue Box).

This ISS Brief describes that work and the benchmarks that indicate progress toward implementation. A six-slide attachment (PDF) accompanies this ISS Brief with illustrations and descriptions of the concepts.

And remember, from previous discussion, that implementation of CEDS 2.0 is voluntary and that implementation of CEDS 2.0 is just one part of implementing the Blue Box. Please note that the Blue Box is **not** part of the CEDS 2.0 release; the Blue Box is a mechanism through which you can implement CEDS 2.0 in a physical way.

The Work to be Done

While the concept of implementing the Blue Box is reasonably straight-forward, there is also a good bit of work to be done in order to make it happen. In the past, your state has probably collected only the data needed for federal reporting and for accountability – neither of which has the capacity to inform teaching and learning and both of which require significant manual labor, either in the district or in your agency. (See Slide 2 in the attachment to get an idea of some of the data that might be needed.)

The Blue Box, which is a physical implementation of CEDS 2.0, will allow you and your colleagues in other states to automate the federal reporting with one application that can work in every state. The Blue Box, with the right data collected from your state’s districts, can also be used to inform teaching and learning in ways not possible before. (Other examples of applications that can use the Blue Box will be described in the next ISS Brief.)

In general, the work to implement CEDS 2.0 and the Blue Box would look like the following (see Slide 4 in the attachment for an outline of the following):

1. Make a statement of intent to implement CEDS 2.0 in your state.
 - a. Within your agency, issue a brief press release that your state/agency will implement CEDS 2.0 and successive versions in order to meet your state/agency’s data needs.
 - b. Notify your state’s districts that CEDS 2.0 and successive versions have been adopted by your state.
 - c. Create the messaging for your state’s efforts to collect and maintain more data elements based on your state’s goals (inform teaching and learning, automate federal reporting, support new accountability principles, and inform your state’s constituencies and communities) and to provide more services related to those goals.
2. Map your state’s existing data elements to the CEDS 2.0 data model.
 - a. Use the CEDS 2.0 tools or another resource of your choice to map your current state-level data set(s) to the standard.
 - b. Identify your current elements that map directly to CEDS 2.0 (the “mapped” list).
 - c. Identify CEDS 2.0 elements that do not map directly to your current elements (the “missing” list).
 - d. Identify your current elements that do not map directly to CEDS 2.0 (the “maybe later” list).
 - e. Share the three lists with your state’s districts and begin planning to collect the items on the “missing” list.
 - f. Work with your districts to ensure that the “missing” elements can be collected with high-quality values.
 - g. Note: With each new version of CEDS, this process will be repeated in order to identify and collect newly defined elements; thus, your building a process that can be replicated and expanded as new versions are released would seem helpful.

3. Collect the appropriate elements from districts in your state.
 - a. Develop your strategy for collecting the elements on the “missing” list.
 - b. There are two basic ways to collect the “missing” elements: (1) Modify your state’s SLDS or (2) create new datasets that can be accessed by your ETL application (see Slide 3 in the attachment to this ISS Brief for a visual example; also, see ISS Brief 3 for more information about the ETL process).
 - c. You may not want to modify your SLDS because doing so may “break” some of your existing applications.
 - d. Design and build the new dataset(s) or modify your SLDS so the “missing” data elements have a place to land when those elements are collected.
 - e. Redesign your data collection tools and processes to include “missing” elements from your districts and to collect all the appropriate data elements daily (at a minimum).
 - f. Again: With each new version of CEDS, this process will be repeated in order to identify and collect newly defined elements; thus, your building a process that can be replicated and expanded as new versions are released would seem helpful.
4. Develop the “upper” part of the ETL (extract and convert to CEDS 2.0; see ISS Brief 3).
 - a. Because your state’s SLDS and other dataset formats are different from other states, the “upper” part of your ETL application will also be different from other states’ ETLs.
 - b. Using the CEDS 2.0 data dictionary, develop an application to extract the appropriate data elements and to convert those elements to CEDS 2.0-compatible elements.
 - c. The converted elements would also include the appropriate values defined in the code sets in the data dictionary.
 - d. The conversion would include all the elements defined in the CEDS 2.0 data dictionary – whether or not you collect some of those values. For elements that your state might not collect from your districts, the element placeholders would still be part of the conversion to CEDS 2.0 formats and would contain the appropriate null value (as defined in the code sets). This is important because of the next step.
5. Implement the “lower” part of the ETL (convert to XML version; see ISS Brief 3).
 - a. Because the “upper” part of the ETL application should contain exactly the same elements as defined in CEDS 2.0 – and because that would be the case in every state – the “lower” part of the ETL application can be developed once and, then, shared with every state.
 - b. The “lower” part of the ETL application will be developed (possibly under contract) and shared with all states implementing CEDS 2.0 and the Blue Box.
 - c. The “lower” part of the ETL application would be integrated with your “upper” part to automate completely the ETL process.
 - d. You will inform the “lower” part of your ETL application about the location of your storage device or service – that is, the location of your Blue Box.
 - e. The “lower” part of the ETL application will look at the data created by the “upper” part, which will be in exact CEDS 2.0 format and will convert those data into an XML version of your data.
 - f. Because the “lower” part of the ETL application is looking at the same data formats in all states and is converting those data to the same XML formats in all states, the XML version of your data will be exactly like the XML versions in all the other states that are implementing CEDS 2.0 and the Blue Box.
6. Load and store a physical copy of the XML version of your data into your state’s Blue Box (see ISS Brief 4).

- a. Within your state/agency's data systems, develop a data storage mechanism for the XML version of your data – in other words, have the physical Blue Box ready to get the data from your ETL application.
 - b. Be sure the “lower” part of your ETL application knows the location of your Blue Box – whether it is located locally or in a “Cloud” (yours or somebody else's).
 - c. Your automated ETL application can then load the XML version of your data into your Blue Box.
 - d. Note: At that point, you have laid a solid foundation for your state to be able to meet the goals that have been outlined for providing services to your districts, schools, educators, and learners – as well as providing the foundation from which applications can automate federal reporting, accountability, and other datasets that your stakeholders want and need. (See Slide 5 for a sequence of the work described here.)
7. As your state's SLDS and other datasets evolve and migrate over time, transform those systems to get the data from districts in XML (*long, long-term*).
 - a. This item is provided simply to get you to think about how your existing data systems – along with those used in your districts – might evolve and migrate over the next decade or so.
 - b. You know your existing systems will age over time and that new database technologies are likely to be introduced – in other words, your current data systems will change over time.
 - c. As those changes are planned for, we want you to consider using the common education data standard as the foundation for your migrations to newer systems. That's all.

The items listed above are general descriptions of the work that will be required if you (voluntarily) implement CEDS 2.0 and the Blue Box. There are many ways that each piece of the work can be done and your state should look at all of its options in planning and doing the work. In those areas where collaboration and collective work make sense, CCSSO may be able to facilitate the collaboration for you and your partner states.

Conclusion

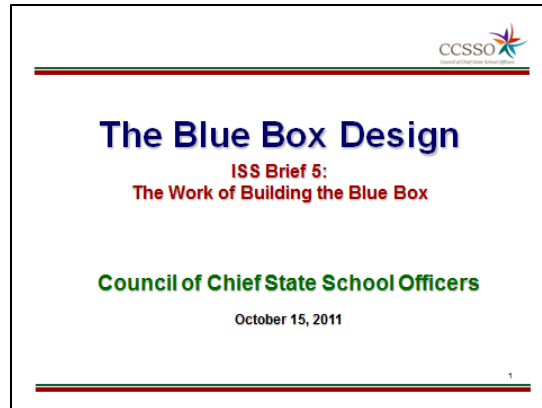
This ISS Brief has discussed the work that must be done to implement CEDS 2.0 and the Blue Box. Because the implementation of the Blue Box is defined by CEDS 2.0, the quality and completeness of the work related to CEDS 2.0 is extremely important (see Slide 6 in the attachment for more information about the data quality issue). Additionally, because one of the goals of your Blue Box is to reduce the costs of applications that can be shared across states, the compatibility and comparability of the data in your Blue Box are also important.

Collaboration with your colleagues throughout the implementation process will help ensure the quality, completeness, compatibility, and comparability that are needed. CCSSO, through EIMAC and other resources, is committed to helping you and your colleagues in that collaboration.

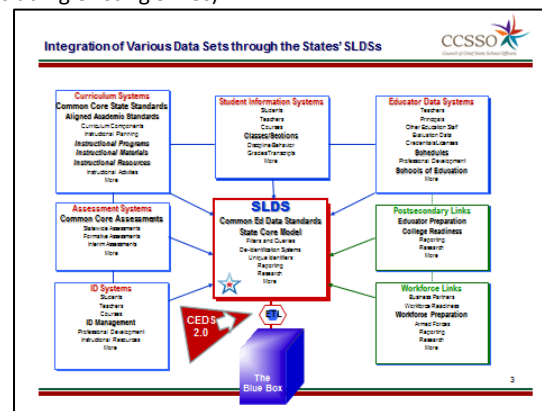
The next ISS Brief will describe some of the possible applications that can make the Blue Box so compelling for your state that you will want to implement immediately. (How was that for a marketing tease?)

Additional briefs, will describe the details of this implementation mechanism as one way for states to implement CEDS 2.0.

Attached Slides



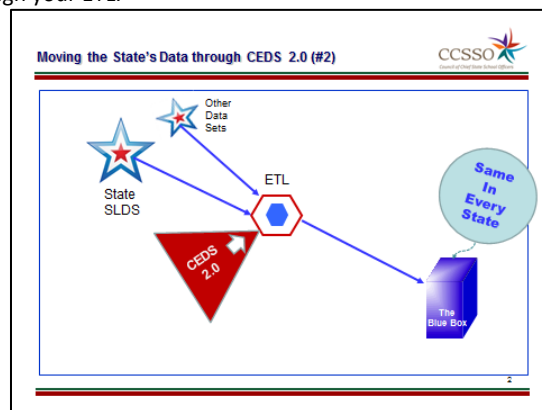
This presentation is designed to present a mechanism by which CEDS 2.0 can be implemented in each state without the costs associated with modifying existing data systems (including existing SLDSS).



CEDS 2.0 will help you determine the data that are needed at the state level if your state is to provide the services and applications outlined previously. Your state must identify the data elements collected at the district level that will be important for informing those services and applications.

Your state must establish policy and practice around the collection of data that can become part of the services that your agency can provide to districts, schools, and classrooms. To provide services, your state will need data elements that can be used to inform teaching and learning as well as to address the reporting and accountability needs of your state.

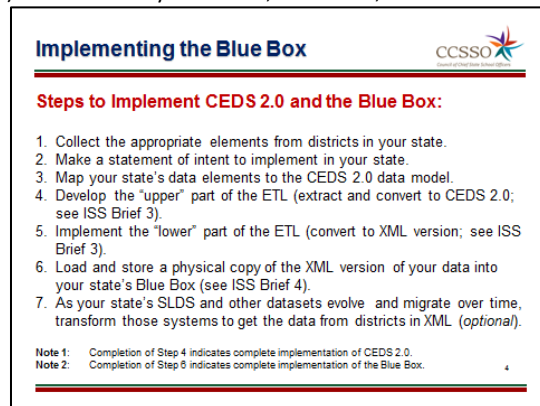
There will be work at the district level to be sure the required data elements are complete, are correct, and are collected for submission to your agency. Those elements will become part of your state's SLDS or part of one or more other datasets that integrate directly with your state's SLDS or that integrate through your ETL.



Your state's SLDS may contain specific data from some sources (SIS, for example) and another data set or sets may contain other data (formative assessment results, for example). The ETL process could link to both or several data sets to create a single, comprehensive set of data to go to the Blue Box.

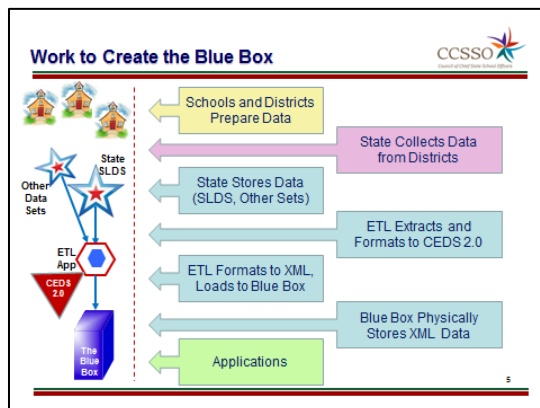
This would let your state to move to the Blue Box, through CEDS 2.0, without changing the existing SLDS or the applications that run on your SLDS. Other data systems could be created alongside the existing SLDS and the ETL process could access each of those data systems, pulling the appropriate data elements, transforming those elements, and loading those to the Blue Box.

This may be the case when you identify, through your mapping process, elements that your state does not yet collect from districts; you can create a new dataset, separate from your current SLDS, into which additional data can be collected. Then, your ETL application can access your SLDS and the other dataset(s) simultaneously to extract, transform, and load to the Blue Box.



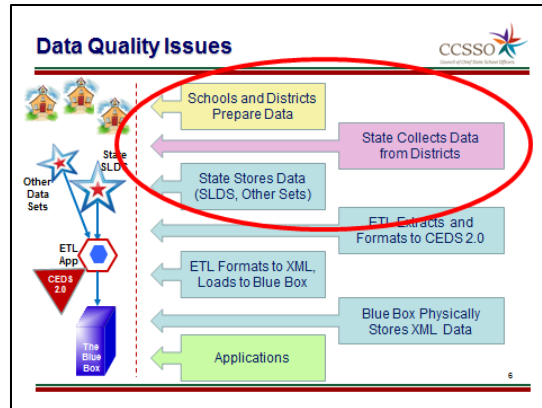
Implementation of CEDS 2.0 (not just adoption) and implementation of the Blue Box require specific action steps and the creation of specific products.

That work begins with the collection of complete, correct, and reliable data from the districts and storing those data in your SLDS and other datasets.



When the work at the school and district levels has been completed, your state must collect the data from the districts and store those data in your SLDS and/or other datasets, based on your state's needs and systems. Your state will need a physical Blue Box in which to store the data that are transformed into the XML versions of your data.

Applications can be created by your vendors and developers to provide access to the data and information in the Blue Box. End users can include learners, teachers, parents, school leaders, and others, as defined by the roles, rights, and responsibilities set in your state's policy and practice.



The quality of the data collected from the schools and districts, as well as the quality of the data stored at the state level will have significant impact on the value of the Blue Box and the applications that can be built to inform teaching and learning and to do the needed reporting.

If the applications are compelling, there will be incentives to improve the quality of the data at its source.

So there are two strategies for improving the quality of the data that get to the Blue Box:

- (1) Develop policies and practices that result in complete, correct, and reliable data collection and storage, and
- (2) Develop applications that are so compelling that educators will see the value brought to the education process and will understand that the process requires complete, correct, and reliable data.

If the data and the applications are compelling, the end users will begin to expect – and even demand – high-quality data from the original sources.

ISS Brief Series: Additional Information and Resources

Just so you know

The term “Blue Box” is not related to anything historical or mythical from technology’s past. When I was putting together the original slides as an outline for this series, I did a clip art search for “box” in Office. Nothing really appealed to me; so, I simply clicked Insert/Shapes and chose the box from Basic Shapes. It was blue. (I mention this only because folks-of-a-certain-age may remember that, many decades ago, a specific vendor used a big blue box to represent its line of technologies. This Blue Box has nothing to do with that vendor or its box. This Blue Box is simply the result of my using the first thing I could find that would do what I wanted to do.)

Questions, Comments, and Suggestions

If you have questions or issues related to information systems and services that you would like to see addressed in this series of briefs, please direct those to Gary West at garyw@ccsso.org.

Resource Links

The following links, whether or not included in the text above, are provided as resources for your research into CEDS 2.0 and its importance to your data and information system efforts:

CCSSO: <http://www.ccsso.org/>

NCES: <http://nces.ed.gov/>

About CEDS: <http://nces.ed.gov/programs/ceds/about.asp>

CEDS 1.0 Standard: http://nces.ed.gov/programs/ceds/version1/data_elements.asp

CEDS 2.0 Draft Standard: http://nces.ed.gov/programs/ceds/version2/data_elements.asp

CEDS 2.0 Draft Public Review and Comment: <http://nces.ed.gov/programs/ceds/intro.asp>
CEDS Stakeholder Group: <http://nces.ed.gov/programs/ceds/representatives.asp>
State Core Mode: <http://www.commoneddatastandards.org/wp-content/uploads/2011/06/CEDS-Data-Mapping-Workbook-v2.1.zip>
CEDS Consortium: <http://commoneddatastandards.org/>
SHEEO: <http://www.sheeo.org/>
EIMAC: <http://www.ccsso.org/EIMAC>
BMGF: <http://www.gatesfoundation.org/>
Accountability Principles: http://www.ccsso.org/Resources/Programs/Accountability_Systems.html
SchoolDataDirect: <http://www.schooldatadirect.org>
SchoolMatters: <http://www.schoolmatters.com>