Data Infrastructure Review

November 30, 2007
Final

Prepared by

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Volume 1: Executive Summary

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Volume 1: Executive Summary

1 Executive Summary

The purpose of this document is to outline as required, the current state of data collection and reporting in Colorado and present recommendations for improvement to the data collection process and systems as executed by the Colorado Department of Education (CDE). This section summarizes the key points from our report with a focus on current state and organizational, business process, and technology recommendations. The full report outlines more details around each of these key areas.

1.1 Scope

This study was initiated by legislation passed in 2007, specifically House Bill 07-1270. Key excerpts of HB 07-1270 are:

> The general assembly and the state board of education recognize that data-based decision making, as well as efficiency in the collection and reporting of education data, is of the utmost importance to the state department of education as well as Colorado's one hundred seventy-eight school districts. The general assembly and the state board of education also recognize the need for a comprehensive review and study of Colorado's educational data systems within the state department and the school districts.
>
> The general assembly further finds that the comprehensive review and study of Colorado's educational data systems should include information on the requirements and ease with which existing data is collected, the hardware and software being used at the local and state levels, and the capability of school districts to share data with each other and to better access appropriate state-level data.

Volume 2: The Current State outlines the participants in the current data collection efforts as well as the technology employed to collect the data. It also examines the legislation behind the collections and the requirements analysis process utilized to turn the legislation into collections. The current process begins with legislation creating the need for a data collection. Major participants in data collection efforts include the school districts, the program units at CDE, the Information Management Services (IMS) department at CDE and the Educational Data Advisory Committee (EDAC).

Volume 3: Future State and Recommendations is limited to recommendations affecting the data collection and reporting processes and systems only. Due to the study's time constraints, we were only able to examine a limited view of each issue and formulate high level recommendations. For each recommendation, we suggest a more detailed analysis into the problem and detailed solution development.

Whereas some of our recommendations address organizational issues and the optimization of data related staffing levels, we were not tasked with, nor did we make specific recommendations regarding specific personnel currently involved in data collection.

The North Highland Company conducted the study under contract with the Colorado Office if Information Technology (OIT) and with the cooperation of school districts, the Colorado Department of Education, as well as other relevant stakeholders.

1.2 Approach

We first sought to understand the current state of the data collection and reporting efforts. We interviewed 30 school districts and conducted an online survey to gather input from the other 148 school districts. We interviewed CDE program unit members and worked closely with CDE IMS to understand the current technology they have in place.

Based on our research we identified problem areas and developed recommendations for both the short term, interim, and long term. Interim recommendations are meant to transition the technology from the current system to the future system. Some are technical in nature while others affect the entire data collection operation and include the school districts, CDE, and other stakeholders.

The recommendations seek to minimize any duplication of effort, services, or resources. We also tried to identify any inefficiencies and costly redundancies within the current data technology system. The technical system was examined to identify areas for the elimination of incompatible standards and architectures.

1.3 Overview of Current Data Collection Process

The CDE data collection process begins with the State Legislature or the Federal Government passing legislation that mandates the collection of certain types of data at specific frequencies, and charges CDE with the responsibility of collecting the data. Data collections are managed by the particular program units within CDE (e.g. Special Education, Public School Finance, etc.) that is most knowledgeable in that subject area.

When legislation is passed, the various program units identify the specific data elements needed to meet the state or federal requirements. The program unit then conducts research to determine whether or not this data is already being collected. If the data is not being collected, the program personnel in school districts are contacted, through e-mail or focus groups, to determine if they are currently collecting the data and, if not, solicit their advice on the best way to begin the collection process. Each program unit involves the school districts in this process to varying degrees. In some cases, the State School Board is involved in the clarification and interpretation of some legislation. They may take into account recommendations from the school districts and CDE program units.

Depending on the data elements that need to be collected, those elements may be added to a current collection or a new collection will be created. This decision is based on several factors, such as when the data needs to be collected and how similar it is in terms of data already being collected. Once a decision is made, the program area presents the proposed collection to EDAC.

If approved by EDAC, the CDE program unit personnel define the business rules (i.e. edits) for the various data elements. This process can take several weeks to several months depending on the magnitude of the collection. When the data specifications are completed, they are then disseminated to the program personnel in all school districts through the Web or by e-mail. These district representatives are expected to communicate all collection-related information to other district personnel and applicable vendors that may be involved with or affected by this collection. This happens with varying degrees of success by school district.

CDE program unit representatives meet with CDE IMS staff to discuss their needs. IMS staff then develop the technical specifications and a subsequent project plan. Upon agreement by both parties, the project plan is finalized. Programming can take several weeks to several months depending on the complexity of the business rules. Program timing is also impacted by other collection programming projects within IMS.

Depending on the whether it is a new collection or a minor change to an existing collection, formal regional training is provided for the district and documentation is provided or documentation is updated and provided to the school district via the Web.

Data collections are opened for a pre-defined window of time. School districts submit fixed-length files through a Web interface. Business rules are applied to the files and error reports are generated. Fatal errors must be fixed by districts and a new file submitted. Re-submissions of files continue until all fatal errors are corrected. Once all errors have been corrected and the district reviews a Summary Report, they approve their data by pressing an "Approve" icon.

Data is maintained by CDE in an operational data store and becomes the source data for the CDE data warehouse. Reports are generated by IMS for submission to the State Legislature or Federal Government. Data is made available to end users through CDE's business intelligence tool, COGNOS, also named the Colorado Education Data Analysis and Reporting (CEDAR) system.

1.4 Current State Technical Overview

Currently, the IMS unit within CDE has developed and deployed a multi-layered, data collection and reporting system. It consists of a series of integrated automated systems that manage the data collection process from beginning, submitting data to CDE, to end, reporting data to stakeholders.

The development of the current automated collection systems began in the late 90's, with the Automated Data Exchange (ADE) system that allows school districts to submit collection data over the internet and was introduced in 1998. At the time, this was an advanced solution to a difficult technical challenge. Since then the system has grown almost exponentially with:

- The addition of numerous new collections and substantial changes to existing ones.
- The creation of the Education Data Warehouse (EDW); initially developed for School Accountability Reporting (SAR), it is now a comprehensive repository of state education data, equipped with a sophisticated set of analysis and reporting tools.
- The inclusion of an automated student matching and identification system (RITS). Enhancing the ability to track and accurately count students.

The systems developed are "collection driven", in that they were developed in direct response to fulfill legislative requirements to report specific data collections to given stakeholders. Given the timing and history of data collections in Colorado, their rapid growth, and the resources available, the systems developed by IMS and the architectural approach taken are in line with what would be expected. These systems are working as designed and being maintained as well as could be expected given the resources available.

1.5 Organization and Process Recommendations

Currently, the data collection process is fragmented, contains redundancies across data collections and does not involve the stakeholders. This leads to confusion, problems with submissions and data collection windows, and complaints by the school districts. Each program unit in CDE conducts all aspects of the data collection process differently. There is no consistency in requirements management, stakeholder involvement, communications, training, or support, which leads to duplication of efforts. There is little coordination between the program units, including with IMS. Prioritization issues are determined by default by IMS as they have resource constraints in regards to programming data collection changes.

There is a need for a Data Program Management Office (PMO) to oversee the entire data collection process from legislation to implementation and collection execution. A Data PMO would implement standards across the organization regarding requirements analysis, communication, training, and support. It would enable coordination by maintaining a master schedule and create rules surrounding prioritization, change control, and define impact analysis processes. By having a PMO, the entire process would become more streamlined internally and eliminate redundancies. The PMO could also ensure stakeholder involvement by guiding a Data Committee that would involve the stakeholders in the data collection process. This would result in a better understanding and acceptance of data collection elements, windows, and processes. The end result would be cleaner data being entered into the system and better results. Several of the short and interim recommendations are building blocks towards a PMO.

The Data PMO and Data Committee could work closer with the legislature to better answer their questions, remove redundancies and help formulate legislation that meets the data request needs. A comprehensive data analysis will

need to be done in the future to determine if the current data collected meets the needs of the current legislation. An analysis could determine if there are areas for consolidation or elimination.

Additionally, the current staffing at CDE should be assessed for future skill gaps and appropriate staffing level. Like most organizations, over time there will be retirements and attrition requiring additional staff to replace those who have left. Having a roadmap of upcoming technical needs will enable the organization to move forward in a logical fashion.

Another area for investigation is the Family Educational Rights and Privacy Act (FERPA) legislation. Current interpretation is outdated in regards to recent precedents set in other states. It is recommended that CDE work with the Attorney General to reevaluate the state's interpretation of this legislation.

Organizational Recommendation	Description	Time Frame	Benefit	Estimated Costs
Data Program Management Office	Implement a program management office to oversee the entire data collection process	Interim to Long Term	Having a single authority will enable collaboration and streamline the data collection process	1 FTE ($80K -$120K)
Communications	Consolidate communications and have a standard communications plan across collections	Short Term	Will aid in presenting a single view of CDE to the school districts and stakeholder	
Stakeholder Involvement	Involve the data collection stakeholders in the whole data collection process from requirements to implementation via a Data Committee	Short Term	Involving the stakeholders will result in a more collaborative environment and better collection results	
Requirements Analysis	Have a more formalized requirements analysis phase that includes the stakeholders	Short Term	Will result in data quality being better due to data requests being in line with school district data and will increase the understanding of why the data is needed	
Coordination	Implement a data collection master schedule and formal processes for prioritization, change control, and coordination with the legislature	Short Term	An overall view of the data collections from legislation to implementation and collection results in better decisions regarding prioritization and impact analysis	
Training/Support	Standardize training and support across program units for data collections	Short Term	Will result in better data collections	$25K - 50K (T4-Remote training access)
FERPA	Analyze FERPA legislation and recent precedents set to enable a data sharing environment	Short to Interim Term	Clarification of legal trends in FERPA will enable a more collaborative, data sharing environment	$0 - Reallocated costs

Notes:

- T1 – Estimated list cost for remote conferencing is 35¢ per minute

1.6 Technology Recommendations

The intent of the technology recommendations is to address areas of:

- Duplication of effort and resources
- Inefficiencies and unnecessary redundancies
- Implementation of industry standards

A review of the existing data collections systems, and recent improvements in technology has revealed several inefficiencies and incompatible standards, which allows for improvement opportunities. These improvements generally fall into three categories:

- **Short Term** - a series of enhancements and changes intended to:
  - Improve Performance through performance enhancements
  - Improve the data collection submission and error reporting process through updated techniques around submission of changes and error reporting
  - Better identify students
  - Improve communications within CDE, between CDE and stakeholders, including districts, across, and within districts using technology
- **Interim** - enhancements and changes that are more comprehensive than short term changes but are designed to improve performance
  - Increase performance through the use of parallel processing
  - Increase collaboration with stakeholders through the use of standard collaboration and communication tools
- **Long Term** - these recommendations require a different architectural approach than that currently being used. Generally, they move away from the current "collection driven" approach to a new "data sharing" paradigm that takes advantage of technology that has come into common use in the past 5 years.

Technical Recommendation	Description	Time Frame	Benefit	Estimated Costs [T4]
Performance Enhancements	Analyze and improve the performance of the systems in place	Short Term	Will enable collection submissions to be processed faster	$15,000-$30,000
Submit Changes Only	Alter the system to allow school districts to only submit changes to the data file rather than the whole file again	Short Term	Will enable quicker submission and error correction cycle	$10,000-$20,000 (T2)
Error Reporting	After a set limit of errors are reached (500), stop processing to allow updates	Short Term	Will minimize processing time and allow for quicker error fixes	$10,000-$20,000 (T2)
Student Identification	Increase the data used to identify a student	Short Term	Will result in better student identification and minimize duplicates IDs, helping to streamline data collection	$20,000-$30,000
District Point of Contacts) POCs	Implement tools to allow more than one District POC for collections	Short Term	Will minimize confusion by the districts and enhance coordination of collections	$2,000-$3,000
Parallel Processing	Split the incoming data file into smaller files and process in parallel	Interim	Will increase processing time of data files	$20,000-$30,000 (T2) $50,000-$100,000 (T3)

Technical Recommendation	Description	Time Frame	Benefit	Estimated Costs [T4]
Tools	Implement collaboration tools	Interim	Will increase ability of CDE to communicate and collaborate with their stakeholders	$20,000-$30,000
Data Sharing/ Reporting Paradigm	Implement a system that allows school districts to submit changes regularly and have master data reside at CDE and available for reporting purposes	Long Term	Minimizes data submission burden on school districts. Enables greater reporting capabilities at CDE	$2-3 Million

Notes:

- T2 – assumes enhancements are only applied to larger collections such as Student October Count and EOY. Smaller collections would not be affected.
- T3 – Higher costs associated with implementing (re-usable) middleware option.
- T4 – Cost estimates are based on high level estimates of complexity, effort and duration. They are meant as a guideline of scale only. Refined cost estimates will require a detailed analysis of the recommendations, which is outside the scope of this report.

Data Infrastructure Review

Volume 2: Current State

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Volume 2: Current State

1 Purpose and Approach

1.1 Document Purpose

Deliver the current state assessment for the CDE Data Infrastructure Review.

1.2 Overview/Scope

This current state document was initiated by legislation passed in 2007, specifically House Bill 07-1270. Key excerpts of HB 07-1270 are:

> The general assembly and the state board of education recognize that data-based decision making, as well as efficiency in the collection and reporting of education data, is of the utmost importance to the state department of education as well as Colorado's one hundred seventy-eight school districts. The general assembly and the state board of education also recognize the need for a comprehensive review and study of Colorado's educational data systems within the state department and the school districts.
>
> The general assembly further finds that the comprehensive review and study of Colorado's educational data systems should include information on the requirements and ease with which existing data is collected, the hardware and software being used at the local and state levels, and the capability of school districts to share data with each other and to better access appropriate state-level data.

The current state document outlines the participants in the current data collection efforts as well as the technology employed to collect the data. It also examines the legislation behind the collections and the requirements analysis process utilized to turn the legislation into collections.

A separate document will follow that outlines recommendations for improvement for data collection activities in Colorado.

The North Highland Company performed the current state assessment under contract with the Colorado Office if Information Technology (OIT) and with the cooperation of school districts, the Colorado Department of Education, as well as other relevant stakeholders.

1.3 Approach

To determine the current state of data collections, the following key tasks were performed as outlined and described in the table below.

Activity	Description of Activity
Project Team Kick-Off	A kickoff meeting was held with key stakeholders that served as a project planning session to align the planned efforts with the Department's expectations for this project. The objectives of this meeting were: • Confirm project goals and objectives • Solicit input on and finalize work plan and timetable • Establish communications protocol between our team and the Department • Identify dates for interim status meetings • Discuss any on-site logistics for project team • Identify Department of Education personnel and stakeholders to participate in interviews and surveys • Identify relevant documents and materials for review by our team members. This meeting provided a foundation for ongoing project communications and was followed by regular status meetings with the Department's Project Sponsor throughout the project.
Identify School Interview Sample Group	The team identified a sampling of school districts consisting of small, medium and large schools from across the state to interview regarding data collections. The Project Sponsor reviewed and approved this list before the interviews were initiated.
Survey Sample Group	The team surveyed the school districts using a variety of methods. North Highland interviewed key school district staff who are involved in the data process at thirty school districts selected in the previous step. In addition to interviews, an on-line survey method was used to expedite customer feedback. The focus of the survey was to understand the needs of the districts and their experience with CDE in transmitting and receiving relevant data.

Activity	Description of Activity
Understand Roles and Responsibilities	The team documented how the organization, specifically the roles and responsibilities, are aligned to meet the needs of the data management processes.
Review Communication Policies	Communication policies and plans were reviewed to understand how CDE requests or shares data with the districts.
Review Data Collection Schedule	The team reviewed the data collection schedule to understand when processes are executed and which data is requested and shared.
Produce Current State Summary	This document summarizes all of the key findings from all of the activities listed above. This deliverable will be used as the starting point for building a future state as it outlines the data collection system. This is a constructive deliverable intended to baseline the current state of data collections.

1.4 Assumptions

- North Highland will produce an assessment against the specified objectives identified in the Scope of Work.
- North Highland will not be responsible for the implementation of the future state recommendations but will provide a high level implementation plan.
- North Highland will not be responsible for implementing or managing data architectural systems.
- North Highland may recommend specific technology platforms and applications but is not aligned with any particular vendor or solution.
- North Highland will work with a sample of school districts for customer service and other process improvements. North Highland will not work with every school district and/or school due to the aggressive time frame.
- CDE has existing documentation about the data currently being collected from the school districts.
- North Highland will not be involved in making specific personnel performance recommendations, although some organizational gaps may be identified.
- North Highland will work collaboratively with the Colorado Department of Education staff and will provide the project sponsor and project steering committee with an opportunity to review key project deliverables.
- The Colorado Department of Education will provide a project sponsor to assist with access to key data, personnel and facilities.

2 Definitions and Acronyms

Word/Phrase/Acronym	Meaning
CDE	**Colorado Department of Education**
CEDAR	**Colorado Education Data Analysis and Reporting**
ADE	**Automated Data Exchange**
RITS	**Records Integration Tracking System**
SIS	**Student Information Systems**
ETL	**Extract, Translate and Load**
SASID	**State Assigned Student Id**
EDWS	**Education Data Warehouse**
SEDB	**State Education Database**
IMS	**Information Management Services**
EDAC	**Educational Data Advisory Committee**
BOCES	**Boards of Cooperative Educational Services**
EOY	**End of Year**

3 Data Collection Process Overview

3.1 High Level Overview

The CDE data collection process begins with the State Legislature or the Federal Government passing legislation that mandates the collection of certain types of data at specific frequencies, and charges the Colorado Department of Education (CDE) with the responsibility of collecting the data. Data collections are managed by the particular program units within CDE (e.g. Special Education, Public School Finance, etc.) that is most knowledgeable in that subject area.

When legislation is passed, the various program units identify the specific data elements needed to meet the state or federal requirements. The program unit then conducts research to determine whether or not this data is already being collected. If the data is not being collected, the program personnel in school districts are contacted, through e-mail or focus groups, to determine if they are currently collecting the data and, if not, solicit their advice on the best way to begin the collection process. Each program unit involves the school districts in this process to varying degrees. In some cases, the State School Board is involved in the clarification and interpretation of some legislation. They may take into account recommendations from the school districts and CDE program units.

Depending on the data elements that need to be collected, those elements may be added to a current collection or a new collection will be created. This decision is based on several factors, such as when the data needs to be collected and how similar it is in terms of data already being collected. Once a decision is made, the program area presents the proposed collection to the Education Data Advisory Committee (EDAC).

If approved by EDAC, the CDE program unit personnel define the business rules (i.e. edits) for the various data elements. This process can take several weeks to several months depending on the magnitude of the collection. When the data specifications are completed, they are then disseminated to the program personnel in all school districts through the Web or by e-mail. These district representatives are expected to communicate all collection-related information to other district personnel and applicable vendors that may be involved with or affected by this collection. This happens with varying degrees of success by school district.

CDE program unit representatives meet with CDE Information Management Services (IMS) staff to discuss their needs. IMS staff then develops the technical specifications and a subsequent project plan. Upon agreement by both parties, the project plan is finalized. Programming can take several weeks to several months depending on the complexity of the business rules. Program timing is also impacted by other collection programming projects within IMS.

Depending on the whether it is a new collection or a minor change to an existing collection, formal regional training is provided for the district and documentation is provided or documentation is updated and provided to the school district via the Web.

Data collections are opened for a pre-defined window of time. School districts submit fixed-length files through a Web interface. Business rules are applied to the files and error reports are generated. Fatal errors must be fixed by districts and a new file submitted. Re-submissions of files continue until all fatal errors are corrected. Once all errors have been corrected and the district reviews a Summary Report, they approve their data by pressing an "Approve" icon.

Data is maintained by CDE in an operational data store and becomes the source data for the CDE data warehouse. Reports are generated by IMS for submission to the State legislature or Federal Government. Data is made available to end users through CDE's business intelligence tool, COGNOS, also named the Colorado Education Data Analysis and Reporting (CEDAR) system.

3.2 Stakeholder Roles and Responsibilities

Many groups play a part in the data collection efforts at various levels.

3.2.1 Legislature

The State legislature passes bill that affect the current state of data collection efforts performed at the state level. The Federal Government also passes legislation or policy changes that affect data collections. The result is new collections or changes to current collections.

3.2.2 Education Related Organizations

Third-party organizations such as the Colorado Association of School Executives, Colorado Children's Campaign, and the Colorado Education Association work with lobbyists to influence education related legislation. In some cases, the legislation results in new or changed data collection efforts.

3.2.3 State Board of Education

In 1948, the Colorado State Constitution was amended to authorize an elected State Board of Education to provide general supervision of public schools, with powers and duties described throughout Title 22 of the Colorado Revised Statutes. The first Colorado State Board of Education was elected in November 1950, and began its work in January 1951.

The State Board of Education sets policy in regards to data collection. In some cases, they interpret and clarify legislation related to data collections.

3.2.4 CDE

The Colorado Department of Education (CDE) is the administrative arm of the Colorado State Board of Education. CDE is made up of over forty units, 25 different programs, and 300-plus staff members.

3.2.4.1 CDE IMS

IMS is the technical branch of CDE responsible for analyzing, programming, implementing, and maintaining the systems used for data collection and dissemination. These systems are described in detail in section 4 Technical Review

3.2.4.2 CDE Program Units

The program units within CDE are responsible for interpreting the legislation related to data collections and working with IMS and the stakeholders to define requirements for new collections or updates to current collections. Some examples of program units are Special Education, Data and Research, Finance, Assessment, and Nutrition.

The program units designate business owners who are responsible for each data collection. The program units also provide training and support to the school districts for collections.

3.2.5 EDAC

"The Educational Data Advisory Committee (EDAC) was implemented by the Colorado Department of Education (CDE) as required by Colorado State Law (22-2-116 C.R.S.) in October 2002 to review data demands placed on Colorado Public Education and:

- determine and recommend the most efficient ways of collecting data,
- determine if recommendations for "new" data collections are redundant and propose alternatives,
- review proposed CDE data collection procedures and recommend improvements.

The committee consists of at least eleven members, with at least five volunteers from school districts and two volunteers from boards of cooperative services and a volunteer from a charter school, the volunteers are appointed by the State Board of Education. School district/BOCES members are representative in terms of geography, enrollment, and subject expertise."

3.2.6 School Districts

The school districts are responsible for collecting and submitting data to CDE. In general, there are three groups at the school districts that participate in this activity.

3.2.6.1 Information Technology Staff

The IT staff at the school district level is responsible for implementing and maintaining the systems that provide the data for the data collection efforts. As described previously, the IT staff capabilities at the districts vary. In some cases, the IT person performs many jobs and may also be a teacher or the data collection person.

3.2.6.2 District Departments

At the school district level, there are departments that are analogous to the units at the CDE level. For example, a school district may have a Special Education, Data and Research, Finance, Assessment, and Nutrition department. Depending on the size of the district, one person may represent multiple departments or there may be a whole staff of people responsible for one area.

3.2.6.3 Data Collection Staff

The data collection staff may consist of one or more people depending on the size of the district. The staff is responsible for the compiling of the data and the submission of the data into the CDE system. The various collections can be spread across multiple people, for example one person may be responsible for Student October and another responsible for Finance. Often at the smaller districts the people responsible for collections also have full-time jobs as secretaries, registrars, teachers, counselors, or even as a superintendent. At larger districts, there may be a dedicated staff whose sole responsibility is data collections.

3.2.6.4 Data Entry Staff

The data entry staff are the people at the lowest level who are collecting data on a day-to-day basis and entering it into the school districts' Student Information Systems, Finance, and/or HR systems.

3.2.7 District Software Vendors

The software vendors supply the school districts with Student Information Systems (SIS), Finance or Human Resources (HR) systems. They make modifications to their systems to accommodate CDE collections. Vendors may have to add or edit fields and create reports.

3.3 Process Flow

Figure 3-1 outlines the process followed by IMS and the program units at CDE once State or Federal legislation is enacted.

3.3.1 Requirements Analysis

As part of the process, some of the CDE program units involve the school districts in the requirements process. For example, any collection changes related to the Finance unit are discussed by the Financial Policy and Procedures (FPP) committee. This committee has membership from 22 districts who weigh in on data collection updates and changes. It also has non-voting membership from CDE.

Other units have less formal ways of gathering input from school districts. For example, the Data and Research unit conducts requirement sessions with representatives from districts for End of Year changes. They have a temporary committee set up and populated with volunteers to help decide how new fields should be implemented.

In certain cases, the recommendations from the school districts and program units are overruled by the state school board. An example of this was the calculation to be used for graduation rates.

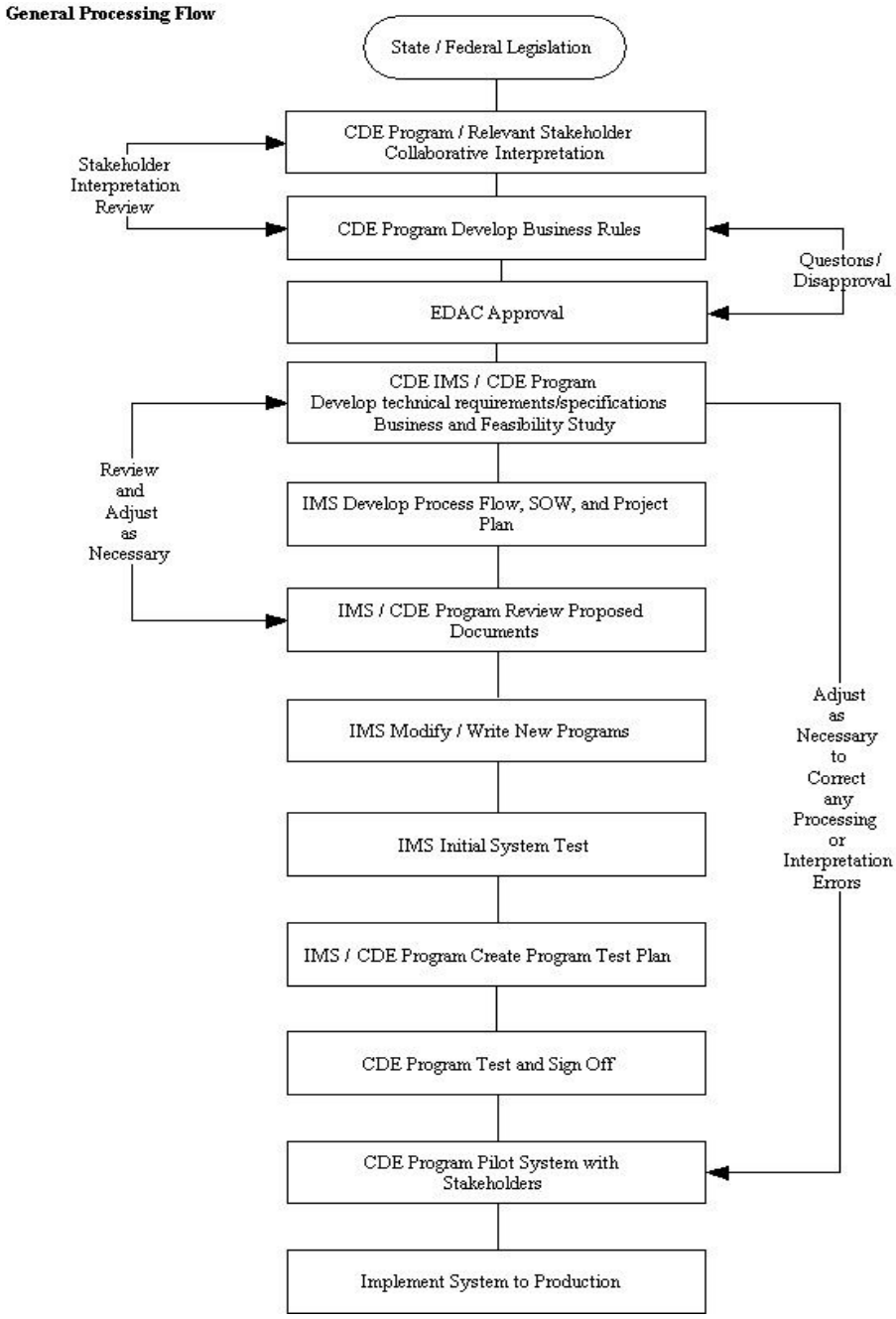
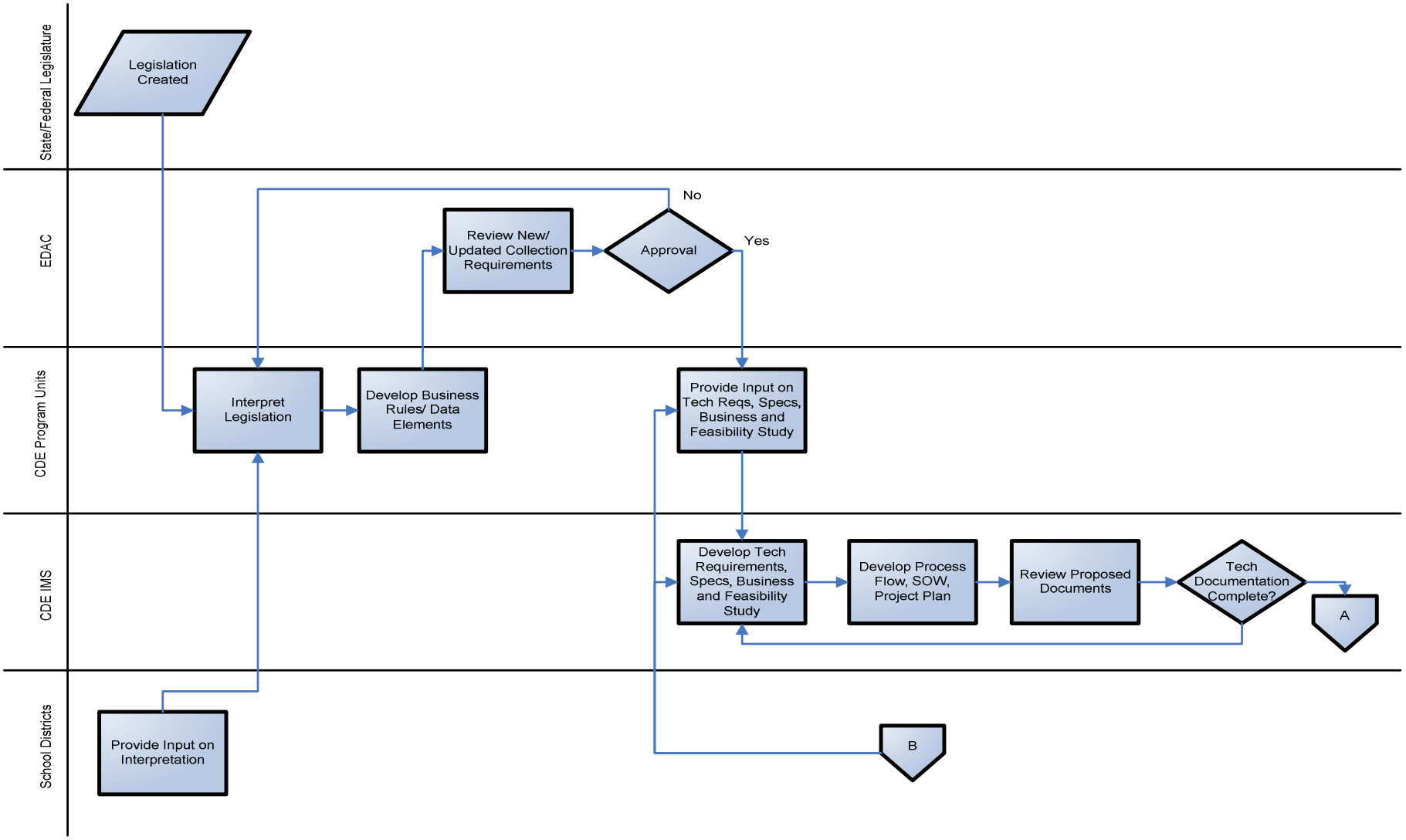
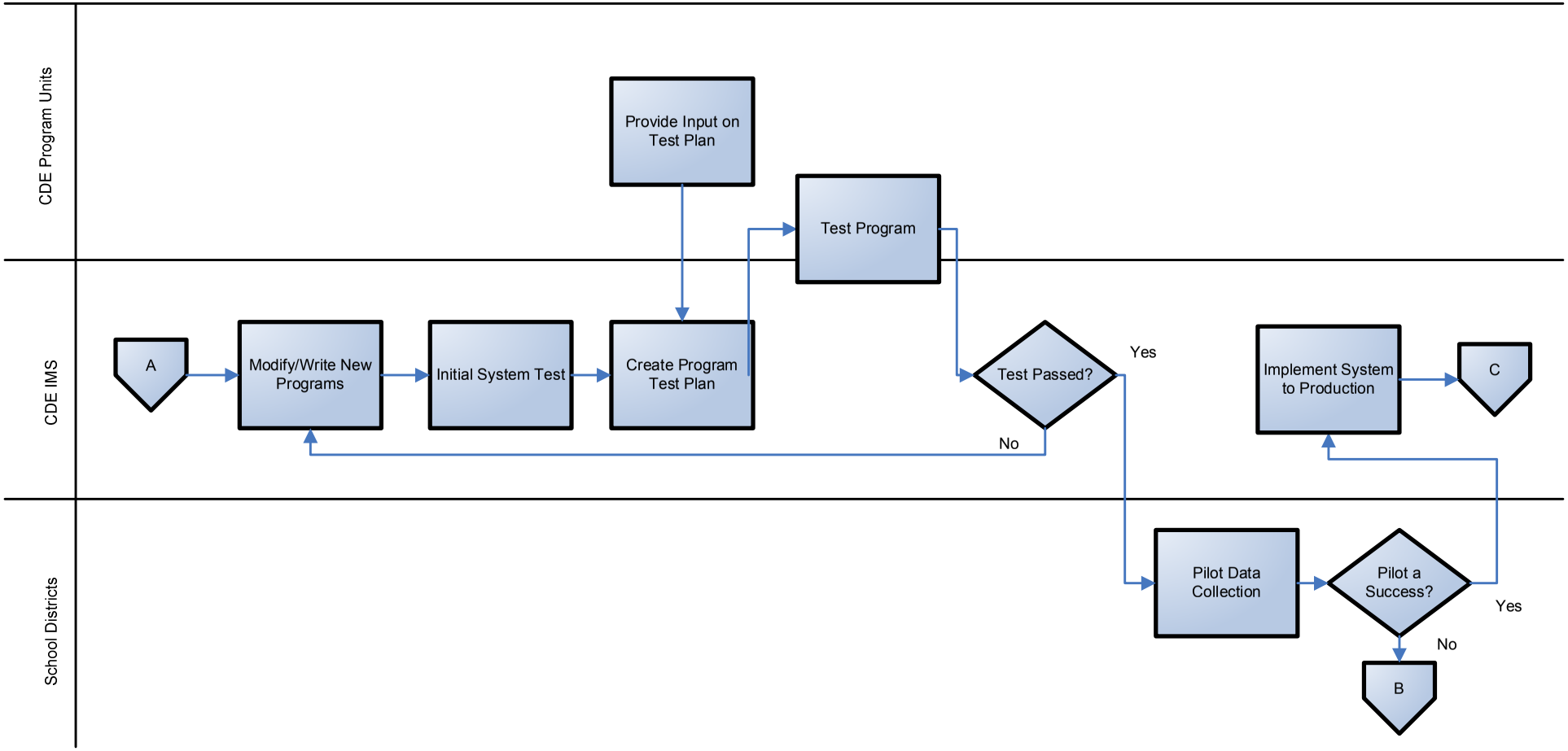


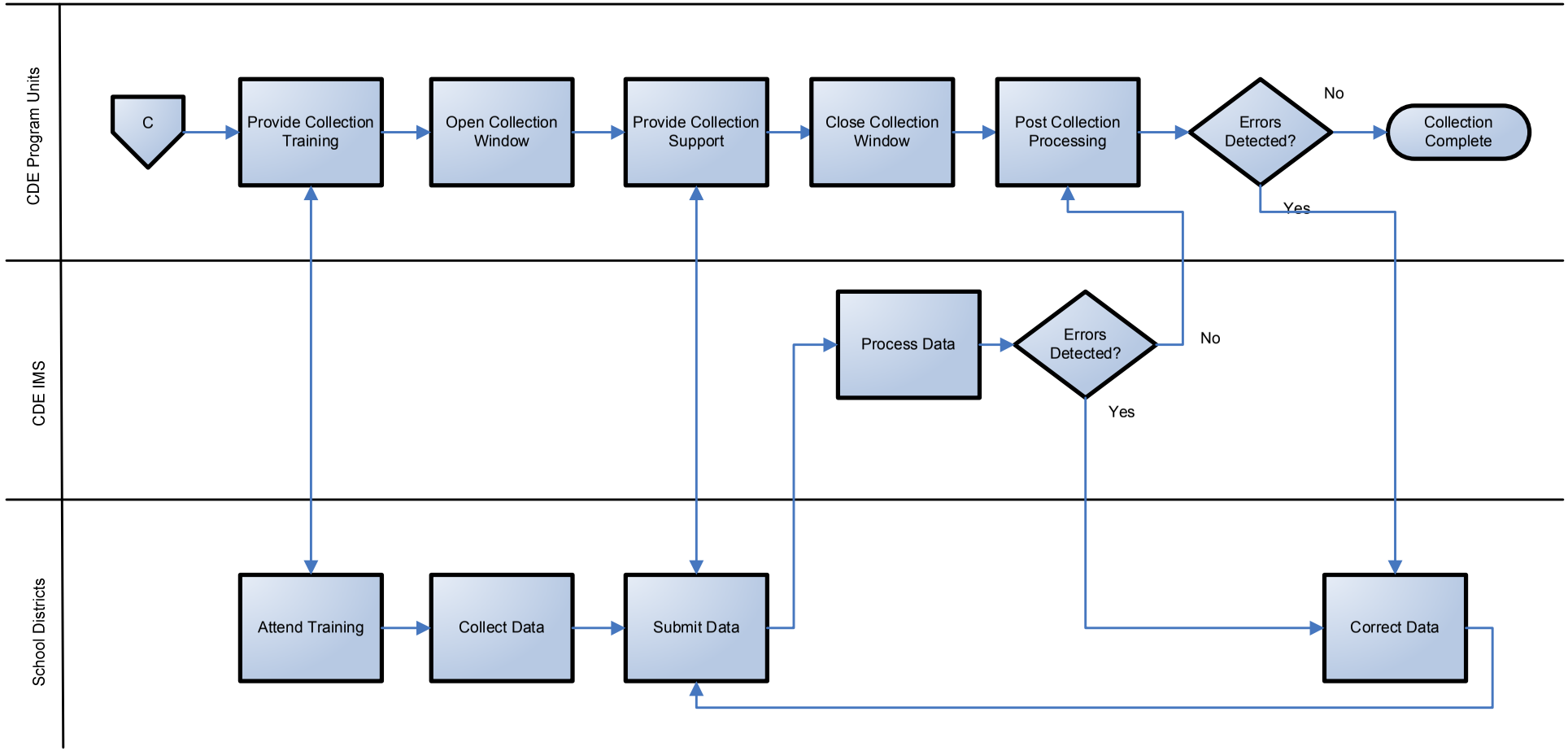
Figure 3-1 Collection Specifications and Implementation Process Flow

3.4 Swimlane Diagram

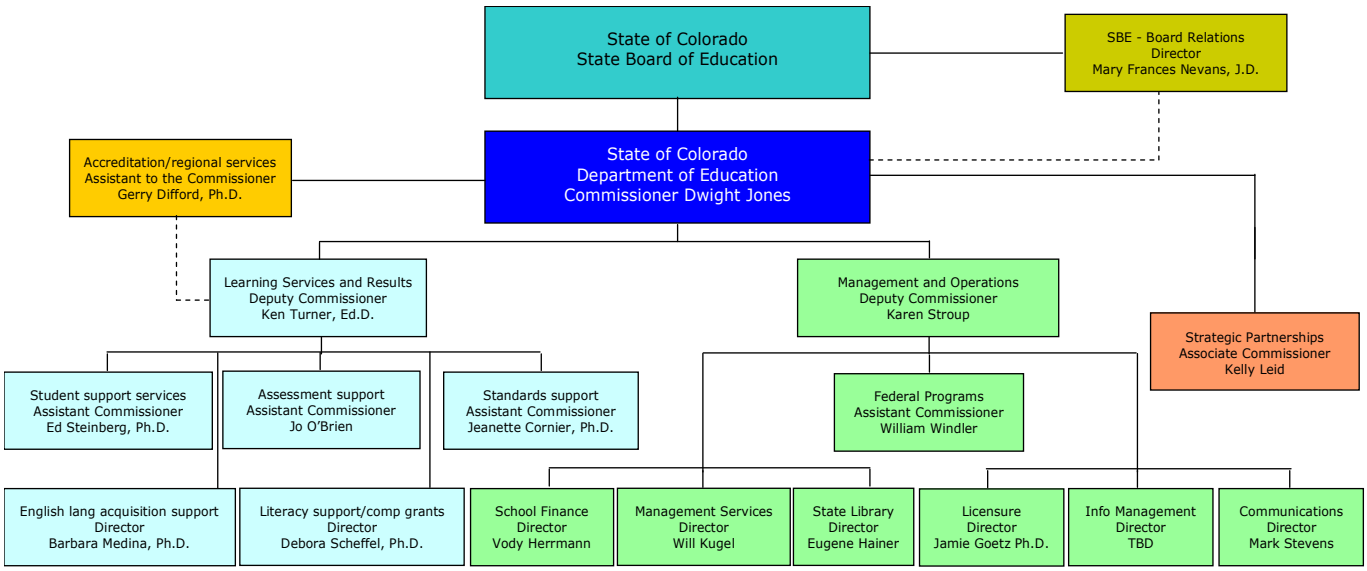
The following swim lane diagrams outline the responsibilities of each group that has a part in the current data collection process.




CDE Program Units
CDE IMS
School Districts
Provide Input on Test Plan
Test Program
A
Modify/Write New Programs
Initial System Test
Create Program Test Plan
Test Passed?
Yes
No
Implement System to Production
C
Pilot Data Collection
Pilot a Success?
Yes
No
B


CDE Program Units
CDE IMS
School Districts
C
Provide Collection Training
Open Collection Window
Provide Collection Support
Close Collection Window
Post Collection Processing
Errors Detected?
No
Yes
Collection Complete
Process Data
Errors Detected?
No
Yes
Attend Training
Collect Data
Submit Data
Correct Data

3.5 CDE Organizational Chart



September 12, 2007

4 Communications

Communications between the districts and CDE encompass multiple aspects. They span the range of topics regarding changes and policy, training, support, and documentation.

4.1 Notice of collections

Policy and data changes are communicated in various different ways. Based on the survey results, 100% of districts receive collection related information via email. Districts also learn about collection information via conferences, workshops, committees such as the Financial Policies and Planning committee, and education related organizations such as CASE. Whereas there are sometimes presentations related to collections during these meetings, most of the information is spread via word of mouth.

4.2 Training

From the survey, 67.9% of respondents are satisfied or somewhat satisfied with the training and training materials given by CDE for collections. The training is given in person, on-line and occurs regionally as well as centralized in the Denver Metro area. Training varies by collection.

4.3 Documentation

In the survey, the majority of the respondents were satisfied with the documentation, but a common request is that they would like to have changes or updates to collections be clearly annotated in the documentation.

4.4 Support during windows

92.9% of the respondents receive support during a collection window by phone. 82.1% also use email to receive support. Other means of support that districts rely on are the CDE Website, FAQ documents, and other districts. The districts noted that they feel the CDE support people are patient and genuine in their desire to help districts during collection windows.

5 Technical Review

5.1 Summary

5.1.1 Introduction

The purpose of this section is to describe the current procedures, processes and systems that make up the CDE Data Collection and Distribution effort.

5.1.2 Overview

Figure 5-1 Statewide Data Exchange Data Flow below shows, at a high level, all the major components and organizations that make up the CDE data collection process. A summary of these components follows:

- **(1) Colorado School Districts, BOCES, and Administrative Units** – collect and submit data collections, access collection data via the CDE website and CEDAR.
- **(2) Automated Data Exchange and Internal Legacy Systems** – CDE systems used to collect and store data collections.
- **(3) Production Oracle Database & Other Systems Databases** – State Education database and other legacy systems used to store data collections.
- **(4) Education Data Warehouse** – extracted from the State Education database used as the basis for generating accountability reports and other information.
- **(5) CTB (McGraw-Hill) Assessment Testing Contractor** – print and distribute test booklets to districts, assemble test results and submit them back to CDE.
- **(6) Education Information Stakeholders** - receive reports and access education data via various techniques:
    - Governor, Legislators, Parents, Public,
    - Education Organizations
    - Media, Researchers
    - Federal Agencies
    - State Board, Commissioner,
    - Directors, Regional Managers, Researchers
    - Other CDE Internal Programs
- **(7) CEDAR/Cognos** – Web based data analysis and reporting systems used to access information contained in the Education Data Warehouse.
- **(8) Discoverer/Cognos** - data analysis and reporting systems used to access information contained in the State Education database
- **(9) Federal and State Reporting** – various mandated reports and data generated from the Education Data Warehouse.

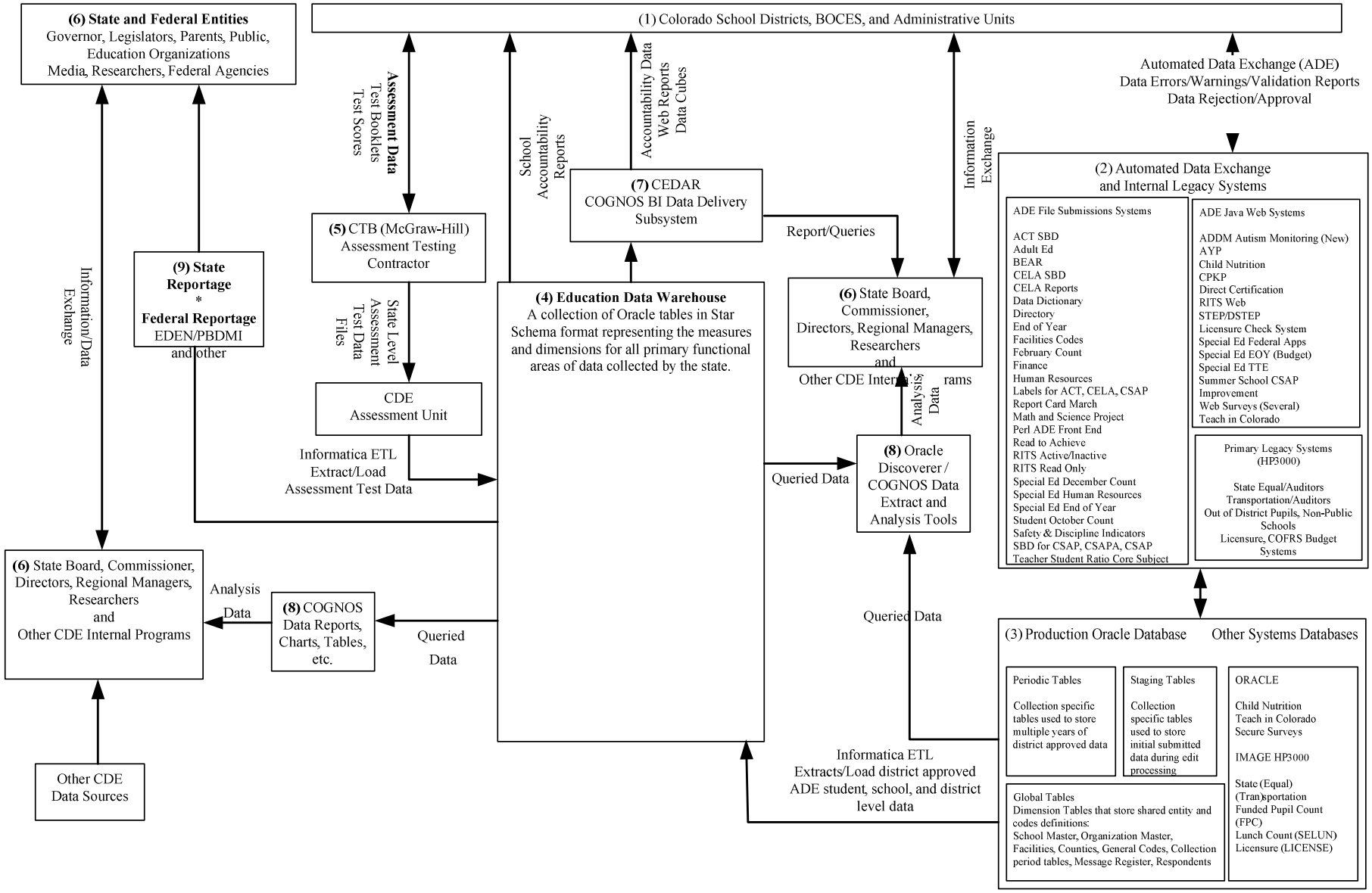


Figure 5-1 Statewide Data Exchange Data Flow

5.1.3 CDE

The CDE has developed a set of systems that support the data collections process, from the submission of data by the school districts, to the analysis and dissemination of the data to interested stakeholders. Most of the process is automated and the systems well integrated. The data collected is processed and stored in two databases (discussed in detail later):

- State Education Database – holds multiple years of collection data in a format that is similar to the format in which it is collected.
- Education Data Warehouse – a star schema or dimensional database that sources most of its data from the State Education Database.

Figure 5-2 CDE Collections Hardware Architecture shows the components of CDE's network and hardware configuration associated with data collection. Details of how these systems are used are discussed later but the architecture shows the basic interaction between the CDE's systems and stakeholders.

The CDE has implemented a typical 3 tiered Web architecture:

- CDE clients access CDE applications like ADE, RITS and CEDAR via the Web over secure HTTPS connections.
- The middle tier consists of 3 servers:
    - ADE Web – provides the Web interface through which districts submit collection data. It performs collection validation and approval, and loads collection data into the ADE database via the ADE database server.
    - J2EE Web Server – hosts Java Web and Oracle Forms applications such as the ADE Web Forms and Interactive RITS.
    - Reporting Web – provides stake holders with access to the data contained in the Education Data Warehouse via various reporting tools such as Cognos and CEDAR.
- The database tier hosts the ADE and Data Warehouse databases. Both are Oracle 9i and consist of one database instance on each server. The two servers are configured in a cluster such that if one server fails either database can be accessed from the other server.
- The ETL Server performs Extract, Translate and Load processes that take data contained in the ADE database and load it into the EDW.

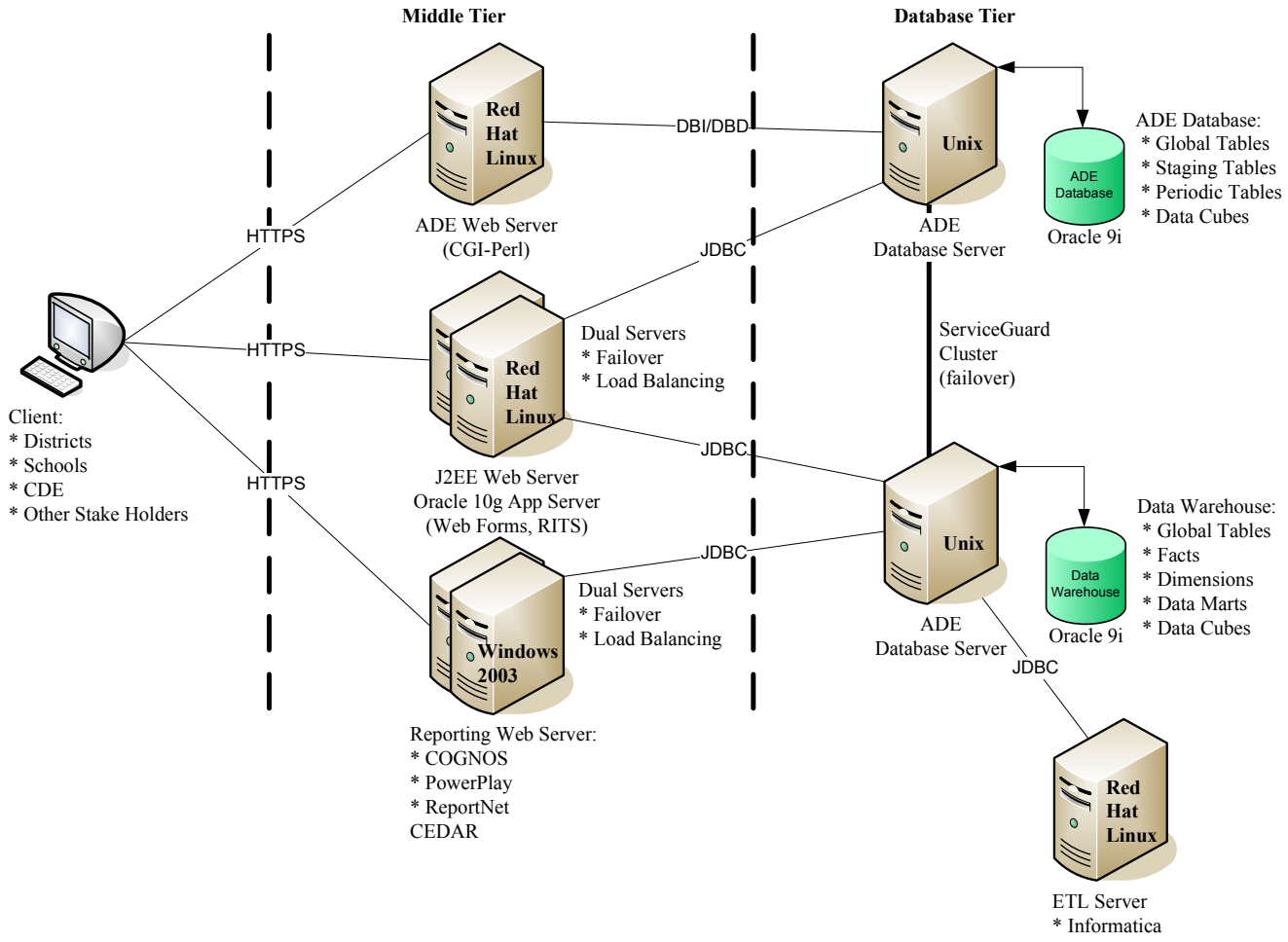


Figure 5-2 CDE Collections Hardware Architecture

5.2 Data Collection Process

5.2.1 Overview

This section describes the Data Collection process from its origin at School Districts to loading the data into databases kept by the CDE.

The primary method used to submit collection data to the CDE is via the Automated Data Exchange (ADE).

5.2.2 Data Sources

Collections data is collected from various sources throughout the state, these sources include:

- Schools and Schools Districts:
  - Data Collections such as End of Year (EOY) and October Count
- External Vendors such as:
  - CTG – McGraw Hill:
    - CSAP test results.
    - CELA test results.
- American College Testing:
  - ACT Test Results

- Boards of Cooperative Educational Services (BOCES) – various reports and collections
- Administrative Units – various reports and collections

5.2.3 School Districts

5.2.3.1 Overview

This section describes the manner in which school districts collect and submit Data Collections to the CDE. Interviews, surveys and meetings with School Districts revealed a broad range of processes, procedures and technologies being used. Attempting to describe each School District's Data Collection processes individually would be prohibitively difficult. Hence, for the purposes of this document, School Districts have been placed into the following Data Collection categories.

- **High Automation** – Districts that extract collection data from their own systems of record such as Student Information Systems (SIS), translate that data into the format required by the CDE and upload the data to the CDE.
- **Intermediate Automation** – Similar to high automation except than one or more of the processes involved may be manual.
- **Low Automation** - Districts that create data collections directly using simple tools like spreadsheets and Access databases. These are typically schools district with a small number of students in rural and remote areas.

Many districts have a hybrid of processes and may fall into the Low Automation category for one collection and the High Automation category for another.

There are also approval processes, other submission processes and other steps that are the same for all School districts, these will be described separately.

5.2.3.2 Collecting and Validating Data

The first stage in most data collections is the day to day collection of data into the school operational systems (Systems of Record). Most districts perform internal data validation processes before submitting any data to the CDE:

- In general, low automation districts usually have only one or two people entering the student data and have a small enough student population that they can manually verify the data.
- Intermediate automation districts have the specialty teachers such as special education, ESL, or Title I, review a file of the specialty students in the system. In some cases they have them check the prior year's list to the current year's information. They may also be proactive in training the primary data entry people such as the secretaries, registrars, counselors, administrators and teachers regarding the importance of data entry and the impact on the reporting and data collections. In some cases they disaggregate the data then send it back down to the schools to verify.
- In general, high automation districts employ the techniques of the intermediate automation districts, but in some cases they have their own data warehouse in which they run queries against to identify bad data. The student information systems have some degree of validation built into them. Some have more built in logic than others.

5.2.3.3 Low Automation

The processes shown in this section are a generalization of the typical Data Collection and Submission processes used by Low Automation category School Districts. Individual School Districts within this category do vary.

5.2.3.3.1 Technical Capabilities

Low automation districts usually have very limited technical capability or access to technical support. Few have any dedicated IT personnel. Most districts rely on the abilities of multi tasked administration staff, assistance from teachers with some IT experience, software vendors, and occasional outside consulting help.

5.2.3.3.2 Typical IT Architecture

Low automation districts typically have very limited access to technology. In some cases the technology being used to support the data collection process is nothing more than a PC and spreadsheet application, often supported by a single administrator located at the district office.

Some of these districts may have basic Student Information (SIS) and other systems such H/R and Finance but even these may be simply be spreadsheets.

Some districts may have centralized SIS, accessible by schools via the Web. Web access in these districts is frequently very limited, (sometimes just dialup), both between schools and the districts, and the district and CDE. Others have distributed SIS, each school having its own system with information being communicated to the district using periodic batch processes that may include, daily uploads, mailed disks/paper, email or telephone.

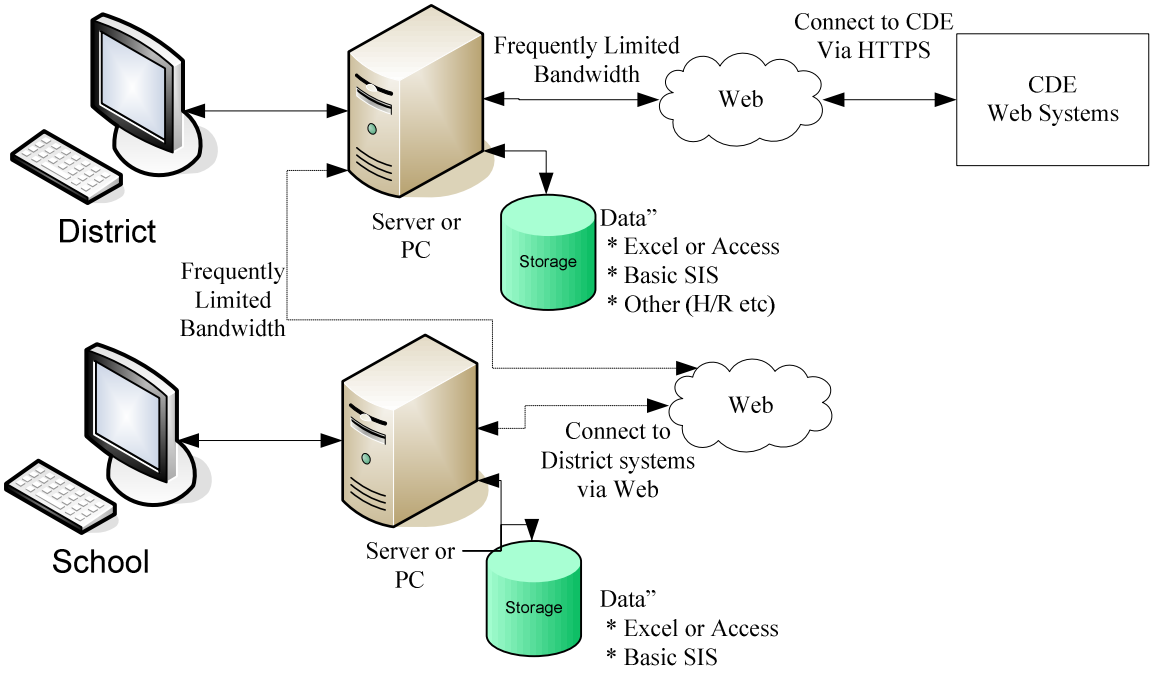


Figure 5-3 Typical Architecture

5.2.3.3.3 Collection Preparation

Figure 5-4 Collection Preparation shows the typical processes used to prepare for new Data Collections and changes to existing ones:

- Data Collections are typically kept in Spreadsheets or small databases like MS Access. Some with one spreadsheet corresponding to one collection. However, many districts in this category are more sophisticated and have a more complex relationship between spreadsheets and collections so as to reduce the amount of duplicate data entry and storage.
- The School District receives notice of new collections and changes via email. Emails are sent from CDE to the designated School District contact for the effected Data Collection. Emails may include preliminary

information about changes, information about training, technical details of changes and pointers to the CDE website where the district can obtain more information.

- The School District then makes appropriate changes to their spreadsheets or database to reflect the changes. These may be as simple as adding a column or as complex as creating new spreadsheets to support new collections.

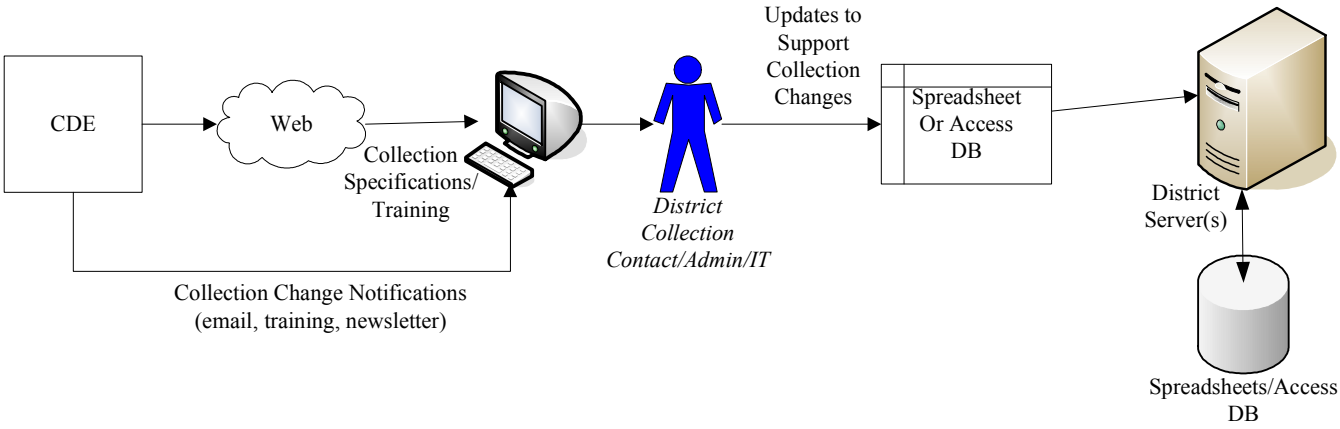


Figure 5-4 Collection Preparation

5.2.3.3.4 Collection Window

Figure 5-5 Collection Window shows the typical process followed during a collection window:

- The district (frequently a single person is responsible for all or most collections), gathers collection data from prior years collections and data from other "systems and record", and enters them into spreadsheets or simple databases.
- The spreadsheets are then saved in the file format required by the CDE, typically fixed length record text files.
- Files are submitted to the CDE via the Web using the ADE process (described later).
- The ADE process generates Error Reports (assuming there are errors) and makes them available to the district via the Web.
- The district prints the Error Report and uses it as the basis for making correction to the collection spreadsheets. The process is then repeated until all errors have been corrected.

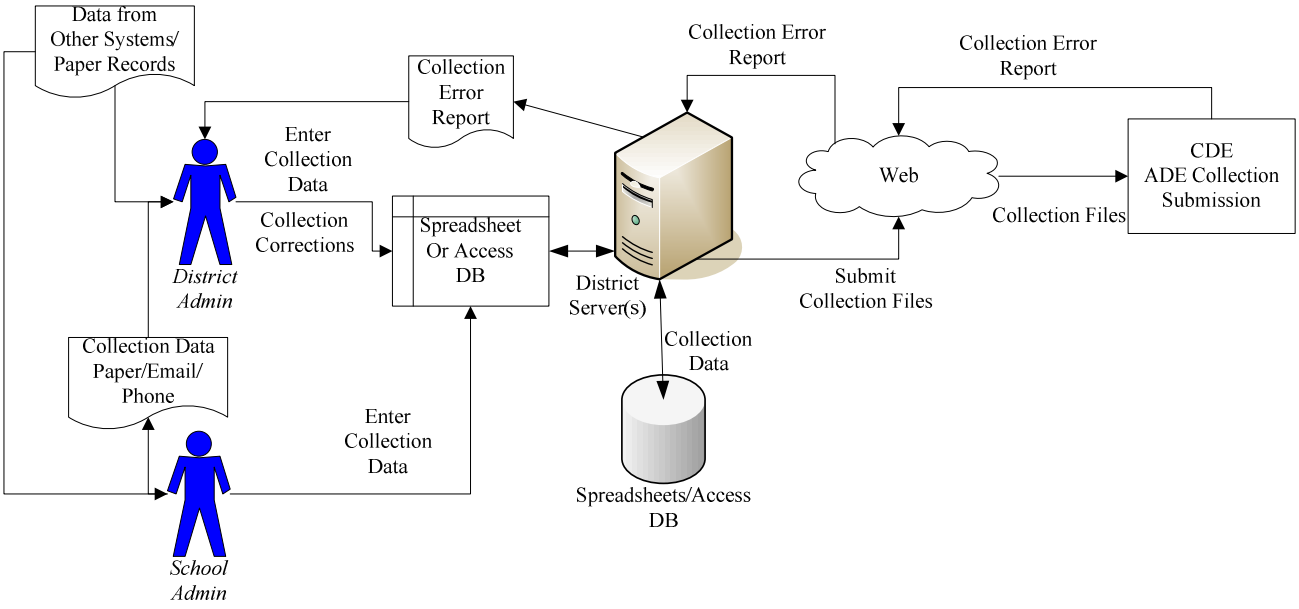


Figure 5-5 Collection Window

5.2.3.4 High Automation

The processes shown in this section are a generalization of the typical Data Collection and Submission processes used by High Automation category School Districts. Individual School Districts within this category do vary.

5.2.3.4.1 Technical Capabilities

Most of these districts have dedicated IT and administrative staff to work on the data collection process, although they may not be assigned to this task full-time.

Typical roles found at districts included:

- CIO – Chief Information Officer responsible for managing the districts and schools IT infrastructure. Setting policy, strategy and direction.
- Developers – Software development specialist that develop, maintain and deploy in-house software, such as Collection ETL, and support vendor software like SIS.
- Database Administrators – Database specialists that deploy, manage, and support the districts databases.
- System Administrators – responsible for managing and supporting the districts servers and networks.
- Administration – support administrative tasks associated with collections, such as:
    - Interpreting and implementing new/changes to collections.
    - Ensuring new data is collected.
    - Reviewing and auditing collected data.
    - Managing the submission process; submitting files, correcting errors and approving final collections.
- Training and Support – responsible for training staff and providing support on the use of the districts systems.

Frequently different roles are performed by the same individual or shared within a team. Districts also enlist support from software vendors to make changes to applications like SIS to support new/changed collections. Many districts also use contract consultants at various times.

5.2.3.4.2 Typical IT Architecture

High automation districts usually have fairly sophisticated IT environments and high capacity networks:

- Districts will have one or more servers. The servers are usually Windows based but some still have legacy systems like IBM AS400, or a combination of both. These servers centrally host various applications:
  - Student Information Systems (SIS)
  - Human Resources (HR)
  - Financial Systems
  - Collection management systems that extract data from systems of record (like SIS), translate it into the format required by the CDE and upload the data to the CDE.
  - Most of these systems are provided by vendors, with a few developed in-house, like Collection ETL (Extract, Translate and Load).
- Schools access the central systems at the district via the Web. In some cases the schools have individual instances of applications like SIS and perform periodic (usually daily) uploads of their data to central systems at the district.
- Some districts use "Hosted Services", in which a third party hosts one or more of their applications, rather than being hosted on servers at the school district.

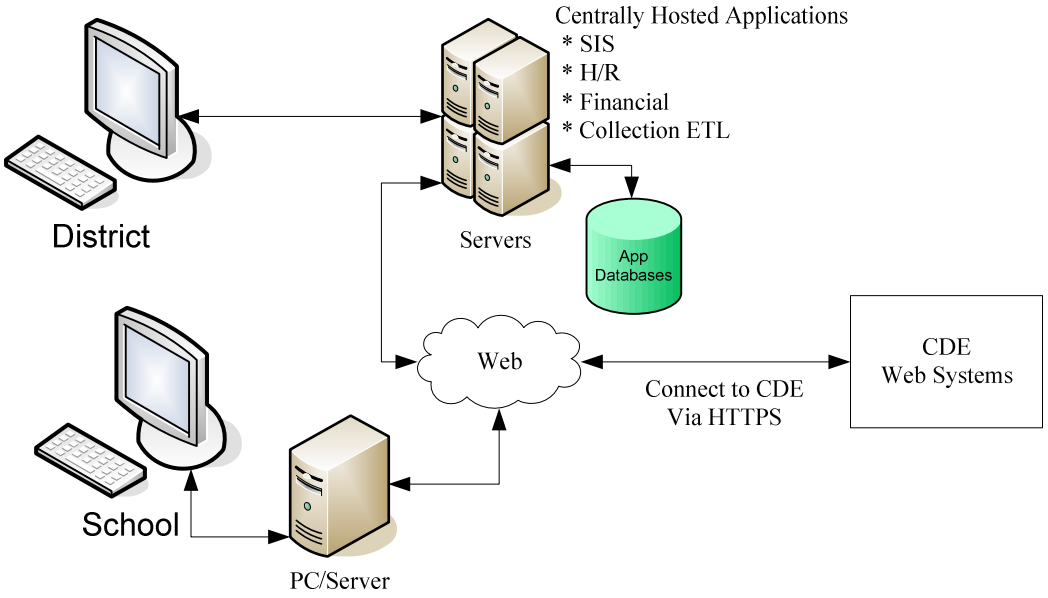


Figure 5-6 Typical Architecture

5.2.3.4.3 Collection Preparation

Figure 5-7 Collection Preparation shows the typical processes used to prepare for new Data Collections and changes to existing ones:

- Data Collections are typically extracted from other "Systems of Record" operated by the district. These systems are typically hosted on a central set of servers by the district and include systems such as:
  - SIS – Student Information Systems
  - HR – Human Resource Systems
  - Financial Systems
- The School District receives notice of new collections and changes via email. Emails are sent from CDE to the designated School District contact for the effected Data Collection. Emails may include preliminary information about changes, information about training, technical details of changes and pointers to the CDE website where the district can obtain more information.

- Depending the complexity and type of change. The district will make changes to systems and processes (usually developed in-house) that Extract and Translate data from their Systems of Record to produce the collection file format required by the CDE. The Software Vendors that supplied the district's systems may also make changes to their software to support the new collection, such adding addition data element to be collected.

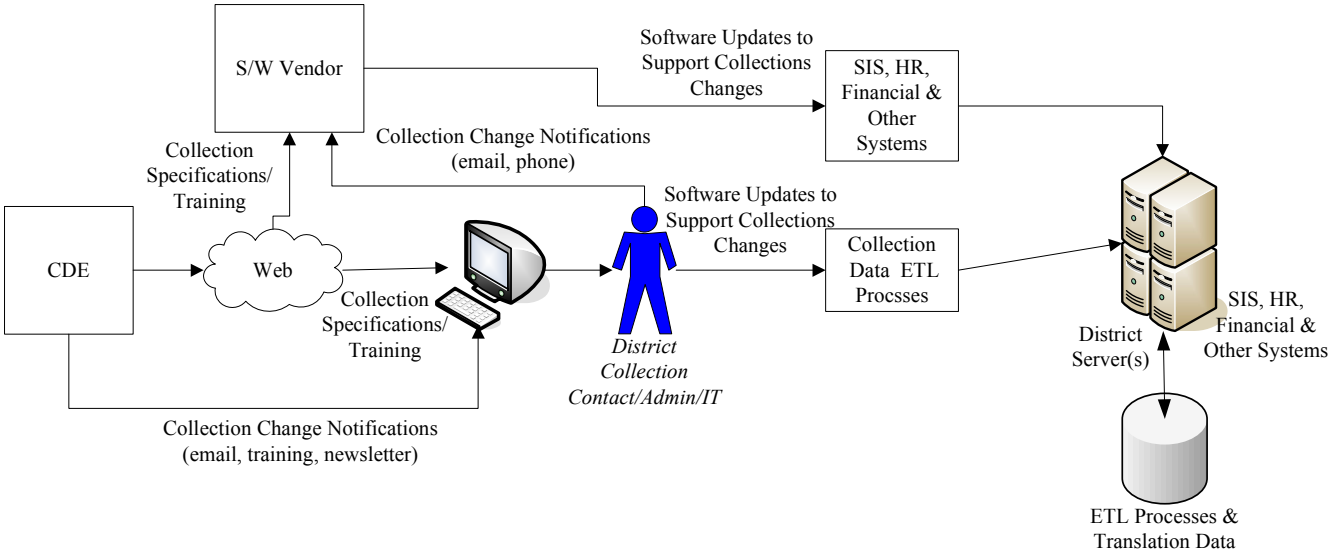


Figure 5-7 Collection Preparation

5.2.3.4.4 Collection Window

Figure 5-8 Collection Window shows the typical process followed during a collection window:

- Various district staff members collect student, financial, human resources and other data throughout the year using the districts own systems. Additional data may be collected during the collection window that is specific to the collection or that is date dependent, such as Student October count.
- District staff members, usually IT specialist, run ETL processes that Extract data from the districts systems, Translate the data into the file in the format required by CDE, typically fixed length record text files.
- Files are submitted to the CDE via the Web using the ADE process (described later).
- The ADE process generates Error Reports (assuming there are errors) and makes them available to the district via the Web.
- Error reports may be printed and reviewed for errors. In many cases district have automated or semi-automated processes that can extract errors from the reports.
- Error can fall into several categories an the action taken depends on the error type:
    - Some errors are a result of incorrect data in the "System of Record". In this case, district staff members are notified of errors and make corrections in the appropriate "System of Record".
    - Errors can be the result of problems with the ETL processes. In which case IT staff make changes to the ETL software.
    - Frequently deadline time pressures force the district to make changes directly to the submission files and then correct the true source of the error at a later time.
- After correcting errors, the process is repeated until all errors are corrected.

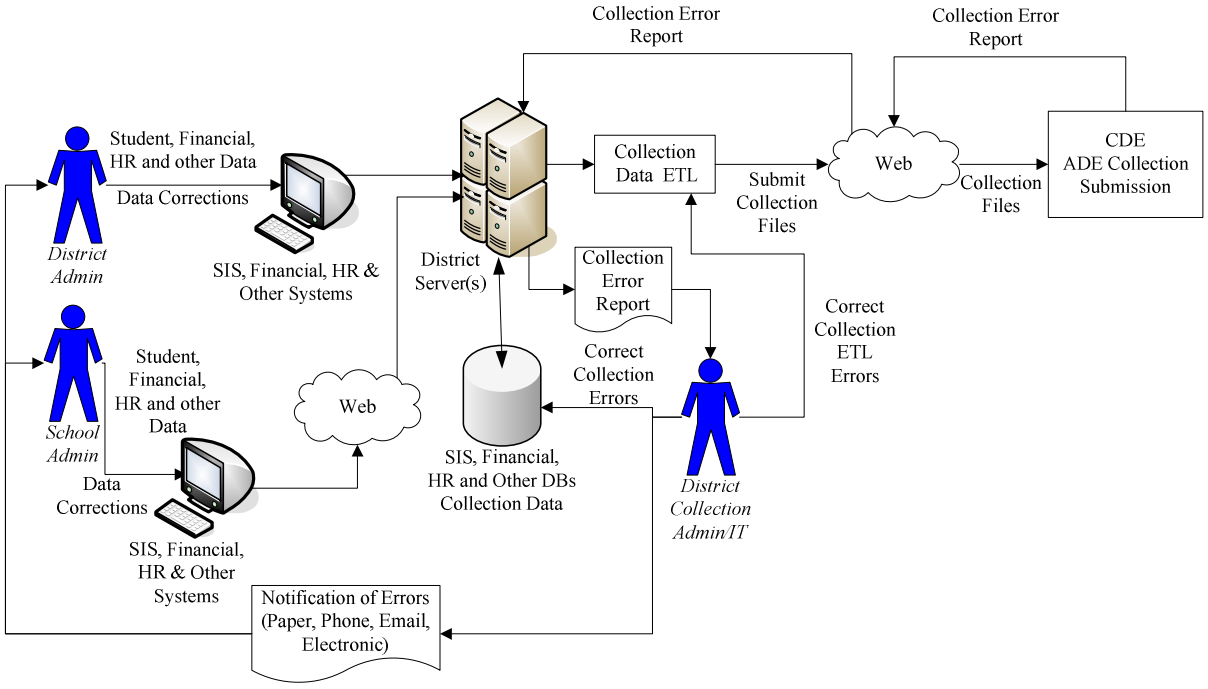


Figure 5-8 Collection Window

5.2.3.5 Intermediate Automation

Most districts fall into this category. The Data Collection and Submission processes are similar to those described in section 5.2.3.4 High Automation except than one or more of the process may be manual or manual intervention may be required.

A typical example would be districts that generate Excel Spreadsheets from "Systems of Record", similar to the ETL process described above but then must manually manipulate the spreadsheets to get the data into the format required by the CDE ADE data submission process.

5.2.3.5.1 Technical Capabilities

The technical capabilities of these districts would be somewhat similar to high automation districts except they may have fewer staff, more staff assigned multiple roles and more reliance on vendors.

5.2.3.5.2 Typical Architecture

The typical architecture for these districts would usually be some mix of the low and high automation districts.

5.2.3.6 Web Form Collections

Applies to all Automation categories.

Several Data Collections must be entered via Web Forms developed by the CDE.

Figure 5-9 Web Form Collection Entry shows the Web Form Data Collection entry process:

- Districts collect data from their internal systems and other records.
- Districts enter data into online forms via the ADE Web Form submission process (described later).

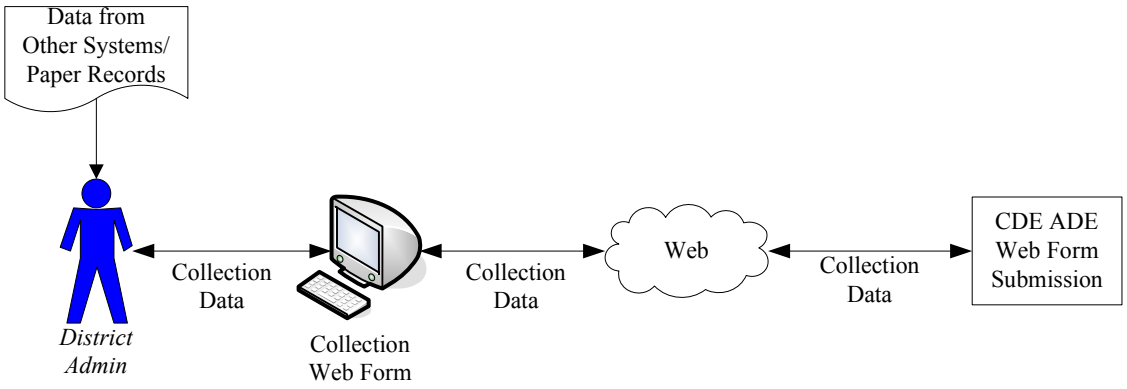


Figure 5-9 Web Form Collection Entry

5.2.3.7 Excel File Template Spreadsheet Tool

A few Data Collections with large record lengths may be submitted to the CDE using Excel File Template Spreadsheets. Collection Excel Template Files are provided by CDE to districts to be used as tool that districts may optionally use to create the collection file to submit data collections via the ADE.

Figure 5-10 Excel File Template Spreadsheet shows the process by which spreadsheet collections are submitted:

- The district downloads the Excel Spreadsheet template from the CDE Website.
- The district enters the collection data into the spreadsheet using data from the districts own records and systems.
- The district executes a macro contained in the spreadsheet to generate the file format needed to submit the data collection to CDE via ADE.
- The data Collection file is submitted to CDE over the WEB via the normal ADE described later.

Many districts have automated this process to one degree or another. Using processes similar to the ETL process described earlier, districts either automatically fill in the spreadsheet or generate the collection file directly from data extracted from their own systems.

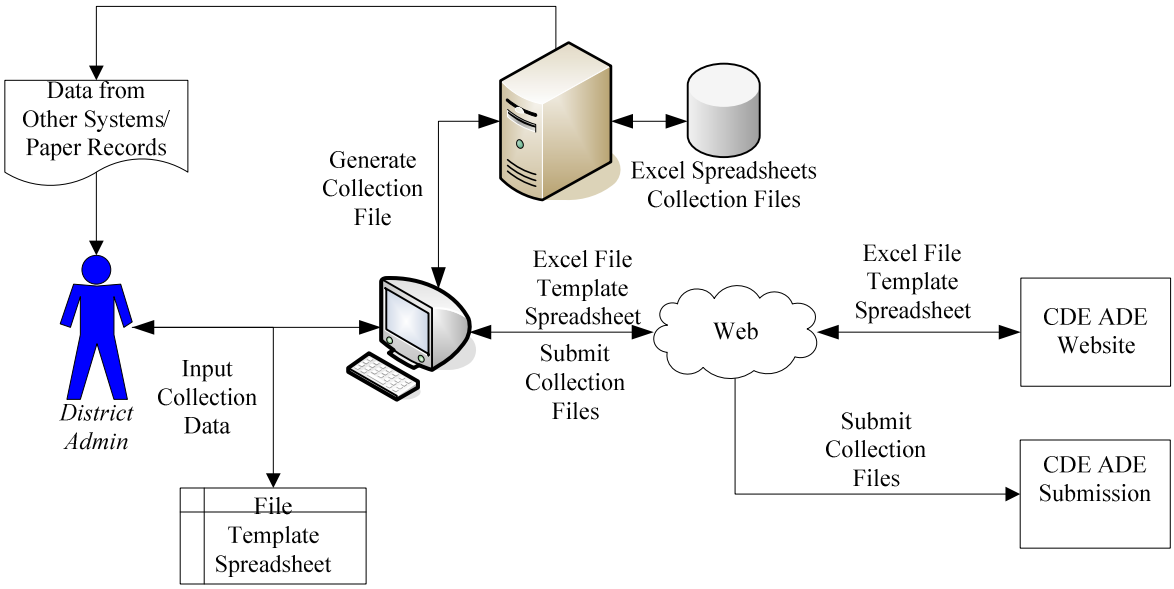


Figure 5-10 Excel File Template Spreadsheet Tool

5.2.3.8 DOS Collection

Applies to all Automation categories.

One Data Collection (Out of District Pupils) is submitted to the CDE via a DOS system using diskettes. However, CDE is hoping to replace it sometime in 2007/2008 with a Java Web Forms process.

Figure 5-11 DOS Collection Process shows the process by which DOS Collections are submitted:

- CDE loads the DOS system onto diskettes along with beginning files based on the prior year's data and mails them to the districts
- The district loads the software and data onto their PC and make current year adjustments to the collection data.
- Then the system and data files are copied back on to the diskette and mailed to CDE for final processing.
- The CDE runs edits and validation procedures on the data before it is accepted as final.
- Any errors or data questions are resolved by phone and email.

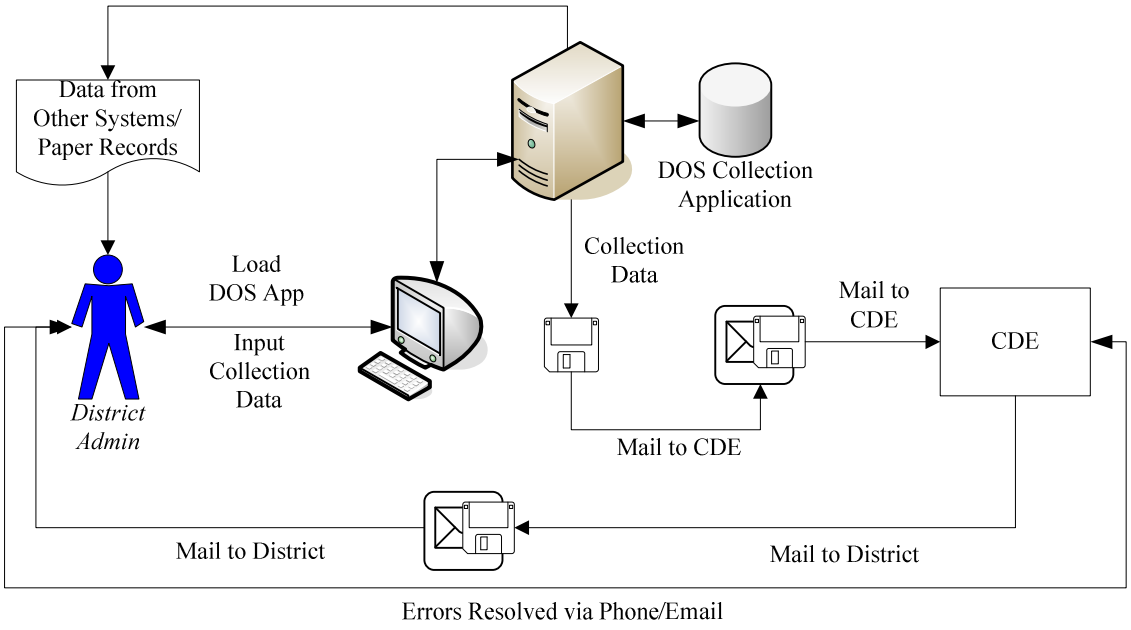


Figure 5-11 DOS Collection Process

5.2.3.9 Collection Approval

Once a Data Collection has passed all edits and validation performed by the ADE process the districts must approve or reject the collection. The approval process is as follows:

- The district reviews collection summary reports using ADE via the internet.
- After review the district can:
    - Approve the collection, at which time no further changes can be made and data moves onto further processing at the CDE (described later).
    - Reject the collection, at which time the district must re-submit collection data files using the methods described earlier.

Some collections go through an additional approval process. Once all districts have submitted and approved their collection the CDE performs state level cross district validations. Any districts that are found to contain errors are

notified via email. The district must then correct the errors and re-submit the data collection in the same way it was submitted during the regular submission process.

5.2.3.10 Records Integration Tracking System (RITS)

Before any student can be included in a data collection, the student must be assigned a statewide unique Id, called a State Assigned Student Id or SASID. Student based data collection files must include the SASID for each student.

Districts and schools use the Records Integration Tracking System (RITS) to attach SASIDs to students. The details of the RITS process are covered in section 5.2.5 Records Integration Tracking System (RITS) later.

5.2.4 Automated Data Exchange (ADE)

5.2.4.1 Overview

The Automated Data Exchange (ADE) is a system developed by the CDE to allow School Districts to submit collection data electronically via a secure WEB interface. The ADE provides two basic data submission interfaces:

- **File Submission** – a Web interface through which districts submit data collections in the form of one or more files. The files are text format with fixed length records and fixed length fields.
- **Web Form Submission** – a Web forms interface through which districts enter data collections directly into predefined forms.

5.2.4.2 File Submission

Figure 5-12 ADE File Based Data Submission Process defines the internal ADE process that takes place during file based submission:

- School districts submit collections in the form of text files via a secure Website (see 5.2.3 School Districts, earlier).
- Preliminary edit checks are performed for record length, etc.
- If edit checks pass, the data collection files are loaded into Staging tables in the State Education Database.
- Otherwise, an Error/Warning report is generated, made available to the district via the Web, and an email sent to the district to notify them of the result. The district must then correct errors and re-submit the files.
- The ADE process then goes through up to 3 levels of edit and validation checks, each becoming more complex, from simple edits for correct format and length and valid value checks through to complex validation of interrelated data elements.
- If the edit checks pass then data collection Summary Reports are generated and a confirmation email is sent to the district. The data is now ready for approval by the district.
- Otherwise, an Error/Warning report is generated, made available to the district via the Web, and an email sent to the district to notify them of the result. The district must then correct errors and re-submit the files.
- Once the submitted files pass all edit checks the district reviews the data collection Summary Reports and approves or rejects the data collection via a Web form.
- If the district approves the data collection, a final data collection Summary Report is generated and the district is sent an acceptance confirmation email. Districts must complete the acceptance process by printing and signing the Summary Report as accepted. Once approved, collection data is loaded from the Staging to the Periodic tables.
- Otherwise the district is sent a rejection confirmation email. The district must then correct any errors and re-submit the files.
- Finally, for some collections, once all districts have submitted a particular collection, the ADE runs state level cross checks, such as ensuring a student is not being reported in more than one district.
- If there are no state level errors, the district goes to the collection approval process as described above.

- Otherwise, an Error/Warning report is generated, made available to the district via the Web, and an email sent to the district to notify them of the result. The district must then correct errors and re-submit the files.

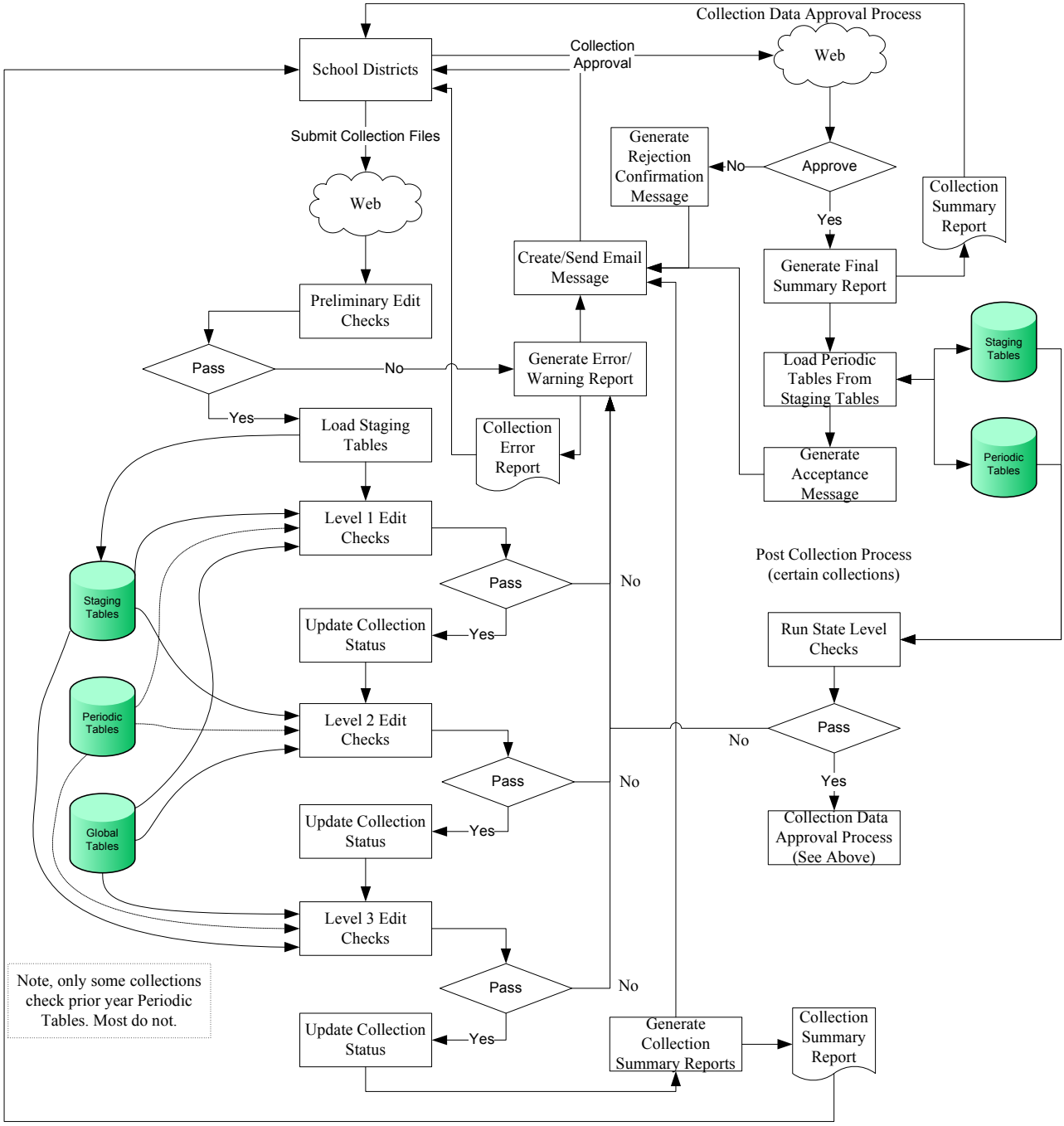


Figure 5-12 ADE File Based Data Submission Process

5.2.4.3 Collection Edits and Validation

As shown in Figure 5-12 ADE File Based Data Submission Process, data collections submitted by districts can go through as many as four levels of edit and validation checks. One collection, End of Year, goes through five levels. Many collections have well over 200 edit and validation rules (End of Year has over 400), which they must pass before they can be accepted.

5.2.4.4 Web Forms

The Web Form submission process is similar to the File Based process except that the data is initially submitted to CDE via online Web forms. After the data is submitted it follows the same processes as file based submissions.

5.2.4.5 Legacy Systems

Some collections continue to use legacy systems developed on an HP3000 using the Image3000 database, COBOL, Cognos, Omnidex, SUPRTOOL and other system Utilities. Most are in the process of being replaced by Java Web Applications. These collections are listed in Appendix D: CDE S/W Summary Tables.

5.2.4.6 Architecture

See Figure 5-2 CDE Collections Hardware Architecture.

5.2.4.7 Database

The ADE, or State Education, database consists of a single Oracle 9i database instance running on a single server (although this server is in a cluster with the Data Warehouse server for failover purposes, see Figure 5-2 CDE Collections Hardware Architecture). It consists of the following major groups of tables:

- **Global Tables** – master tables of codes such as schools, districts, counties, general codes, etc.
- **Staging Tables** – tables that reflect the format of data submission files. Typically there is one detail staging table per collection file, but some collections use two files e.g. header and detail table. These tables are used to store collection data until it is validated and accepted.
- **Periodic Tables** – once collection data has passed all edit and validation checks, it is loaded from the Staging tables into the Periodic tables. Periodic tables are similar to the Staging tables except they hold multiple years of data.

Details of the tables are contained in Appendix A: State Education DB Tables.

5.2.5 Records Integration Tracking System (RITS)

The Record Integration Tracking System (RITS) is a Web based system deployed by the CDE to assign unique identifiers (State Assigned Student Identifiers, SASID) to every student in the state.

All student-based data collections use the SASID to uniquely identify students. Submitted collection files include the SASID for each student. SASIDs are subsequently validated using the RITS matching engine, comparing student locators against the data contained in RITS. Student locators include:

- First Name
- Last Name
- Middle Name
- DOB
- Gender

SASIDs uses include:

- Uniquely identify every student in the state.
- Help identify and resolve duplicate student record both within a district and across districts.
- Used in the label process for printed CSAP testing booklets.

RITS has the following primary interfaces (see Figure 5-13 RITS Process):

- An interactive Web (Java) interface through which districts and schools can search, update and add student SASID records directly online.
- An ADE interface through which districts may submit text files containing batches of student locators for SASID changes and new assignment. This interface works in much the same way as the Collection Submission ADE interface (see 5.2.4 Automated Data Exchange (ADE) earlier).

- Case Management - a Web based Java application that supports duplicate SASID research and resolution/correction.
- SASID validation of collection data during the ADE collection submission process.

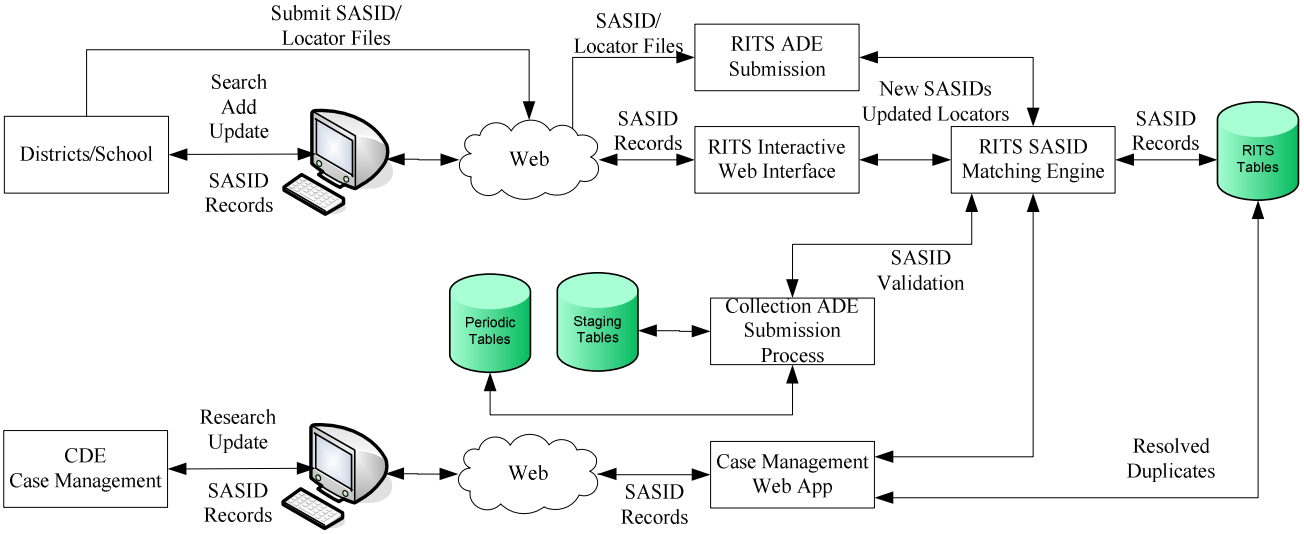


Figure 5-13 RITS Process

5.3 Data Collection Access and Distribution

5.3.1 Overview

This section describes the processes by which the information collected in the Data Collections is reported and made available to the various stakeholders.

5.3.2 State Education Database

Once data has been collected and stored in the State Education database, it is distributed and made available to interested stakeholders via a number of tools and techniques, these include:

- **Oracle Discoverer and Cognos**- ad-hoc query, reporting, analysis, and Web-publishing tools that allow internal CDE program staff to analyze data contained in the database to research collection issues and publish data for various stakeholders, including:
    - The State Board
    - The Commissioner
    - Regional Managers
    - Researchers
    - Other CDE Internal Programs
- **Collection Reports** – collection reports are made available to districts via the CDE website. These are typically accessed by districts during the collection process to review and confirm the data's accuracy.
- **CSAP Labels** – ADE processes generate labels files that are sent to the CTB vendor (MCGraw Hill). Whom, in turn print CSAP test booklets and distribute them to schools for testing. Test results are loaded into the Education Data Warehouse (see later).

5.3.3 Education Data Warehouse

The Education Data Warehouse was originally developed to support School Accountability reporting. It now contains most of the data collected in the SEDB, supports several other reporting needs, and is accessible by certain stakeholders via analysis and reporting tools. It is a "Star Schema" or dimensional database intended for research and analysis. Its data is loaded from the State Education Database using Extract, Translate and Load (ETL) processes.

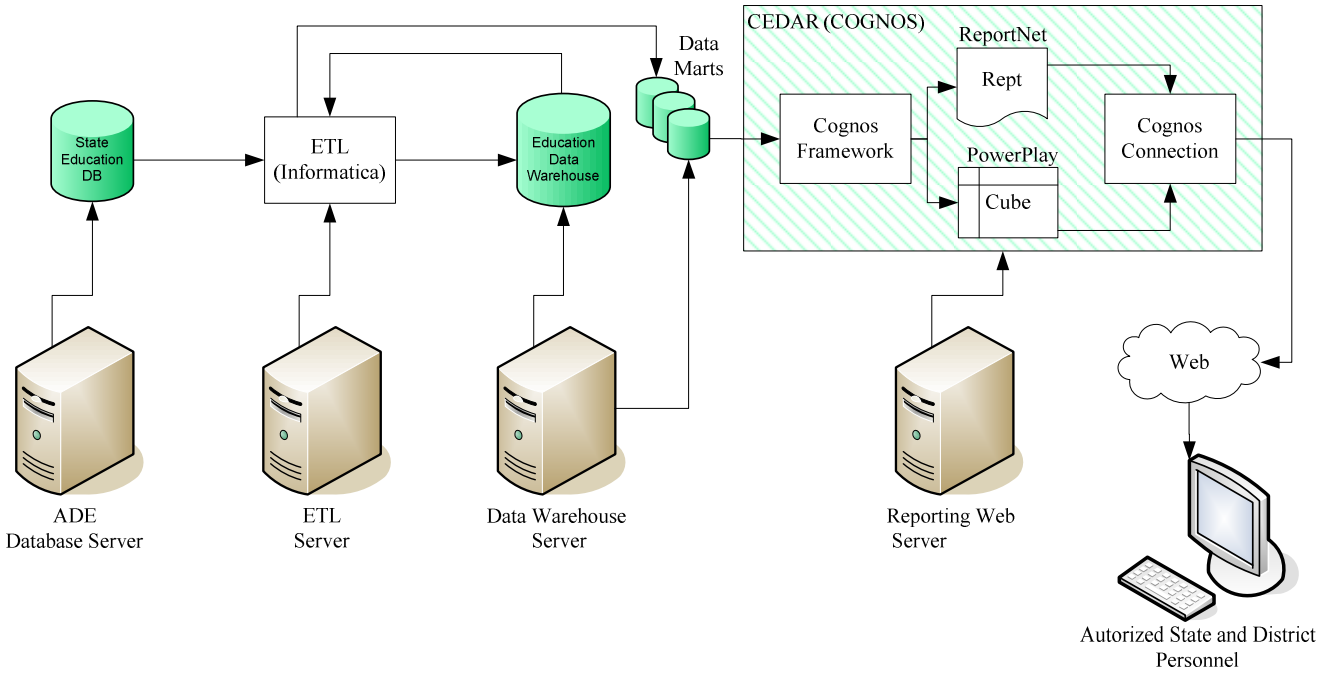


Figure 5-14 Education Data Warehouse

5.3.3.1 ETL

The ETL tool used by the CDE is an off the shelf software application called Informatica. Using this tool, IMS developers are able to define data sources, data destinations, and extraction and translation rules, from which processes are generated to extract, translate and load data into the data warehouse and Data Marts. Sources of data loaded via this process include:

- The State Education Database (collections)
- CSAP test results, obtained in structured file format from the CTB vendor (McGraw Hill).

Although originally developed to support Accountability reporting, the EDWS is continuously evolving to support data reporting needs. Approximately 80% of the data collected in the State Education database is loaded into the EDWS and there are plans to include more.

5.3.3.2 Data Marts

Data Marts are essentially small data warehouses extracted from the Education Data Warehouse to support the reporting and analysis of particular segments of information. IMS creates data marts using similar ETL processes using Informatica as described above. Several data marts have been created to support particular reporting needs (see 5.3.3.4 Stakeholder Reporting later) and support the Colorado Education Data Analysis and Reporting (CEDAR) tool (see later).

5.3.3.3 Data Analysis (Cognos)

CDE uses two COGNOS software applications, ReportNet and PowerPlay, to analyze and report on data contained in the Education Data Warehouse:

- ReportNet – is used to generate standard or fixed format reports, which can be refined by users adding selection criteria and filters at the time of execution.
- PowerPlay -. Generates user definable data analysis cubes and reports. Data cubes are methods of analyzing data from different perspectives or dimensions, similar to Excel pivot tables.

Both tools are accessible via a Web interface and analyze and aggregate large amounts of data into summarized, comprehensible forms, including reports, charts, tables and graphs.

5.3.3.4 Stakeholder Reporting

One of the primary purposes of the Education Data Warehouse is to generate reports for various stakeholders. IMS uses a number of tools, including Cognos, to generate these reports, both in the form of standard reports and ad-hoc reports and analysis.

Stake holders that receive reports or access data from the Education Data Warehouse include:

- Districts, schools and parents receive School Accountability Reports in printed format. Any interested party may also access these reports via the CDE website.
- US Department of Education – reports are provided to the USDE via EDEN (Education Data Exchange Network), a Web based file submission process. Approximately 200 separate data files must be transmitted from CDE to the USDE each year via EDEN. Approximately 20% of these are generated from the data warehouse via automated processes. The remainder require various amounts manual intervention, but are in the process of being fully automated.
- Various Education Units, Research Organizations and Foundations - request 'customized' data from time to time. These requests are formalized via a CDE Data Request form and often fulfilled via ad-hoc data warehouse queries using the SQL or the Cognos tools described earlier.
- The CDE (State Board, Commissioner, Directors and other internal CDE groups), School Districts and BOCES have access to information in the data warehouse via CEDAR (see 5.3.3.5Colorado Education Data Analysis and Reporting (CEDAR) later)

5.3.3.5 Colorado Education Data Analysis and Reporting (CEDAR)

CEDAR is a data analysis and reporting tool developed by IMS and made available over the Web to School Districts, BOCES and Administrative Units.

CEDAR is built around data marts, and Cognos ReportNet and PowerPlay. It provides several data analyses and reporting options:

- Fixed Reports – fixed format reports that allow the user to set filters and data selection criteria.
- Analysis Cubes – ability to analyze data and reports from different perspectives or dimensions. Similar to Excel pivot tables.
- Query Studio – ad-hoc query and reporting tool that allows users to define report content, format and selection criteria. This tool is not yet available to districts due to lack of training and support available from CDE.

Due to licensing and capacity restrictions CEDAR is only available to two users per School District. District users must be pre-authorized to access CEDAR via written superintendent approval.

6 Data Collection Related Legislation

The data collections listed in the table below were initiated by the primary legislation listed. There are a total of 107 regular collections scheduled for the 2007/2008 calendar year. An additional 2 collection are listed as one time collections for the same period for a total of 109 collections. All of which have one or more state or federal legislations tied to the compiled data.

The collections are listed in three types of categories: voluntary, required to obtain benefit and mandatory. The breakdown is as follows:

Voluntary – 23
Required to Obtain Benefit – 51
Mandatory – 35

These collections are determined by either a federal or a state mandate. There are sixty-five collections, which are based on the state mandates, and thirty-seven for federal. Three of these collections have both federal and state requirements. One of the collections is listed as "grant closed" and there are seven collections, which are pending verification. Of the 37 federal collections, 10 are for the No Child Left Behind Act of 2001 (NCLB--Public Law 107-110).

The following is the number of collections by unit (greater than five) and represents 83 of the 109 collections for the 2007/2008 school year:

Public School Finance – 20
Exceptional Student Leadership -- 18
Special Education Data – 14
Prevention Initiatives – 11
Data and Research – 9
Assessment – 6
Auditing – 5

List of All Active Collections 2007-2008

Form or Document Title	State Legislature	Federal Legislature	Description/Summary	Form Number	Unit	Mandatory Recommended Voluntary
ACT Student Biographical Data	C.R.S 22-7-409 Assessment (1), C.R.S. 22-24-105		**22-7-409** --This legislature is focused on the administering a state wide assessment program beginning the spring semester 1997. There have been legislative updates each year since 1997, including the incorporation of the federal "No Child Left Behind Act of 2001." This legislature details how and when the results are report each year. **22-24-105** --This legislature details how the assessments are administered for students who speak a non-English language as their dominant language.	ASMT-102	Assessment	Voluntary
NAEP Assessment E-File Collection		Title I, Part A, Section 1111 No Child Left Behind Legislation Pertinent to NAEP	Title I, Part A, Section 1111 No Child Left Behind Legislation Pertinent to NAEP	ASMT-104	Assessment	Mandatory
ADE Precoded Labels	Pending			ASMT-105	Assessment	Voluntary
ADE Student Biographical Data Review Form CSAP/CSAPA	C.R.S 22-7-409 Assessment (1), C.R.S. 22-24-105		**22-7-409** --This legislature is focused on the administering a state wide assessment program beginning the spring semester 1997. There have been legislative updates each year since 1997, including the incorporation of the federal "No Child Left Behind Act of 2001." This legislature details how and when the results are report each year. **22-24-105** --This legislature details how the assessments are administered for students who speak a non-English language as their dominant language.	ASMT-106	Assessment	Voluntary
Colorado English Language Assessment Student Biographical Data Review	C.R.S 22-7-409 Assessment (1) , C.R.S. 22-24-105		**See Above**	ASMT-108	Assessment	Voluntary

Form or Document Title	State Legislature	Federal Legislature	Description/Summary	Form Number	Unit	Mandatory Recommended Voluntary
CSAPA Online	22-7-409 Assessment (1) C.R.S		**22-7-409** --This legislature is focused on the administering a state wide assessment program beginning the spring semester 1997. There have been legislative updates each year since 1997, including the incorporation of the federal "No Child Left Behind Act of 2001." This legislature details how and when the results are report each year.	ASMT-416	Assessment	Mandatory
Pupils in Detention Centers as of the Official Count Day	C.R.S. 22-54-103(10)(a)(I)		**22-54-103** -- This legislature is part of article 54 'Public School Finance Act of 1994' and includes the relocation of provisions formerly contained in article 53	AUD-101	Auditing	Voluntary
Certification of Eligibility for Counting Pupils Enrolled in On-Line Educational Programs	C.R.S. 22-54-103(10)(a)(I)		**See Above**	AUD-102	Auditing	Voluntary
Certification of Eligibility for Counting New Enrollees on Alternative Count Day	C.R.S. 22-54-103(10)(a)(I)		**See Above**	AUD-103	Auditing	Voluntary
Official Notification Form of Pupils Publicly Placed in Facilities	C.R.S. 22-54-103(10)(a)(I)		**See Above**	AUD-104	Auditing	Voluntary
Notification Letter of Pupil Enrollment on the Count Day or in the Five Days Proceeding the Count Day	C.R.S. 22-54-103(10)(a)(I)		**See Above**	AUD-105	Auditing	Voluntary
Family Literacy Fund RFP	C.R.S. 22-2-124		**22-2-124** -- The legislative section is known as the "Colorado Family Literacy Act of 2002." This section details the meaning of "English literacy" and "family literacy" and guidelines for the literacy education program.	CARE-111	Center for At-Risk Education	Required to Obtain Benefit

Form or Document Title	State Legislature	Federal Legislature	Description/Summary	Form Number	Unit	Mandatory Recommended Voluntary
Even Start Children's Reading Skills Study		Title I, Part B, Subpart 3 (William F. Goodling Even Start Family Literacy Programs) of the No Child Left Behind Act of 2001 (NCLB--Public Law 107-110).	Title I-Improving the Academic Achievement of the Disadvantaged, Part B-Student Reading Skills Improvement Grants, Even Start is a federally funded program focused on family literacy. It is designed to work in cooperation with other programs, such as Head Start, community colleges, local school districts, Title I and parent education programs. It may be used in conjunction with other family development and family resource center programs. Programs must comply with state and local evaluation criteria to receive funding.	CARE-112	Center for At-Risk Education	Voluntary
Colorado Even Start Progress Report		Title I, Part B, Subpart 3 (William F. Goodling Even Start Family Literacy Programs) of the No Child Left Behind Act of 2001 (NCLB--Public Law 107-110).	**See Above**	CARE-2101	Center for At-Risk Education	Mandatory
Colorado Reading First BEAR Assessment		Title I, Part B, Subpart 1 of the Elementary and Secondary Education Act, as amended by the No Child Left Behind Act of 2001	**See Above**	CGA-102	Competitive Grants and Awards	Required to Obtain Benefit
Section C-1: Non Public School Information Form	C.R.S. 22-1-114		**22-1-114** - The legislative section is regarding how and when the census statement is collected from private schools.	DAR-101	Data and Research	Mandatory
ADE Directory	C.R.S. 22-32-109(1)(d)		**22-32-109** -- This section details the specific duties of the board of education including the directory.	DAR-102	Data and Research	Mandatory
ADE Report Card March Miscellaneous	C.R.S. 22-7-605		**22-7-605** -- School Accountability Reports (5)© Student Attendance and time Spent in School (D) Student Dropouts.	DAR-103	Data and Research	Mandatory

Form or Document Title	State Legislature	Federal Legislature	Description/Summary	Form Number	Unit	Mandatory Recommended Voluntary
ADE Safety and Discipline Indicator	C.R.S 'Section 22-33-105, and 22-32-109.1(2)(b)		**22-33-105** -- School Accountability Reports, this legislative section provides details of suspension, expulsion and denial of admission. **22-32-109.1** -- This section is board of education-specific powers and duties-safe schools. Safe school reporting requirements	DAR-104	Data and Research	Mandatory
ADE End of Year	C.R.S. 22-2-114.1; 22-7-605 ; 22-34-101; 22-35-101; 22-11-104	PL 107-110 No Child Left Behind Act	**22-2-114.1** --This is a section a clarification and detailing the collection of dropout rates. **22-7-605** -- School Accountability Reports (5)© Student Attendance and time Spent in School (D) Student Dropouts. **22-34-101** This section is for the high school fast track program and agreements with accredited state institution to fulfill graduation requirements. **22-35-101** This article is cited as the "Postsecondary Enrollment Options Act." **22-11-104** This is a section for accreditation indicators (2)(d) graduation rates	DAR-105	Data and Research	Mandatory
ADE Student October	C.R.S 103(10)(a); C.R.S 22-54-112(2)		**22-54-112** --This section details the assessment reports to the state board	DAR-106	Data and Research	Mandatory
ADE December Human Resources	C.R.S. 'Section 22-2-112, C.R.S 22-7-605; C.R.S.22-2-112(k); C.R.S. 22-32-109.1(b)		**22-2-112** --This section details the commissioner duties and the statistical data reported. **22-7-605** -- School Accountability Reports (5)© Student Attendance and time Spent in School (D) Student Dropouts. **22-32-109.1(b)** -- This section details the specific duties of the board of education including safe school reporting requirements.	DAR-107	Data and Research	Mandatory
Request for New School Code and School Closure Form	C.R.S. 22-1-101		**22-1-101** -- Article 1 for the general provisions and definition of schools	DAR-108	Data and Research	Mandatory
School District Mapping Project (Every 2 Years Next One 2009)		P.L.107-110	As a part of the No Child Left Behind Act of 2001 (P.L.107-110) the Census Bureau, in conjunction with the U.S. Department of Education asks all 50 states to validate the their school district's boundaries	DAR-109	Data and Research	Mandatory

Form or Document Title	State Legislature	Federal Legislature	Description/Summary	Form Number	Unit	Mandatory Recommended Voluntary
Four-Day School Week/CDE-479	C.R.S 22-32-109 (n) (I)		**22-32-109.1(b)** -- This section details the specific duties of the board of education including safe school.	EDS-101	Educational Services	Required to Obtain Benefit
Power Results Grant Program RFP and Application		Title II-D of the federal Elementary and Secondary Education Act of 2001 (NCLB)	This legislation reauthorized the Elementary and Secondary Education Act of 1965 and established the Ed Tech Program that consolidates the Technology Literacy Challenge Fund (TLCF) program and the Technology Innovation Challenge Grant (TIC) program into a single state formula grant program.	EDT-106	Educational Services	Required to Obtain Benefit
CSAP Oral Transcripts Translation Survey	C.R.S 22-7-409 Assessment (1)		**22-7-409** --This legislature is focused on the administering a state wide assessment program beginning the spring semester 1997. There have been legislative updates each year since 1997, including the incorporation of the federal "No Child Left Behind Act of 2001." This legislature details how and when the results are report each year.	ELA-103 (Now ASMT-109)	English Language Acquisition	Voluntary
Migrant Education Program Certificate of Eligibility		The Migrant Education Program (MEP) is authorized by Part C of Title I of the ESEA		ELA-104	English Language Acquisition	Mandatory
Title III Desk Review (Every 2 Years Next one 2009)		Title III, Part A, English Language Acquisition; (Public Law 107-110)		ELA-105	English Language Acquisition	Mandatory
Gifted and Talented End of Year Report	C.R.S. 22-26-101		**22-26-101** -- This is article 26 for gifted and talented students and legislative declaration	ESL-103	Exceptional Student Leadership	Required to Obtain Benefit
Indicator 13 Checklist For State Performance Plan		(20 U.S.C. 1416(a)(3)(B))	This is a reauthorized Individuals with Disabilities Education Act (IDEA) signed into law 12/3/2004	ESL-115	Exceptional Student Leadership	Mandatory

Form or Document Title	State Legislature	Federal Legislature	Description/Summary	Form Number	Unit	Mandatory Recommended Voluntary
MESH Annual Report	C.R.S.-26-4-531		**26-4-531-- This authorizes the school districts, Boards of Cooperative Services (BOCES) and state K-12 education institutions to provide health services to children with reimbursed Medicaid funds.**	ESL-116	Exceptional Student Leadership	Required to Obtain Benefit
ESCAPE AP Exam Fee Information Packet		Federal Grant CDFA Number 84-33B	This is a grant to eliminating student cost for advanced placement exams (ESCAPE).	ESL-401	Exceptional Student Leadership	Required to Obtain Benefit
Gifted and Talented Student Education Plan	C.R.S. 22-26-101		**22-26-101** -- This is article 26 for gifted and talented students and legislative declaration	ESL-403	Exceptional Student Leadership	Required to Obtain Benefit
Gifted Education Administrative Unit Report	C.R.S. 22-26-101		**22-26-101** -- This is article 26 for gifted and talented students and legislative declaration	ESL-404	Exceptional Student Leadership	Required to Obtain Benefit
CO Statewide Census Students Who Are Deaf blind	Pending			ESL-405a	Exceptional Student Leadership	Required to Obtain Benefit
CIMP Student Record Review		(20 U.S.C. 1416 (a)(3)(B))	This is a reauthorized Individuals with Disabilities Education Act (IDEA) signed into law 12/3/2004	ESL-407b	Exceptional Student Leadership	Required to Obtain Benefit
CIMP Staff Survey		(20 U.S.C. 1416 (a)(3)(B))	**See Above**	ESL-407c	Exceptional Student Leadership	Voluntary
CIMP Parent Survey		(20 U.S.C. 1416 (a)(3)(B))	**See Above**	ESL-407d	Exceptional Student Leadership	Required to Obtain Benefit
Administrative Unit Checklist		(20 U.S.C. 1416 (a)(3)(B))	**See Above**	ESL-407f	Exceptional Student Leadership	Mandatory
Behavior Evaluation Support Team Annual Evaluation	No Statutes	No Statutes	N/A	ESL-408	Exceptional Student Leadership	Voluntary
Sliver Grant Applications/ Set Aside Grant Applications	Grant Closed	Grant Closed	N/A	ESL-410	Exceptional Student Leadership	Required to Obtain Benefit

Form or Document Title	State Legislature	Federal Legislature	Description/Summary	Form Number	Unit	Mandatory Recommended Voluntary
Trainings by PBS Coaches	Pending			ESL-419	Exceptional Student Leadership	Required to Obtain Benefit
PBS Discipline Data	Pending			ESL-420	Exceptional Student Leadership	Required to Obtain Benefit
Colorado Special Education Personnel Shortages Survey - Fall	Pending			ESL-421A	Exceptional Student Leadership	Voluntary
Colorado Special Education Personnel Shortages Survey - Spring	Pending			ESL-421B	Exceptional Student Leadership	Voluntary
Record Integration Tracking System	C.R.S. 22-7-603.5(4)		**22-7-603.5(4)** -- A legislative declaration for the measurement of value added to academic progress	LON-101	Longitudinal Growth	Mandatory
Child Nutrition Programs Renewal Agreement		7 CFR Part 210.9 and 2103.14 (NSLP); 215.7 (SMP); 220.7 (SBP)	'7 CFR Part 210.9 -- States that school food authorities administering after school snacks must and review two the program twice a year.	NU-104	Nutrition	Required to Obtain Benefit
Renewal Agreement - After school Snack Program Addendum		7 CFR Part 210.9	**See Above**	NU-105	Nutrition	Required to Obtain Benefit
Fresh Fruit and Vegetable Pilot Program	C.R.S. 22-82.5-101		**22-82.5-101** -- This article is cited as the "Colorado Information Technology Education Act."	NU-107	Nutrition	Required to Obtain Benefit
School District Wellness Policy Assessment Tool		P.L. 108-265 (a)(4)Local School Wellness Policy	**P.L. 108-265** --This is the Child Nutrition and WIC Reauthorization act of 2004.	NU-108	Nutrition	Required to Obtain Benefit
Financial Literacy RFP	C.R.S. 22-2-127; C.R.S. 22-32-135		**22-2-127** -- This section details the financial literacy resource bank of materials. **22-32-135** -- The section is a description of "financial literacy" and recommendations.	OLR-101	Office of Learning and Results	Required to Obtain Benefit
Application for Alternative Education Campus Designation	C.R.S. Section 22-7-604.5, and CCR 301-57.		**22-7-604.5** -- The section is the alternative education campuses criteria, application and rule-making, Colorado State Board of Education Rules 1	OMS-101	Office of Management Services	Required to Obtain Benefit

Form or Document Title	State Legislature	Federal Legislature	Description/Summary	Form Number	Unit	Mandatory Recommended Voluntary
First Year Teacher Survey	C.R.S. 22-60.5-102		**22-60.5-102** -- This article is cites as the "Colorado Educator Licensing Act of 1991" and the definitions.	OPS-101	Office of Professional Services	Voluntary
Consolidated Federal Programs Application		No Child left Behind Act of 2001, Sec. 1112, Sec. 1119, Sec. 2414, Sec. 3116, Sec. 5133, Sec. 6211	No Child left Behind Act of 2001	OSS-101	Office of Special Services	Required to Obtain Benefit
Education for Homeless Children and Youth Program, USDOE Forms		McKinney-Vento Homeless Assistance Act , Sec. 1031, Sec 1032, Sec. 721, Sec. 722, Sec. 723, Sec. 724, Sec. 725, Sec. 726, Sec. 1033	This is cited as the 'McKinney-Vento Homeless Education Assistance Improvements Act of 2001.'	PI-101	Prevention Initiatives	Mandatory
School Health Profiles (Every 2 Years Spring 2008)	Pending			PI-105	Prevention Initiatives	Voluntary
Comprehensive Health Education	C.R.S. 22-25-101 to 22-25-110		**22-25-101 to 22-25-110** -- This is the Colorado Comprehensive Health Education Act (Article 25) and was originally enacted in 1975, with several changes to the sections.	PI-107	Prevention Initiatives	Required to Obtain Benefit
Expelled/At Risk Student Serve Final and Continuation Report	C.R.S. 22-33-205		**22-33-205** -- This section is for services of expelled and at-risk students, grants criteria.	PI-108	Prevention Initiatives	Required to Obtain Benefit
Expelled and at Risk Student Services Mid Year Report	C.R.S. 22-33-205		**See Above**	PI-108a	Prevention Initiatives	Required to Obtain Benefit
Year End Performance Report Title IV-A Safe and Drug Free Schools		Title IV, Part A, Safe and Drug-Free Schools and Communities, Title IV -- 21st Century Schools	This is cited as the 'Safe and Drug-Free Schools and Communities Act'. The purpose of this part is to support programs that prevent violence in and around schools.	PI-109	Prevention Initiatives	Mandatory

Form or Document Title	State Legislature	Federal Legislature	Description/Summary	Form Number	Unit	Mandatory Recommended Voluntary
Colorado Healthy Kids Survey		Coordinated School Health Initiative Grant from the Centers for Disease Control and Prevention	This is funding of promoting regular physical activity among 9 to 13 year olds.	PI-110	Prevention Initiatives	Voluntary
Title X Implementation Plan & End of Year Report for McKinney-Vento Funded Programs		Federal McKinney-Vento act, Title X of NCLB Sec 772(f)(1)	This is cited as the 'McKinney-Vento Homeless Education Assistance Improvements Act of 2001.'	PI-111	Prevention Initiatives	Required to Obtain Benefit
Colorado Prevention Partners	C.R.S. 25-20.5-106(2)(b)		**25-20.5-106** -- Health and Environment concerning administration of the provision of youth services. This section is the state board of health rules and program duties.	PI-112	Prevention Initiatives	Required to Obtain Benefit
2006-2009 Local Education Agency Service-Learning Grants		National can Community Service Trust Act of 1993, CFDA 94.004	The program objectives are to encourage elementary and secondary schools to create, develop, and offer service-learning opportunities.	PI-116	Prevention Initiatives	Required to Obtain Benefit
RFP for Title X, Part C of NCLB (Mckinney-Veno homeless Education Programs)(Every 3 Years)(2010 Next Review)		Homeless Education program is authorized under Title VII-B of the McKinney-Vento Homeless Assistance Act (42 USC 11431 et seq.	This is cited as the 'McKinney-Vento Homeless Education Assistance Improvements Act of 2001.'	PI-118	Prevention Initiatives	Required to Obtain Benefit
CO Preschool Program Reapplication and Annual Report	C.R.S. 22-28-112		**22-28-112** -- This is Article 28, Colorado Preschool and Kindergarten Program Act and the reports to legislative committees.	PSF-101	Public School Finance	Mandatory
Colorado Preschool Program Expansion Application	C.R.S. 22-28-107		**22-28-112** -- This is Article 28, Colorado Preschool and Kindergarten Program Act and eligibility of school districts for participation instate preschool and kindergarten programs.	PSF-102	Public School Finance	Required to Obtain Benefit

Form or Document Title	State Legislature	Federal Legislature	Description/Summary	Form Number	Unit	Mandatory Recommended Voluntary
Report of November Elections	CCR301-39,2254-R-13.01		These are the Rules for the Administration of the Public School Finance Act of 1994, by the Colorado State Board of Education. This is the authorization of additional local revenues	PSF-104	Public School Finance	Mandatory
Certification of CO Division of Wildlife Impact Asst Grant	C.R.S. 30-25-302(5)(b)		The school districts certifies to CDE the amount of Colorado Division of Wildlife impact assistance grant monies received in the previous fiscal year from the county treasurer	PSF-106	Public School Finance	Required to Obtain Benefit
ADE Financial December	C.R.S. 22-44-105 (4) (a)		**22-44-105** - This is Article 44, Budget Policies and Procedures and which of the contents and format of the standard budget format for school districts.	PSF-107	Public School Finance	Mandatory
Accreditation Report	C.R.S. 22-11-104 (2)(a)(II)(k)		**22-11-104** - The sections is Article 11, Educational Accreditation and details the indicators, contents, rules achievement levels, measurements and audit	PSF-108	Public School Finance	Mandatory
Public School Transportation Fund Reimbursement Claim	C.R.S. 22-51-105(1)		**22-51-105** -- This is the Public School Transportation Fund (Article 51) and school districts that desire reimbursement must supply the necessary certifications.	PSF-110	Public School Finance	Required to Obtain Benefit
Children Placed in Educational Programs Outside of their Home districts	2254-R-17.00, 2254-R-18.00 and 2254-R-19.00 Code of Colorado Regulations 301.39		These are the Rules for the Administration of the Public School Finance Act of 1994, by the Colorado State Board of Education. 17.00 details the pupils publicly placed outside the districts of residence -- monthly reporting to CDE for reimbursement. 18.00 details determining full-time equivalent membership. 19.00 details monthly CDE reimbursement payments. Also contains specific criteria governing the out-of-district placed pupils program.	PSF-111	Public School Finance	Required to Obtain Benefit
Certification of Mill Levies	C.R.S. 39-5-128(1)		This is legislature that describes how the assessors certify all taxing entities and to the divisions of Local Governments the total new assessed and actual values used.	PSF-119	Public School Finance	Mandatory
Capital Construction Project Request Five Year Plan	C.R.S. 22-43.7-101		**22-43.7-101** -- This is Article 43.5, School District Capital Improvement Zones, which provides matching grants and loans to school districts.	PSF-CC01	Public School Finance	Required to Obtain Benefit

Form or Document Title	State Legislature	Federal Legislature	Description/Summary	Form Number	Unit	Mandatory Recommended Voluntary
Capital Construction Loan Coversheet (CC-02)	C.R.S. 22-43.7-103.5		**22-43.7-103.5** -- This is Article 43.5, School District Capital Improvement Zones, which provides matching grants and loans to school districts. This section is to provide loans for qualified capitol construction projects.	PSF-CC02	Public School Finance	Required to Obtain Benefit
Capital Construction Project Request (CC-03)	C.R.S. 22-43.7-105 and C.R.S. 22-54-117		**22-43.7-105** -- This is Article 43.5, School District Capital Improvement Zones, which provides matching grants and loans to school districts. This section describes the financial assistance application requirements, evaluation criteria, oversight board, duties and rules.	PSF-CC03	Public School Finance	Required to Obtain Benefit
Capital Construction Capital Project Schedule	C.R.S. 22-43.7-105 and C.R.S. 22-54-117		**See Above**	PSF-CC04	Public School Finance	Voluntary
Capital Construction Project Status Report	C.R.S. 22-43.7-105 and C.R.S. 22-54-117		**See Above**	PSF-CC05	Public School Finance	Required to Obtain Benefit
Capital Construction Project Funding Request (CC-06)	C.R.S. 22-43.7-105 and C.R.S. 22-54-117		**See Above**	PSF-CC06	Public School Finance	Required to Obtain Benefit
Capital Construct District's Facility Inventory List	C.R.S. 22-43.7-105 and C.R.S. 22-54-117		**See Above**	PSF-CC07	Public School Finance	Required to Obtain Benefit
Qualified Zone Academy Bonds Program Application		Qualified Zone Academy Bonds (QZAB's)	QZABs are bonds the Federal Government subsidizes by allowing bondholders to received tax credits that are approximately equal to the interest that states and communities would pay holders of taxable bonds. These were first authorized under Section 226 of the Taxpayer's Relief Act of 1997	PSF-CC11	Public School Finance	Required to Obtain Benefit
List of Expenditures and Project Description	C.R.S. 22-54-124		**22-54-124** - This article is for the Public School Finance Act of 1994 and this section describes how the state aid for charter schools, use of state education fund moneys and definitions.	PSF-CSCC-01	Public School Finance	Mandatory
Charter School Eligibility	C.R.S. 22-30.5-513(3)(a);C.R.S. 22-30.5-107(1)(a)		**22-30.5-513** - -This is Article 30.5 and list as "Charter Schools." This section describes the funding for institute charter schools (definitions, funding, and repeal) **22-30.5-107** -- This is the application process for the charter schools.	PSF-CSCC-02	Public School Finance	Mandatory

Form or Document Title	State Legislature	Federal Legislature	Description/Summary	Form Number	Unit	Mandatory Recommended Voluntary
Single Assurance Form for State Administered Federal Education Programs (No Grant for 2006-2007)		Part B, Individuals with disabilities Education Act (IDEA), 20 U.S.C. 1401	This is a reauthorized -- Individuals with Disabilities Education Act (IDEA) signed into law 12/3/2004 and 1201 is a clarification with definitions	SED-201	Special Education Data	Mandatory
Application for Special Education High Cost Reimbursement Under the Exceptional Children's Educational Act	C.R.S. 22-20-114.5(3)		**22-20-114.5** -- This is Article 20, the Education of Exceptional Children and this section defines the various funding programs.	SED-202	Special Education Data	Required to Obtain Benefit
Report of Children with Disabilities Unilaterally Removed Suspended/Expelled More than Ten day, FY 03-04		Section 618(a)(1)(vii) of the Federal Individuals with Disabilities Education Act	Section 618 is new data requirements for: child count data (race, ethnicity, gender, English proficiency and disability category), due process hearings, disciplinary hearings, mediations, and etc.	SED-210	Special Education Data	Mandatory
Special Education End-of-Year Revenue and Expenditure Report, 2004-2005	C.R.S. 22-20-104; C.R.S. 22-20-106		**22-20-104** -- This is Article 20, the Education of Exceptional Children and this section defines the administration, advisory committee and rules. **22-20-106** -- this section defines the special education programs.	SED-218	Special Education Data	Mandatory
Annual Count of Eligible Students under Part B of the Individuals with Disabilities Education Act		20 U.S.C 1411(d)(2), 1418 (a)(1)(A)(i), 1418(a)(1)(a)(iii), 1418 (a)(1)(iv), 1418 (a)(1)(A)(v), and 1418 (a)(2) C.R.C. 22-20-104(4) and 22-20-114	This is a reauthorized Individuals with Disabilities Education Act (IDEA) signed into law 12/3/2004, with these sections a description of use of funds	SED-220	Special Education Data	Mandatory
Staff Employed/Contracted to Provide Special Ed/ Related Serve Dec. 1	C.R.C 22-20-104(4)	20 U.S.C 1418 (a)(2);	**22-20-104** -- This is Article 20, the Education of Exceptional Children and this section defines the administration, advisory committee and rules.	SED-221	Special Education Data	Mandatory
Request for Reimbursement of Substitute Teacher	No Statutes	No Statutes	N/A	SED-275	Special Education Data	Required to Obtain Benefit

Form or Document Title	State Legislature	Federal Legislature	Description/Summary	Form Number	Unit	Mandatory Recommended Voluntary
Special Educator Eligibility (SEE) Application and Verification Forms	C.R.S. 22-20-R-3.04(2)		**22-20-R-3.04** These are the Colorado Code of Regulations 301-8 for the Colorado State Board of Education. This section describes the temporary teacher eligibility (TTE)	SED-276	Special Education Data	Required to Obtain Benefit
Temporary Teacher Eligibility Application and Verification Form	C.R.S. 22-20-R-3.04(2)		See Above	SED-277A	Special Education Data	Required to Obtain Benefit
Temporary Teacher Eligibility: Educational Interpreter Application	22-20-116, C.R.S.	Rules for the Administration of the Exceptional Children's Education Act, Section 304(2)	**22-20-116** -- This is Article 20, the Education of Exceptional Children and this section defines the minimum standards for educational interpreters for the deaf in the public schools, including committee to recommend standards and rules.	SED-278	Special Education Data	Required to Obtain Benefit
Documentation of a Tuition Rate for Charter Schools, not Including On-Line Programs	C.R.S. 22-20-R-7.03(2)		**22-20-R-7.03** This is Article 20 of Title 22. These are the Colorado Code of Regulations 301-8 for the Colorado State Board of Education. This section applies charter schools that intend to seek tuition costs.	SED-279	Special Education Data	Required to Obtain Benefit
Documentation of a Tuition Rate for On-Line Programs, Including On-Line Programs in Charter Schools	C.R.S. 22-20-R-7.03 (4)		**See Above**	SED-280	Special Education Data	Required to Obtain Benefit
Federal Application Project Narrative	C.R.S. 22-20-R-7.03 (4)		**See Above**	SED-409A	Special Education Data	Required to Obtain Benefit
Application for Federal Special Education Funds		Administration of the Exceptional Children's Education Act 7.03(1)(a)	Article 20 of title 22, 'Rules (for the) Administration of the exceptional Children's Educational Act', with this section special education funding.	SED-409B	Special Education Data	Required to Obtain Benefit
Colorado Charter Schools 2004-2005 Evaluation Study (Done every 3 years 07-08 next review)	C.R.S. 22-30.5-113		**22-30.5113** - -This is Article 30.5 and list as "Charter Schools." This section describes the state board, department of education, duties, charter schools, evaluation and reporting.	SPS-102	Special Services	Voluntary

Form or Document Title	State Legislature	Federal Legislature	Description/Summary	Form Number	Unit	Mandatory Recommended Voluntary
Highly Qualified Teacher Plans		Title II Part A NCLB	This section of NCLB is improving Educator quality. The purpose of this grant program is to increase student achievement through comprehensive district initiatives that focus on the preparation, training, recruitment, and retention of highly qualified educators.	SPS-115	Special Services	Mandatory
Colorado School Library Survey	C.R.S. 24-90-109		**24-90-109 -- Powers and duties of board of trustees.** Have supervision and care for. library property, rooms, and. buildings. Employ a librarian, and other staff. as recommended by librarian. Also a contract or inter-governmental agreement (IGA) may be made after the establishment of district and appointment of trustees.	STL-101	State Library	Voluntary
Colorado Power Libraries Program	C.R.S. 24-90-105 (1) (i)		**24-90-105.** Powers and duties of state librarian.	STL-102	State Library	Voluntary
Education Technology-Information Literacy (ET-IL) Plan & Form	C.R.S. 22-81.5-101		22-81.5-101 --This Article 81.5 and known as the "Colorado Information Technology Education Act."	ETC-102	Title II Consolidated Federal Programs	Mandatory
NCLB Consolidated State Performance Report Data Collection (Next collection 2008)		Title II NCLB	This section of NCLB is improving Educator quality. The purpose of this grant program is to increase student achievement through comprehensive district initiatives that focus on the preparation, training, recruitment, and retention of highly qualified educators.	SPS-111	Title II Consolidated Federal Programs	Required to Obtain Benefit
CO Mathematics and Science Partnerships Program		Title II Consolidated Federal Programs	Title II addresses teacher and principal training, and Enhancing Education through Technology.	TII-102	Title II Consolidated Federal Programs	Required to Obtain Benefit
School Vehicle Accident Report Form	C.R.S 301-26, 4204-R-210.02 (b), 22-51-108 and 42-4-1904,		**301-26, 4204-R-210.02 (b)** -- Colorado Transportation Bus rules; **22-51-108** --This is the Public School Transportation Fund (Article 51) and rules and regulations. **42-4-1904** -- The regulations for school buses and statutory authority	TRA-101	Transportation	Mandatory

Form or Document Title	State Legislature	Federal Legislature	Description/Summary	Form Number	Unit	Mandatory Recommended Voluntary
2007-2008 One Time Only Collections						
Autism and Developmental Disabilities Monitoring Network		Conducted with funds from the Centers for Disease Control		ESL-114	Exceptional Student Leadership	Voluntary
Full-Day Kindergarten Phase in Plan		SB07-199	This legislature is "Concerning the Financing of Public Schools, and Making an Appropriation therefore." and is for purposes of determining pupil enrollment in first grade for the 2006-07 budget year and each budget year thereafter, a district shall count and receive funding only for pupils enrolled in first grade who are six years old on or before October 1 of the applicable budget year	PSF-113	Public School Finance	Mandatory

7 Data Collection Calendar

The following table is compiled from the EDAC 07/08 collections calendar and outlines all of the 07/08 scheduled data collections. The dates the collection window is open and then closes is graphically demonstrated in red. There are 28 year round collections and additional periodic collections through-out the year. There are a high of 24 additional collections that are scheduled in October and again in May as shown in Figure 6-1, which follows the collection calendar table. There is often a discrepancy as to when a collection is planned to open and close and when the window actually occurs. The table at the end of this section illustrates a few of the collections that did not occur during their planned windows.

Unit	Form Number	Form or Document Title	Collection Start Date	Collection End Date	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Center for At-Risk Education	CARE-111	Family Literacy Fund RFP	Year Round	June												
Center for At-Risk Education	CARE-2101	Colorado Even Start Progress Report	Year Round	June												
Data and Research	DAR-102	ADE Directory	Year Round	November												
English Language Acquisition	ELA-104	Migrant Education Program Certificate of Eligibility	Year Round	July												
Exceptional Student Leadership	ESL-407f	Administrative Unit Checklist	Year Round	Other												
Exceptional Student Leadership	ESL-408	Behavior Evaluation Support Team Annual Evaluation	Year Round	September												
Exceptional Student Leadership	ESL-419	Trainings by PBS Coaches	Year Round	May												
Exceptional Student Leadership	ESL-420	PBS Discipline Data	Year Round	April												
Longitudinal Growth	LON-101	Record Integration Tracking System	Year Round	September												
Nutrition	NU-104	Child Nutrition Programs Renewal Agreement	Year Round	July												
Nutrition	NU-105	Renewal Agreement - After school Snack Program Addendum	Year Round	June												
Nutrition	NU-108	School District Wellness Policy Assessment Tool	Year Round	July												
Prevention Initiatives	PI-101	Education for Homeless Children and Youth Program, USDOE Forms	Year Round	October												

Unit	Form Number	Form or Document Title	Collection Start Date	Collection End Date	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Prevention Initiatives	PI-105	School Health Profiles (Every 2 Years Spring 2008)	Year Round	July												
Prevention Initiatives	PI-107	Comprehensive Health Education	Year Round	June												
Prevention Initiatives	PI-112	Colorado Prevention Partners	Year Round	September												
Prevention Initiatives	PI-116	2006-2009 Local Education Agency Service-Learning Grants	Year Round	July												
Public School Finance	PSF-111	Children Placed in Educational Programs Outside of their Home districts	Year Round	July												
Public School Finance	PSF-CC06	Capital Construction Project Funding Request (CC-06)	Year Round	July												
Public School Finance	PSF-CC11	Qualified Zone Academy Bonds Program Application	Year Round	July												
Special Education Data	SED-275	Request for Reimbursement of Substitute Teacher	Year Round	September												
Special Education Data	SED-276	Special Educator Eligibility (SEE) Application and Verification Forms	Year Round	July												
Special Education Data	SED-277A	Temporary Teacher Eligibility Application and Verification Form	Year Round	July												
Special Education Data	SED-278	Temporary Teacher Eligibility: Educational Interpreter Application	Year Round	June												
Special Education Data	SED-409B	Application for Federal Special Education Funds	Year Round	June												
State Library	STL-102	Colorado Power Libraries Program	Year Round	June												
Transportation	TRA-101	School Vehicle Accident Report Form	Year Round	July												
Exceptional Student Leadership	ESL-114	Autism and Developmental Disabilities Monitoring Network (07/08 one time only)	Year Round	January												
Prevention Initiatives	PI-110	Colorado Healthy Kids Survey	August	December												

Unit	Form Number	Form or Document Title	Collection Start Date	Collection End Date	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Public School Finance	PSF-108	Accreditation Report	August	December												
Data and Research	DAR-108	Request for New School Code and School Closure Form	June	November												
Exceptional Student Leadership	ESL-103	Gifted and Talented End of Year Report	June	September												
Exceptional Student Leadership	ESL-404	Gifted Education Administrative Unit Report	August	September												
Prevention Initiatives	PI-111	Title X Implementation Plan & End of Year Report for McKinney-Vento Funded Programs	May	September												
Special Education Data	SED-201	Single Assurance Form for State Administered Federal Education Programs (No Grant for 2006-2007)	May	September												
Special Education Data	SED-210	Report of Children with Disabilities Unilaterally Removed Suspended/Expelled More than Ten day, FY 03-04	June	September												
Special Education Data	SED-218	Special Education End-of-Year Revenue and Expenditure Report, 2004-2005	August	September												
Data and Research	DAR-105	ADE End of Year	May	August												
Public School Finance	PSF-106	Certification of CO Division of Wildlife Impact Asst Grant	July	August												
Public School Finance	PSF-110	Public School Transportation Fund Reimbursement Claim	July	August												
Auditing	AUD-101	Pupils in Detention Centers as of the Official Count Day	September	October												
Data and Research	DAR-106	ADE Student October	September	December												
Data and Research	DAR-109	School District Mapping Project (Every 2 Years Next One 2009)	September	December												
English Language Acquisition	ELA-105	Title III Desk Review (Every 2 Years Next one 2009)	September	November												
Nutrition	NU-107	Fresh Fruit and Vegetable Pilot Program	September	November												

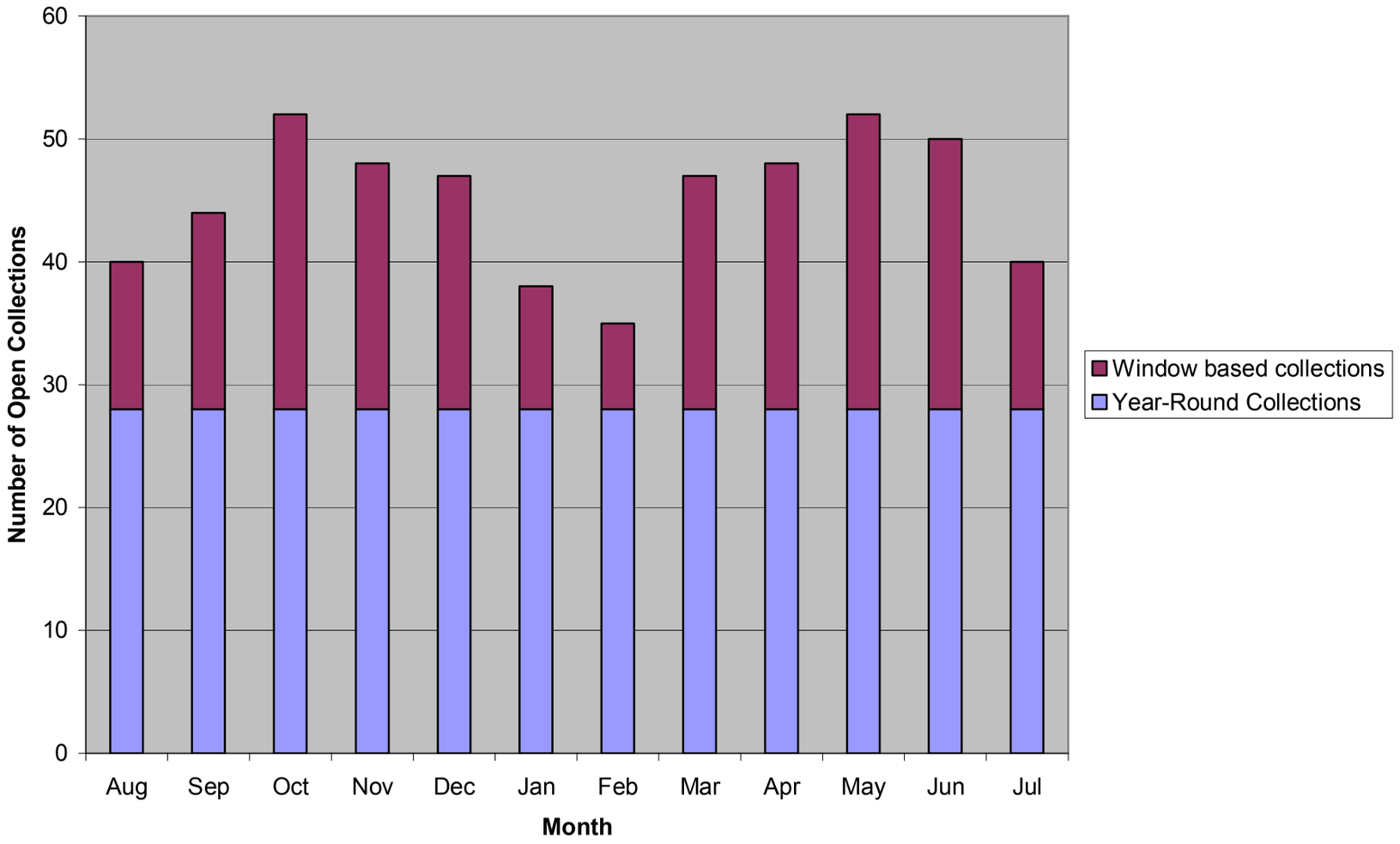
Unit	Form Number	Form or Document Title	Collection Start Date	Collection End Date	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Special Education Data	SED-279	Documentation of a Tuition Rate for Charter Schools, not Including On-Line Programs	September	October												
Special Education Data	SED-280	Documentation of a Tuition Rate for On-Line Programs, Including On-Line Programs in Charter Schools	September	October												
Assessment	ASMT-104	NAEP Assessment E-File Collection	October	November												
Auditing	AUD-102	Certification of Eligibility for Counting Pupils Enrolled in On-Line Educational Programs	October	October												
Auditing	AUD-103	Certification of Eligibility for Counting New Enrollees on Alternative Count Day	October	October												
Auditing	AUD-104	Official Notification Form of Pupils Publicly Placed in Facilities	October	October												
Auditing	AUD-105	Notification Letter of Pupil Enrollment on the Count Day or in the Five Days Proceeding the Count Day	October	October												
Data and Research	DAR-101	Section C-1: Non Public School Information Form	October	October												
Exceptional Student Leadership	ESL-115	Indicator 13 Checklist For State Performance Plan	October	May												
Exceptional Student Leadership	ESL-116	MESH Annual Report	October	December												
Exceptional Student Leadership	ESL-405a	CO Statewide Census Students Who Are Deaf blind	October	May												
Exceptional Student Leadership	ESL-407b	CIMP Student Record Review	October	February												
Exceptional Student Leadership	ESL-421A	Colorado Special Education Personnel Shortages Survey - Fall	October	October												
Prevention Initiatives	PI-109	Year End Performance Report Title IV-A Safe and Drug Free Schools	October	November												

Unit	Form Number	Form or Document Title	Collection Start Date	Collection End Date	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
State Library	STL-101	Colorado School Library Survey	October	November												
Public School Finance	PSF-113	Full-Day Kindergarten Phase in Plan (07/08 one time only	October	February												
Public School Finance	PSF-119	Certification of Mill Levies	November	December												
Title II Consolidated Federal Programs	TII-102	CO Mathematics and Science Partnerships Program	November	December												
Exceptional Student Leadership	ESL-407c	CIMP Staff Survey	November	November												
Exceptional Student Leadership	ESL-407d	CIMP Parent Survey	November	November												
Public School Finance	PSF-104	Report of November Elections	November	November												
Assessment	ASMT-105	ADE Precoded Labels	December	January												
Data and Research	DAR-107	ADE December Human Resources	December	January												
English Language Acquisition	ELA-103	CSAP Oral Transcripts Translation Survey	December	January												
Prevention Initiatives	PI-108a	Expelled and at Risk Student Services Mid Year Report	December	January												
Special Education Data	SED-220	Annual Count of Eligible Students under Part B of the Individuals with Disabilities Education Act	December	January												
Special Education Data	SED-221	Staff Employed/Contracted to Provide Special Ed/ Related Serve Dec. 1	December	January												
Public School Finance	PSF-107	ADE Financial December	December	December												
Public School Finance	PSF-CSCC-02	Charter School Eligibility	December	December												
Prevention Initiatives	PI-118	RFP for Title X, Part C of NCLB (Mckinney-Veno homeless Education Programs)(Every 3 Years)(2010 Next Review)	February	June												
Public School Finance	PSF-101	CO Preschool Program Reapplication and Annual Report	February	April												

Unit	Form Number	Form or Document Title	Collection Start Date	Collection End Date	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Special Education Data	SED-202	Application for Special Education High Cost Reimbursement Under the Exceptional Children's Educational Act	February	March												
Data and Research	DAR-103	ADE Report Card March Miscellaneous	March	April												
Educational Services	EDT-106	Power Results Grant Program RFP and Application	March	Apr												
Exceptional Student Leadership	ESL-401	ESCAPE AP Exam Fee Information Packet	March	July												
Office of Professional Services	OPS-101	First Year Teacher Survey	March	April												
Public School Finance	PSF-CC01	Capital Construction Project Request Five Year Plan	March	June												
Public School Finance	PSF-CC02	Capital Construction Loan Coversheet (CC-02)	March	June												
Public School Finance	PSF-CC03	Capital Construction Project Request (CC-03)	March	June												
Public School Finance	PSF-CC04	Capital Construction Capital Project Schedule	March	June												
Public School Finance	PSF-CC07	Capital Construct District's Facility Inventory List	March	June												
Special Services	SPS-115	Highly Qualified Teacher Plans	March	May												
Title II Consolidated Federal Programs	SPS-111	NCLB Consolidated State Performance Report Data Collection (Next collection 2008)	March	April												
Assessment	ASMT-108	Colorado English Language Assessment Student Biographical Data Review	March	March												
Center for At-Risk Education	CARE-112	Even Start Children's Reading Skills Study	March	March												
Exceptional Student Leadership	ESL-410	Sliver Grant Applications/ Set Aside Grant Applications	March	March												
Assessment	ASMT-416	CSAPA Online	April	April												
Competitive Grants and Awards	CGA-102	Colorado Reading First BEAR Assessment	April	May												

Unit	Form Number	Form or Document Title	Collection Start Date	Collection End Date	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Exceptional Student Leadership	ESL-403	Gifted and Talented Student Education Plan	April	May												
Exceptional Student Leadership	ESL-421B	Colorado Special Education Personnel Shortages Survey - Spring	April	April												
Title II Consolidated Federal Programs	ETC-102	Education Technology-Information Literacy (ET-IL) Plan & Form	April	June												
Assessment	ASMT-106	ADE Student Biographical Data Review Form CSAP/CSAPA	May	June												
Data and Research	DAR-104	ADE Safety and Discipline Indicator	May	June												
Office of Management Services	OMS-101	Application for Alternative Education Campus Designation	May	June												
Office of Special Services	OSS-101	Consolidated Federal Programs Application	May	June												
Prevention Initiatives	PI-108	Expelled/At Risk Student Serve Final and Continuation Report	May	June												
Special Education Data	SED-409A	Federal Application Project Narrative	May	June												
Office of Learning and Results	OLR-101	Financial Literacy RFP	May	May												
Public School Finance	PSF-102	Colorado Preschool Program Expansion Application	May	May												
Assessment	ASMT-102	ACT Student Biographical Data	June	July												
Educational Services	EDS-101	Four-Day School Week/CDE-479	June	June												
Public School Finance	PSF-CC05	Capital Construction Project Status Report	July	July												
Public School Finance	PSF-CSCC-01	List of Expenditures and Project Description	July	July												
Special Services	SPS-102	Colorado Charter Schools 2004-2005 Evaluation Study (Done every 3 years 07-08 next review)	Other	Other												

Figure 6-1 Open Collections



The calendar below demonstrates the planned versus actual collection windows for End-of-Year, Student October, and the December Human Resources collections. As you can see the actual collection windows (yellow) differ from the planned (blue). Some of the reasons for the delays are system programming delays and school district submission delays.

Schedule	Collection	Collection Start Date	Collection End Date	Post Collection End Date	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
EDAC	ADE End of Year (2005-2006 School Year) Feb start	February	March	April												
Actual	ADE End of Year (2005-2006 School Year) Feb start	February	May	June												
EDAC	ADE End of Year (2006-2007 School Year) July (Cont. thru August 2008)	May	August	September												
Actual	ADE End of Year (2006-2007 School Year) July (Cont. thru August 2008)	July	October	December												
EDAC	ADE End of Year 07/08	May	September	November												
Estimated	ADE End of Year 07/08	May	September	November												
EDAC	ADE Student October	September	November	November												
Actual/ Estimate	ADE Student October	September	November	November												
EDAC	ADE December Human Resources	December	January													
Estimated	ADE December Human Resources	November	April													
EDAC	ADE Safety and Discipline Indicator	May	June													
Estimated	ADE Safety and Discipline Indicator	May	June													

Appendices

Appendix A: State Education DB Tables

Table Name	Purpose
RFBEAR_CODES_PERIODIC	Reading First BEAR
RFBEAR_PERIODIC	Reading First BEAR
RFBEAR_STAGE	Reading First BEAR
AYP_VALIDATION_2002	SAR
AYP_VALIDATION_2003	SAR
CSAPA_ONLINE_PASSWORDS	CSAPA ONLINE
CSAPA_ONLINE_PERIODIC	CSAPA ONLINE
CSAPA_ONLINE_STAGE	CSAPA ONLINE
CSAPA_RELEASE	SAR
CSAP_SAR_PANEL_VALIDATION	SAR
PS_TXN	Summer School
R2A_ONLINE_PASSWORDS	Read To Achieve
R2A_STUDENT_INFO_PERIODIC	Read To Achieve
R2A_STUDENT_INFO_STAGE	Read To Achieve
SUMMER_DISTRICT_PERIODIC	Summer School
SUMMER_ONLINE_PASSWORDS	Summer School
SUMMER_STUDENT_PERIODIC	Summer School
SUMMER_STUDENT_STAGE	Summer School
ACCOUNT_DETAIL	FINDEC
ACCOUNT_DETAIL_PERIODIC	FINDEC
ACCOUNT_MASTER	FINDEC
ACCOUNT_MASTER_PERIODIC	FINDEC
ACCOUNT_SEGMENT_MASTER	FINDEC
ACTSBD_COMBINED_ORIG	ACT SBD / Pre Coded Labels
ACTSBD_PERIODIC	ACT SBD
ADE_EXCEPTIONS	NOT USED
ADMIN_UNIT_MASTER	GENERAL
AE_ATTENDANCE	Old Adult Ed Exclude
AE_EFL_MAP	Old Adult Ed Exclude
AE_GED_RECIPIENTS	Old Adult Ed Exclude
AE_GENERAL_CODES	Old Adult Ed Exclude
AE_PROGRAMS	Old Adult Ed Exclude
AE_PROGRAM_PERSONNEL	Old Adult Ed Exclude
AE_RESPONDENTS	Old Adult Ed Exclude
AE_SCHOOL_YEAR	Old Adult Ed Exclude
AE_STUDENTS	Old Adult Ed Exclude
AE_STUDENT_ATTENDANCE	Old Adult Ed Exclude
AE_STUDENT_TESTS	Old Adult Ed Exclude
AE_TEST_DESCRIPTIONS	Old Adult Ed Exclude
AE_TEST_DESCRIPTIONS_DETAIL	Old Adult Ed Exclude
AE_TEST_SCORING	Old Adult Ed Exclude
AE_TEST_SCORING_051215_1358	Old Adult Ed Exclude
AE_TEST_SCORING_NEW	Old Adult Ed Exclude

CDE_ADVISORY_COMMITTEES	DIRECTORY
CDE_OFFICE	DIRECTORY
CDE_STAFF	DIRECTORY
CDE_UNIT	DIRECTORY
CELA_GRT	ELPA / Student October
COFRS_AMOUNTS_PERIODIC	FINDEC
COFRS_GBL_TO_GRANT_PERIODIC	FINDEC
COFRS_VENDOR_TO_ORG	FINDEC
COLLECTION_PERIOD_DETAIL	GENERAL
COLLECTION_PERIOD_MASTER	GENERAL
COLLECTION_PERIOD_ORG_TYPES	GENERAL
COLORADO_CITIES	Adult Ed?
CPP_ALLOTMENTS_PERIODIC	Student October
DIM_CROSS_REFERENCE	NOT USED
EDUCATIONAL_GROUPS	DIRECTORY
EDUCATIONAL_GROUP_HEADERS	DIRECTORY
EDUCATIONAL_GROUP_STAFF	DIRECTORY
ELPA_PERIODIC	ELPA Reports
EXCEPTIONS	NOT USED
FACILITY_MASTER	General
FD_ALLOCATIONS_PERIODIC	FINDEC
FD_AUDIT_PERIODIC	FINDEC
FD_CHARTER_COUNT_PERIODIC	FINDEC
FD_ECEA_ADJ_PERIODIC	FINDEC
FD_PRESCHOOL_ACTIVITY_PERIODIC	FINDEC
FILE_STATUS	General
FIN_PERIODIC	SAR
FIN_STAGE	SAR
FPC_PERIODIC	FINDEC
GENERAL_CODES	GENERAL
GENERAL_SOURCES	GENERAL
GRADE_TO_AGE	GENERAL
HQT_EXCEPTION_PERIODIC	Human Resource / Highly Qualified
HQT_HOUSSE_PERIODIC	Human Resource / Highly Qualified
HQT_HR	NOT USED
HQT_LICENSE_EXPIRE	NOT USED
HQT_LICENSURE	Human Resource / Highly Qualified
HQT_PERIODIC	Human Resource / Highly Qualified
HR_CODES_PERIODIC	Human Resource
HR_ORG_PERIODIC_MEAN	NOT USED
HR_ORG_PERIODIC_MODE	Human Resource
HR_PERIODIC	Human Resource
HR_PERIODIC_DETAIL	Human Resource
HR_PERIODIC_FTE	Human Resource
INDIRECT_RATES_PERIODIC	FINDEC
JOBCLASS_CATEGORY_PERIODIC	Human Resource / Special Ed December
LAB_OCT_ACT_SCHOOL_XWALK	Pre Coded Labels
LAB_OCT_PERIODIC	Pre Coded Labels
LEGACY_FPC_PERIODIC	FINDEC
LEGACY_STATE_EQUAL_PERIODIC	FINDEC

LEGACY_STUDENT_COUNT_DISTRICT	DIRECTORY
LEGACY_STUDENT_COUNT_SCHOOL	DIRECTORY
LIBRARIES_ACADEMIC	DIRECTORY
LIBRARIES_INSTITUTION	DIRECTORY
LIBRARIES_INSTITUTION_TYPE	DIRECTORY
LIBRARIES_PUBLIC	DIRECTORY
LIBRARIES_SPECIAL	DIRECTORY
MEP_ACTIVITY_CODES	Migrant Exclude
MEP_CATEGORY_CODES	Migrant Exclude
MEP_EXAMS	Migrant Exclude
MEP_FAMILY	Migrant Exclude
MEP_FAMILY_HISTORY	Migrant Exclude
MEP_FORMAL_ASSESS	Migrant Exclude
MEP_GENERAL_CODES	Migrant Exclude
MEP_GRADE_TO_AGE	Migrant Exclude
MEP_HEALTH	Migrant Exclude
MEP_IMMUN	Migrant Exclude
MEP_INSTRUCT	Migrant Exclude
MEP_REGION_MASTER	Migrant Exclude
MEP_RESPONDENTS	Migrant Exclude
MEP_SCHOOL_MASTER	Migrant Exclude
MEP_SECONDARY	Migrant Exclude
MEP_STUDENT	Migrant Exclude
MEP_STUD_SCHL	Migrant Exclude
MEP_SUPPORT	Migrant Exclude
MEP_TEMP_ACTIVITY_CODES	Migrant Exclude
MESSAGE_LOG	GENERAL
MESSAGE_REGISTER	GENERAL
MSP_PERIODIC	Math/Science
OODS_PERIODIC	FINDEC
ORGANIZATION_COUNTIES	GENERAL
ORGANIZATION_MEMBERS	NOT USED
ORGANIZATION_UNIT_MASTER	GENERAL
ORGANIZATION_UNIT_PERIODIC	GENERAL
ORG_UNIT_ADDRESSES	DIRECTORY
ORG_UNIT_BOARD_MEMBERS	DIRECTORY
ORG_UNIT_BOCES	DIRECTORY
ORG_UNIT_CALENDAR	DIRECTORY
ORG_UNIT_FACILITY	GENERAL
ORG_UNIT_KEY_STAFF	DIRECTORY
RC_MARCH_PERIODIC	RCMAR
REF_VALUES	GENERAL
RESPONDENTS	GENERAL
RESPONDENT_COLLECTIONS	GENERAL
RITS_ADE_DUPCHECK_TEMP	RITS
ROLE_COLLECTION_ACCESS	GENERAL
SALARY_JOBCLASS	NOT USED
SALARY_MATRIX	NOT USED
SALARY_MATRIX_PERIODIC	Human Resource
SBD_CHANGED	SBD

SBD_COMBINED_ORIG	SBD
SBD_SOA	SBD
SCHOOL_MASTER	GENERAL
SCHOOL_PERIODIC_DETAIL	GENERAL
SDI_EXCEPTIONS	SDI
SDI_INCIDENT_PERIODIC	SDI
SDI_RACE_ETHNIC_PERIODIC	SDI
SO_AT_RISK_PERIODIC	Student October
SO_CATEGORY_CODES	Student October
SO_CPP_COUNT_DAY_PERIODIC	Student October
SO_ELL_EXCEPTION_PERIODIC	Student October
SO_FINANCE_PERIODIC	NOT USED
SO_FULLTIMEFUND_EXCPT_PERIODIC	Student October
SO_GENERAL_CODES	Student October
SO_GRADUATE_EXCEPTION_PERIODIC	Student October
SO_MIGRANT_PERIODIC	Student October
SO_ONLINE_PERIODIC	Student October
SO_RITS	Student October
SO_TOLERANCE_PERIODIC	Student October
SO_UNSATISFACTORY_SCHOOLS	Student October
SO_VALIDATION	Student October
SO_WAIVERS	Student October
SO_WAIVER_TYPES	Student October
SO_WAREHOUSE	NOT USED
SO_WAREHOUSE_021104	NOT USED
SPD_CODES_PERIODIC	Special Ed December
SPD_DEAF_BLIND_REGISTRY	Special Ed December
SPD_ELL_STATUS_PERIODIC	Special Ed December
SPD_GRADEAGE_EXCEPT_PERIODIC	Special Ed December
SPD_GRADE_TO_AGE_PERIODIC	Special Ed December
SPD_PROGRAM_EXCEPT_PERIODIC	Special Ed December
SPD_SALARY_MATRIX_PERIODIC	Special Ed December
SPD_STD_PERIODIC	Special Ed December
SPD_STF_DETAIL_PERIODIC	Special Ed December
SPD_STF_MASTER_PERIODIC	Special Ed December
STATE_EQUAL_PERIODIC	FINDEC
STND_DAYS_HRS	Human Resource
STUDENT_INSTR_PROGRAM_TYPES	NOT USED
STUDENT_PERIODIC	NOT USED
STUDENT_PROVIDERS	NOT USED
STUD_OCT_PERIODIC	Student October
TEMP_SALARIES	NOT USED
USER_PROGRAM_ACCESS	GENERAL
WH_SCHOOL_MASTER	SAR
LIC_APPLICATIONS	License Check
LIC_BIOGRAPHICAL	License Check
LIC_CERTIFICATE	License Check
LIC_CERTIFICATE_ENDOR	License Check
LIC_CORRESPONDENCE	License Check
LIC_LETTERS_OF_AUTHORIZATION	License Check

LIC_LICENSE	License Check
LIC_NOTES	License Check
LIC_SCORES	License Check
PS_TXN	License Check
DISTRICTS	RITS
GFDISTRICTS	RITS
REQUESTS	RITS
REQUEST_DETAILS	RITS
REQUEST_RESPONSES	RITS
RITS_READ_STAGING	RITS
SCHOOLS	RITS
SEY_ADJUSTMENTS_TEMP	EOY
SEY_ADJUST_1990_2003	EOY
SEY_ADJUST_INDIVIDUAL_PERIODIC	EOY
SEY_ADJUST_INDIVIDUAL_STAGE	EOY
SEY_CBLA_COHORT_PERIODIC	EOY
SEY_CBLA_EXCEPTION_PERIODIC	EOY
SEY_CELA_EXCEPTION_PERIODIC	EOY
SEY_CSAP_PERIODIC	EOY
SEY_DETAIL_PERIODIC	EOY
SEY_DETAIL_STAGE	EOY
SEY_DETAIL_STAGE_POST	EOY
SEY_GED_RECIPIENTS_PERIODIC	EOY
SEY_GRAD_CALC_PERIODIC	EOY
SEY_GRAD_CALC_STAGE	EOY
SEY_MASTER_DETAIL_STAGE_TEMP	EOY
SEY_MASTER_PERIODIC	EOY
SEY_MASTER_STAGE	EOY
SEY_MASTER_STAGE_POST	EOY
SEY_PART_2_INDIVIDUAL_PERIODIC	EOY
SEY_PART_2_INDIVIDUAL_STAGE	EOY
SEY_PART_2_SUMMARY_PERIODIC	EOY
SEY_PART_2_SUMMARY_STAGE	EOY
SEY_POST_ERRORS_PERIODIC	EOY
SEY_REASSIGNED_SASID_PERIODIC	EOY
SEY_SPEC_ED_EXCEPTION_PERIODIC	EOY
SEY_SPED_PERIODIC	EOY
SEY_STATE_ADVAN_PLACE_ETH_GEN	EOY
SEY_STATE_CBLA	EOY
SEY_STATE_DROPOUT_BY_IPST	EOY
SEY_STATE_DROPOUT_BY_SCHOOL	EOY
SEY_STATE_GRAD_COMP_RATE	EOY
SEY_STATE_GRAD_ETH_GEN	EOY
SEY_STATE_GRAD_RATE_BY_IPST	EOY
SEY_STATE_GRAD_RATE_CALC	EOY
SEY_STATE_GRAD_RATE_ETH_GEN	EOY
SEY_STATE_MEMB_AND_DROP	EOY
SEY_STATE_MEMB_ETH_GEN	EOY
SEY_STATE_POSTSEC_OPTIONS	EOY
SEY_STATE_POSTSEC_OTHER_PROG	EOY

ADMIN_INST_AREA	Special ED FED
ADMIN_UNIT	Special ED FED
ALLOCATION	Special ED FED
AU_APPROVAL	Special ED FED
AU_APPROVAL_HISTORY	Special ED FED
CONTRACT	Special ED FED
CONTRACT_GOODS	Special ED FED
CONTRACT_HISTORY	Special ED FED
CONTRACT_PERSONAL	Special ED FED
CONTRACT_SERVICES	Special ED FED
COORD_SERVICE	Special ED FED
DEC_PUPIL	Special ED FED
DISTRICTS	Special ED FED
EARLY_INTERVEN_SERVICES	Special ED FED
EMPLOYMENT_STATUS	Special ED FED
EQUIPMENT_CODES	Special ED FED
FED_BUDGET	Special ED FED
FED_STAFF	Special ED FED
FED_STAFF_HISTORY	Special ED FED
GRANT_FUND_SOURCE	Special ED FED
JOB_CLASSIFICATION	Special ED FED
NONSPECIFIC_STAFF	Special ED FED
OBJECT_CODES	Special ED FED
OTHER_CODES	Special ED FED
PRINCIPAL_LEVEL	Special ED FED
PURCHASED_SERVICES_CODES	Special ED FED
SCH_MASTER	Special ED FED
SCH_WIDE	Special ED FED
SUPPLIES_CODES	Special ED FED
TEACH_SUBJ_AREA	Special ED FED
CADI_INDICATORS	STEP/DSTEP
CADI_INDICATORS_HISTORY	STEP/DSTEP
CADI_RUBRIC_CATEGORY_CODES	STEP/DSTEP
CADI_RUBRIC_GENERAL_CODES	STEP/DSTEP
CADI_RUB_CAT_COD_HISTORY	STEP/DSTEP
CADI_RUB_GEN_COD_HISTORY	STEP/DSTEP
CADI_STANDARDS	STEP/DSTEP
CADI_STANDARDS_HISTORY	STEP/DSTEP
SSTEP_INDICATORS	STEP/DSTEP
SSTEP_INDICATORS_HISTORY	STEP/DSTEP
SSTEP_RUBRIC_CATEGORY_CODES	STEP/DSTEP
SSTEP_RUBRIC_GENERAL_CODES	STEP/DSTEP
SSTEP_RUB_CAT_COD_HISTORY	STEP/DSTEP
SSTEP_RUB_GEN_COD_HISTORY	STEP/DSTEP
SSTEP_STANDARDS	STEP/DSTEP
SSTEP_STANDARDS_HISTORY	STEP/DSTEP

Appendix B: CDE H/W Summary Table

Server	Model	Processor Type	Processor Qty	RAM	Estimated Disk Space	Operating System
ADE Database Server	HP rx4640	Intel Itanium	4	16 GB	400 GB	HP-UX 11i v2
Data Warehouse Database Server	HP rx4640	Intel Itanium	4	16 GB	500 GB	HP-UX 11i v2
ADE Web Server	Dell PowerEdge 2650	Intel Xeon	2	8 GB	180 GB	Red Hat AS 2.1
J2EE Web Server	Dell PowerEdge 2650	Intel Xeon	2	12 GB	365 GB	Red Hat AS 4.0
J2EE Web Server	Dell PowerEdge 2650	Intel Xeon	2	12 GB	365 GB	Red Hat AS 4.0
Reporting Web Server	Dell PowerEdge 2650	Intel Xeon	2	4 GB	365 GB	Windows 2003
Reporting Web Server	Dell PowerEdge 2650	Intel Xeon	2	4 GB	730 GB	Windows 2003
ETL Server	Dell PowerEdge 2850	Intel Xeon	2	6 GB	1.5 TB	Red Hat AS 4.0

Appendix C: Education Data Warehouse

See document "Education Data Warehouse - Attachment.doc"

Appendix D: CDE S/W Summary Tables

SOFTWARE	Vendor	Purpose	Licenses
Data Base Oracle 9i moving to 10g	Oracle	Data Repository	2 CPUs
Discoverer	Oracle	DB Query/Reporting	Named Users 30
TOAD	Quest	DB analysis tool	All Developers 13
COGNOS	Robelle	DB Query/Reporting	Named Users 350
SQL Plus	Oracle	DB Queries	All Developers 13

DEVELOPMENT TOOLS	**Vendor**	**Purpose**	**Licenses**
Oracle Developer Suite Forms/Reports	Oracle	Web and in-house forms	ADE Developers/User ~ 5
SQR	Oracle	ADE backend processing	ADE Developers/User 18
Jdeveloper	Oracle	Java Development	Java Developers ~ 4
TOAD	Quest`	Development/Support	All Developers 13
SQL Plus	Oracle	Development/Support	All Developers 13
PERL	Open Source	ADE Front End	N/A Flat Rate
Adager	Rego	Development/Support	N/A Flat Rate
Informatica	Informatica	Development/Support	Developers 8
ESRI / ARC INFO	ESRI	Development/Support	Developers 2
COBOL Legacy HP3000	HP	Development	N/A Flat Rate
COGNOS Legacy HP3000	Cognos	Development	N/A Flat Rate
SUPRTOOL Legacy HP3000	Robelle	Development/Support	N/A Flat Rate
Speedware Legacy HP3000	Speedware	Development	N/A Flat Rate

Automated Data Exchange Web	Language	Database	Vendor/Version
ACT SBD	PERL	SEDB	Oracle 9i
Adult Ed	PERL	SEDB	Oracle 9i
Adult Ed Replacement (New)	PERL	SEDB	Oracle 9i
BEAR	PERL	SEDB	Oracle 9i
CELA SBD	PERL	SEDB	Oracle 9i
CELA Data Uploads/Reports	PERL	SEDB	Oracle 9i
Directory	PERL	SEDB	Oracle 9i
End Of Year (Legislative Enhancements)	PERL	SEDB	Oracle 9i
Facilities	PERL	SEDB	Oracle 9i
Finance	PERL	SEDB	Oracle 9i
Human Resources / HQT	PERL	SEDB	Oracle 9i
Labels For ACT, CSAP, CELA	PERL	SEDB	Oracle 9i
Miscellaneous March	PERL	SEDB	Oracle 9i
Perl Ade Front End	PERL	SEDB	Oracle 9i
Read To Achieve	PERL	SEDB	Oracle 9i
Rits Active/Inactive	PERL	SEDB	Oracle 9i
Rits Read Only	PERL	SEDB	Oracle 9i
Special Ed December Count	PERL	SEDB	Oracle 9i
Special Ed HR	PERL	SEDB	Oracle 9i
Special Ed EOY (New)	PERL	SEDB	Oracle 9i
Student October Count	PERL	SEDB	Oracle 9i
Safety & Discipline Indicators	PERL	SEDB	Oracle 9i
SBD CSAP, CSAPA, CSAPO	PERL	SEDB	Oracle 9i

SEDB - Sate Education Database

Other Web Systems	Language	Database	Vendor/Version
Addm Autism Monitoring (New)	Java	SEDB	
Ayp (Major Federal Enhancement)	Java	SEDB	Oracle 9i
Child Nutrition	Java	CNUT	Oracle 9i
Data Dictionary (New Project Support)	Java	SEDB	Oracle 9i
Direct Certification	Java	SEDB	Oracle 9i
RITS	Java	SEDB	Oracle 9i
Special Ed Web Reports	Java	SEDB	Oracle 9i
SSTEP	Java	SEDB	Oracle 9i
DSTEP	Java	SEDB	Oracle 9i
CPP	Java	SEDB	Oracle 9i
Licensure Status Check (District/Public)	Java	SEDB	Oracle 9i
School Accountability Report Web	Java	SEDB	Oracle 9i
Special Ed TTE (New)	Java	SEDB	Oracle 9i
Special Ed Federal App (New)	Java	SEDB	Oracle 9i
Special Ed EOY (Budget) (New)	Java	SEDB	Oracle 9i
Summer School CSAP Improvement (New 2007)	Java	SEDB	Oracle 9i

Hp3000 Legacy Systems	Database
Monthly Budget (COFRS)	IMAGE 3000
Licensure	IMAGE 3000
Non Public Schools	IMAGE 3000
Out Of District Pupils	IMAGE 3000
Position Cost	IMAGE 3000
Special Projects	IMAGE 3000
State Equal	IMAGE 3000
State Equal Auditors	IMAGE 3000
Transportation Auditors	IMAGE 3000
State Equal/Auditors (Replacement Analysis)	IMAGE 3000

Data Warehouse:	Database	Vendor/Version
AYP Determination	EDWS	Oracle 9i
Cognos Administration	EDWS	Oracle 9i
Cognos Development	EDWS	Oracle 9i
Cognos/Cedar Data Analysis/Reporting Enhancements	EDWS	Oracle 9i
Cognos/Cedar Training/Support	EDWS	Oracle 9i
Data Dictionary / Meta Data Maintenance (New)	CCAT	Oracle 9i
Data Dictionary Web Interface (New)	CCAT	Oracle 9i
Data Warehouse Modeling/Administration	EDWS	Oracle 9i
Data Warehouse Expansion/Enhancements (New)	EDWS	Oracle 9i
PBDMI/EDEN/Edfacts Maintenance	EDWS	Oracle 9i
PBDMI/EDEN /Edfacts Development	EDWS	Oracle 9i
School Accountability Reports	EDWS	Oracle 9i
ETL Informatica Administration	EDWS	Oracle 9i
Discoverer End-User Layer	EDWS	Oracle 9i
Database Oracle 10g Upgrade / Access Manager (New)	SEDB/EDWS	Oracle 10g

EDWS – Education Data Warehouse

Appendix E: CDE Planned Projects

Legislative:
Teacher Student Ratio In Core Subjects (New)
Yearly system changes
State Initiatives:
Data Base Encryption
Access Management
Security Audit
State Security Compliance
Planned Internal Projects:
Current Year:
10g Oracle DB Upgrade
Read to Achieve Replacement
Special Ed EOY Replacement
Special Ed TTE Replacement
Teach in Colorado Replacement
Licensure Replacement
Teacher Student Ratio In Core Subjects (New)
As Resources are Available:
Non-public Schools Replacement
Out of District Pupils Replacement
State Equal/Auditors Replacement
Oracle 9i Forms to 10g
Other Legacy System Replacements

Appendix F: District H/W Summary Table

Hardware Basis	% of Districts *
3rd Party Hosted System	13.64%
Intel/Windows	72.73%
Mac	6.82%
DOS	0.00%
Other	6.82%

* Represents the percentage of districts that responded to the survey or where interviewed. Not all schools where included.

Appendix G: District S/W Summary Table

Student Information System	% of Districts (1)
Infinite Campus	36.84% (2)
MacSchool	2.63%
Power School	15.79%
Prostar/GoEdustar	18.42%
SASSI	7.89%
SDS	10.53%
SES School Data Systems	2.63%
SILK	2.63%
ZANGLE	2.63%

(1) Percentages are based on districts that responded to the survey or where interviewed. Not all schools where included or responded.

Database Vendors *
SQL Server
Oracle
MS Excel
MS Access
My SQL

Financial systems

DataTeam
SAGE
JD Edwards
Coyote
PeopleSoft
DiTech

* Survey results did not provide enough information determine percentages.

Appendix C – Database Objects

C Database Objects

C.1 Database Instances

The EDW consists of four databases, two on each of the database servers AQUAMAN and BATMAN. AQUAMAN contains one of the production databases *EDWP1* and the production staging database *EDWS*. BATMAN contains the second production database *EDWP2* and the development/test database *EDWD*. These instances are described in the table below.

Table 1 - Database Instances

Instance	Type	Server
EDWS	Production staging Area	Aquaman
EDWD	Development/Test	Batman
EDWP1	Production 1	Aquaman
EDWP2	Production 2	Batman

C.2 Data Models

The data warehouse was designed using a star schema approach. A star schema is the simplest form of a data model, which contains a single fact table and one or more lookup or dimension tables that are related through foreign keys. Dimension tables contain the information that represents the attributes of the business and determines how facts can be analyzed. Fact tables contain the numerical performance measures of the business. For reporting purposes, the data in several fact tables have been aggregated.

There are thirteen logical data models grouped into four subject areas, which are described in the subsections that follow.

Student Performance

The Student Performance subject area contains detailed (student level) and summarized (school level) assessment data – specifically CSAP and ACT results. This subject area consist of five models:

- CSAP Detail
- CSAP Detail EMH GCE
- CSAP Analysis
- CSAP Summary
- ACT Detail
- ACT Detail GCE
- ACT Summary

Staff Information

The Staff Information subject area contains detailed (staff level) and summarized (school level) human resource data about staff. This subject area consist of three models:

- Staff Detail
- Staff Analysis
- Staff Summary

School Information

The School Information subject area contains an assortment of information about schools. This subject area consist of four models:

- Enrollment Detail
- Discipline Summary
- Student End of Year Analysis
- School Detail
- School Summary

District/Financial

The District/Financial subject area contains financial and profile data about districts. Currently this subject area consist of only one model:

- Finance Revenue
- Finance Expense
- District Financial Detail
- District Financial Summary
- Finance RPT
- Finance RPT Aggregate

C.3 Dimension Tables

The data warehouse includes 47 dimension tables that contain the information representing the attributes of the School Accountability Report system. A description of each table and its source is provided below.

Table 2 - Dimension Tables

Dimension Table	Description	Source
Dim_504_Plan	Contains Y/N/U (unreported) indicators to determine if a student is identified as being handicapped under Section 504 of the Rehabilitation Act of 1973	Dim_504_Plan.txt
Dim_Accomodation	Contains the codes which indicate special accommodations (if any) that were made for CSAP testing	Dim_Accomodation.txt
Dim_ACT_Subject	Contains the ACT subject areas and codes	Dim_ACT_Subject.txt
Dim_ACT_Test_Type	Contains ACT Test types	Dim_ACT_Test_Type.txt
Dim_Award	Codes to indicate Awards given to school	Dim_Award.txt
Dim_Bilingual	Codes to Indicate whether the student is enrolled in bilingual	Dim_Bilingual.txt
Dim_College	Contains the codes that indicate the college attended by Staff members	Dim_College.txt
Dim_CSAP_Content_Proficiency	Contains the overall CSAP content proficiency codes to indicate if the student's performance was Below or At/Above proficiency	Dim_CSAP_Content_Proficiency.txt
Dim_CSAP_Proficiency	Contains the CSAP proficiency levels (Unsatisfactory, Partially Proficient, Proficient, Advanced, Not Tested/Invalid)	Dim_CSAP_Proficiency.txt
Dim_CSAP_Subject	Contains the CSAP subject areas and codes	Dim_CSAP_Subject.txt
Dim_Did_Not_Test	Contains the codes and	Dim_Did_Not_Test.txt

Dimension Table	Description	Source
	reasons why a student did not take the CSAP	
Dim_Disabling_Condition	Contains student disabling conditions and codes	Dim_Disabling_Condition.txt
Dim_Disciplinary_Action	Contains the types of school disciplinary actions that are taken	Dim_Disciplinary_Action.txt
Dim_Disciplinary_Incident	Contains the types of school disciplinary incidents	Dim_Disciplinary_Incident.txt
Dim_District	Contains school district names and codes	Dim_District.txt
Dim_Education_Level	Contains staff member education levels	Dim_Education_Level.txt
Dim_Esl	Codes to indicate whether the student is enrolled in ESL program	Dim_Esl.txt
Dim_Ethnicity	Contains ethnicity codes	Dim_Ethnicity.txt
Dim_Farm	Contains codes to indicate if a student is eligible for the Free and Reduced Meal program	Dim_Farm.txt
Dim_Finance_Rpt_Cat	Finance reporting category codes	Dim_Finance_Rpt_Cat.txt
Dim_Fund	Fund type for finance.	Dim_Fund.txt
Dim_Gender	Contains gender codes	Dim_Gender.txt
Dim_Grade	Contains student grade levels	Dim_Grade.txt
Dim_Grade_Calc_Exemption	Contains the reasons a CSAP record should be exempt from the performance and improvement rating calculations	Dim_Grade_Calc_Exemption.txt
Dim_Grad_Class	Contains Graduation Year for a student	Dim_Grad_Class.txt
Dim_Grant_Project_Funding	Contains grant/project funding codes and the name of the grant/project	Dim_Grant_Project_Funding.txt
Dim_Iep	Contains Instructional Education Programs plan status codes	Dim_Iep.txt
Dim_Instr_Prog_Svc_Type	Contains the types of instructional programs students are participating in	Dim_Ipst.txt
Dim_Job_Class	Contains district staff job classes and codes	Dim_Jobclass.txt
Dim_Language_Background	Contains the language	Dim_Language_Background.txt

Dimension Table	Description	Source
	codes for the primary language spoken	
Dim_Location	Location code for Finance	Dim_Location.txt
Dim_Migrant_Status	Contains Y/N/U codes indicating if a student is a member of a migrant family	Dim_Migrant_Status.txt
Dim_Object	Object Codes for Finance	Dim_Object.txt
Dim_Program	Program Codes for Finance	Dim_Program.txt
Dim_Pub_Schl_Fin_Fund_Type	Contains status codes to indicate if a student is eligible for funding under the Public School Finance Act	Dim_Psfa_Funding.txt
Dim_Pupil_Attendance_Info	Contains student district residency status codes and school program types	Dim_Pupil_Attend_Info.txt
Dim_School	Contains the school names, addresses, grade span, location coordinates and phone numbers	Dim_School.txt GIS_Dsch_Coords
Dim_School_Emh	Contains school type (E,M,H), grade span, location coordinates, report flag and school name	Adm_Emh_Rules Dim_School GIS_Demh_Coords
Dim_School_Year	Contains the school academic years for which data is available in the warehouse	Dim_School_Year.txt
Dim_Source	Source codes for Finance	Dim_Source.txt
Dim_Staff_Member	Contains district staff ids	HR_Periodic
Dim_Subject	Contains the subject areas taught by teachers	Dim_Subject.txt
Dim_Tenure	Contains codes to indicate if a district staff member has tenure	Dim_Tenure.txt
Dim_Time_In_District	Contains the number of months that a student has been enrolled in a specific district	Dim_Time_In_District.txt
Dim_Time_In_School	Contains the number of months that a student has been enrolled in a specific school	Dim_Time_In_School.txt
Dim_Title_1	Contains Y/N/U codes indicating title one status	Dim_Title_1.txt

C.4 Fact Tables

The data warehouse contains ten fact tables corresponding to the data models referenced in section 2.4.2. The fact tables contain the numerical performance measures of each subject area. A brief overview and the model for each of the fact tables are presented in the subsections that follow.

C.4.1 Fact_ACT_Detail

The Fact_ACT_Detail table is used to generate the Fact_ACT_Summary table, which the warehouse uses, in turn, to calculate the Overall Academic Rating for high schools. The data in this table is imported from ACT test files provided by ACT annually in June.

This table contains student demographic information and ACT subject area test scores.

Table 4.1.a - Fact_ACT_Detail

Dimensions	Measures
District	ACT ID
School	Date of Birth
Grade	Scaled Score
Ethnicity	Sum of Scaled Scores
Gender	Test Date
ACT Subject	Oct_New_School
Year	Oct_New_District
ACT Test Type	Oct_New_State
Migrant Status	Feb_New_School
Language Background	Feb_New_District
IEP	Feb_New_State
504	ESID
Title 1	
Disabling Condition	
Farm	
Did Not Test	
Grade Calc Exemption	
ESL	
Bilingual	
Accommodation	
Time In District	
Time In School	

Table 4.1.b – Fact_ACT_Detail Keys

Column Keys	Dimension
Facd_Dasy_Key	Dim_School_Year
Facd_Dgnd_Key	Dim_Gender
Facd_Dgrd_Key	Dim_Grade
Facd_Dsch_Key	Dim_School
Facd_Ddst_Key	Dim_District
Facd_Datt_Key	Dim_ACT_Test_Type
Facd_Dasb_Key	Dim_ACT_Subject
Facd_Deth_Key	Dim_Ethnicity
Facd_Dmgs_Key	Dim_Migrant_Status
Facd_Dlng_Key	Dim_Language_Background
Facd_Diep_Key	Dim_Iep
Facd_D504_Key	Dim_504_Plan
Facd_Dttl_Key	Dim_Title_1
Facd_Ddis_Key	Dim_Disabling_Condition
Facd_Dfrm_Key	Dim_Farm
Facd_Ddnt_Key	Dim_Did_Not_Test
Facd_Dgcl_Key	Dim_Grade_Calc_Exemption
Facd_Desl_Key	Dim_Esl
Facd_Dbln_Key	Dim_Bilingual
Facd_Dacm_Key	Dim_Accomodation
Facd_Dtid_Key	Dim_Time_In_District
Facd_Dtis_Key	Dim_Time_In_School

C.4.2 Fact_CSAP_Detail

The Fact_CSAP_Detail table supports detail score and item level analysis of CSAP Assessment results. This table is also used to generate the Fact_CSAP_Analysis and Fact_CSAP_Summary tables that support various Accountability Report panels and processes.

CSAP data is provided by CTB/McGraw-Hill annually in June. The CSAP Assessment File reports data by each student in a number of broad categories. These include demographic data, subject area scores (raw, scaled and evaluated proficiency), content area scores, and evaluation of item level responses.

Table 4.2.a - Fact_CSAP_Detail

Dimensions	Measures
Year District School	Subject Area Percent of Points Total Points

Grade	Scale Score
Ethnicity	Content Areas 1-4
Gender	Content Title
CSAP Subject Area	Percent of Points
CSAP Proficiency	Total Points
Content Area 1-4 Proficiency	Scale Score
Accommodation 1-2	CTB Administrative
Disabling Condition Code	CTB Mode
IEP Plan Status	CTB Organization ID
504 Plan Status	CTB Student Element Number
Primary Language Code	Test Form
Title 1 Status	Test Name
Did Not Test Code	Item Evaluation
Time in District Code	Multiple Choice 1…
Time in School Code	Criteria Referenced 1…
ESL	Student Age in Months
Bilingual	Feb_new_school
Free and Reduced Lunch	Feb_new_district
Migrant status	Feb_new_state
Graduation Class	Oct_new_school
	Oct_new_district
	Oct_new_state
	Continuously_in_state
	Continuously_in_country
	Continuously_in_ell
	ESID

Table 4.2.b – Fact_CSAP_Detail Keys

Column Keys	Dimension
Fcsd_Dccp_1_Key	Dim_CSAP_Content_Proficiency
Fcsd_Dccp_2_Key	Dim_CSAP_Content_Proficiency
Fcsd_Dccp_3_Key	Dim_CSAP_Content_Proficiency
Fcsd_Dccp_4_Key	Dim_CSAP_Content_Proficiency
Fcsd_Dccp_5_Key	Dim_CSAP_Content_Proficiency
Fcsd_Dccp_6_Key	Dim_CSAP_Content_Proficiency
Fcsd_Sub_Dccp_1_Key	Dim_CSAP_Content_Proficiency
Fcsd_Sub_Dccp_2_Key	Dim_CSAP_Content_Proficiency
Fcsd_Sub_Dccp_3_Key	Dim_CSAP_Content_Proficiency
Fcsd_Sub_Dccp_4_Key	Dim_CSAP_Content_Proficiency
Fcsd_Sub_Dccp_5_Key	Dim_CSAP_Content_Proficiency
Fcsd_Sub_Dccp_6_Key	Dim_CSAP_Content_Proficiency
Fcsd_504_Key	Dim_504_Plan
Fcsd_Dacm_Key_Reading	Dim_Accomodation
Fcsd_Dacm_Key_Writing	Dim_Accomodation
Fcsd_Dasy_Key	Dim_School_Year

Fcsd_Dcpf_Key	Dim_CSAP_Proficiency
Fcsd_Dcsb_Key	Dim_CSAP_Subject
Fcsd_Ddis_Key	Dim_Disabling_Condition
Fcsd_Ddnt_Key	Dim_Did_Not_Test
Fcsd_Ddst_Key	Dim_District
Fcsd_Deth_Key	Dim_Ethnicity
Fcsd_Dgnd_Key	Dim_Gender
Fcsd_Dgrd_Key	Dim_Grade
Fcsd_Diep_Key	Dim_Iep
Fcsd_Dlng_Key	Dim_Language_Background
Fcsd_Dmgs_Key	Dim_Migrant_Status
Fcsd_Dtid_Key	Dim_Time_In_District
Fcsd_Dtis_Key	Dim_Time_In_School
Fcsd_Dttl_Key	Dim_Title_1
Fcsd_Dgcl_Key	Dim_Grade_Calc_Exemption
Fcsd_Dfrm_Key	Dim_Farm
Fcsd_Dsch_Key	Dim_School

C.4.3 Fact_District_Finance_Detail

The Fact_District_Finance_Detail table is used to generate the Fact_District_Finance_Summary table, which the warehouse uses to produce the Student Accountability report.

Table 4.3.a - Fact_District_Finance_Detail

Dimensions	Measures
School Year District	FDFD_AVG_DEBT_APR FDFD_MOST_RECENT_BOND FDFD_NEW_BLDGS_LAST_2_YEARS FDFD_TTL_BONDED_DEBT FDFD_RVN_TTL_ENROLLMENT FDFD_VOTER_BOND_ISSUE_AMT FDFD_VOTER_ELEC_LAST_NOV_YN FDFD_VOTER_MILL_LEVY_INC_AMT FDFD_VOTER_TABOR_OVERRIDE_YN

Table 4.3.b – Fact_District_Finance_Detail Keys

Column Keys	Dimension
Fdfd_Dasy_Key	Dim_School_Year
Fdfd_Ddst_Key	Dim_District

C.4.4 Fact_Finance_Exp

The Fact_Finance_Exp table contains expenditure amounts dimensioned by the school year, district, fund, location, program, object, job class, and grant. It is used to generate the Fact_Finace_RPT and FACT_FINANCE_RPT_AGG tables, which the warehouse uses to generate finance reports.

Table 4.4.a - Fact_Finance_Exp

Dimensions	Measures
School Year District Fund Grant Project Funding Job Class Location Object Program	FFEX_AMOUNT

Table 4.4.b – Fact_Finance_Exp Keys

Column Keys	Dimension
Ffex_Dasy_Key	Dim_School_Year
Ffex_Ddst_Key	Dim_District
Ffex_Dfnd_Key	Dim_Fund
Ffex_Dgpf_Key	Dim_Grant_Project_Funding
Ffex_Djcl_Key	Dim_Job_Class
Ffex_Dloc_Key	Dim_Location
Ffex_Dobj_Key	Dim_Object
Ffex_Dprg_Key	Dim_Program

C.4.5 Fact_Finance_Rev

The Fact_Finance_Rev table contains revenue amounts dimensioned by the school year, district, fund, source and grant. . It is used to generate the Fact_Finace_RPT and FACT_FINANCE_RPT_AGG tables, which the warehouse uses to generate finance reports.

Table 4.4.a - Fact_Finance_Rev

Dimensions	Measures
School Year District Fund Grant Project Funding Source	FFRV_AMOUNT

Table 4.4.b – Fact_Finance_Rev Keys

Column Keys	Dimension
Ffrv_Dasy_Key	Dim_School_Year
Ffrv_Ddst_Key	Dim_District
Ffrv_Dfnd_Key	Dim_Fund
Ffrv_Dgpf_Key	Dim_Grant_Project_Funding
Ffrv_Dsrc_Key	Dim_Source

C.4.6 Fact_Staff_Names

The Fact_Staff_Names table is used to generate the Departure count and Principal name in PNL_STAFF_SUMMARY table, which the warehouse uses to generate the Student Accountability report.

Table 4.6.a - Fact_Staff_Names

Dimensions	Measures
School Year Staff Member	Last Name First Name Middle Name SSN

Table 4.6.b – Fact_Staff_Names Keys

Column Keys	Dimension
Fstd_Dasy_Key	Dim_School_Year
Fstd_Dstf_Key	Dim_Staff_Member

C.4.7 Fact_School_Detail

The Fact_School_Detail table is used to generate the Fact_School_Summary table, which the warehouse uses to generate Student Accountability report

Table 4.7.a - Fact_School_Detail

Dimensions	Measures
School Year School District	Length_of_year Feb_stability_count After_school_yn Closed_campus_yn Community_programs_yn Home_visits_yn Parental_conferences_yn Uniforms_yn Teach_prof_dev_days Teach_days_wo_contact Disc_current_year_ttl Grade_span_high Grade_span_low Teach_ttl_days_absent Total_days_attended Total_days_possible Total_contract_days

Table 4.7.b – Fact_School_Detail Keys

Column Keys	Dimension
Fscd_Dasy_Key	Dim_School_Year
Fscd_Dsch_Key	Dim_School
Fscd_Ddst_Key	Dim_District

C.4.8 Fact_Staff Detail

The Fact_Staff_Detail table provides underlying data for the Accountability Report About Our Staff Panel. It contains records for each staff member including FTEs, salary, and experience. In the case of teachers, additional data on subjects taught, grades taught, and whether this record counts as "teaching in degree area."

The data for this table is extracted from the *Hr_Periodic* and *Hr_Periodic_Detail* tables maintained by CDE. This data is collected through the existing HR ADE system annually from October through January and is available for import into the data warehouse in February.

Table 4.8.a - Fact_School_Detail

Dimensions	Measures
School Year	FTE
District	Hourly Pay Rate
School	Hours worked Per Day
Staff Member	Base Salary
Ethnicity	Additional Compensation
Gender	Salary
Education Level	Contract Days
College	Employee Status Code
Job Class Code	Teaching in Degree Area Flag
Grant Project Funding	Tenure
Grade	Start Date
Subject Taught	Years Experience
	Teaching In State
	Teaching Out of State
	Education Experience In State
	Education Experience Out of State
	Principal in Any School
	Principal in This School

Table 4.8.b – Fact_School_Detail Keys

Column Keys	Dimension
Fstd_Dasy_Key	Dim_School_Year
Fstd_Dsch_Key	Dim_School
Fstd_Ddst_Key	Dim_District
Fstd_Stf_Key	Dim_Staff_Member
Fstd_Dgnd_Key	Dim_Gender
Fstd_Deth_Key	Dim_Ethnicity
Fstd_Dedl_Key	Dim_Education_Level
Fstd_Dcol_Key	Dim_College
Fstd_Dgpf_Key	Dim_Grant_Project_Funding
Fstd_Dgrd_Key	Dim_Grade
Fstd_Djcl_Key	Dim_Job_Class
Fstd_Dsbj_Key	Dim_Subject

C.4.9 Fact_Enrollment Detail

The Fact_Enrollment_Detail table provides the necessary data to calculate the student count information that is used in the Accountability Report About our Staff, Safety and School Environment, and Taxpayers' Report Panels. This data is imported annually in January from the *Stud_Oct_Periodic* table that is maintained by CDE.

Table 3 - Fact_Enrollment_Detail

Dimensions	Measures
School Year District School Ethnicity Gender Language 504 Plan Grade IEP Instructional Program Service Type Public School Finance Funding Type Pupil's Attendance Information FARM	Record Number Date of Birth ESID

Table 4.8.b – Fact_Enrollment_Detail Keys

Column Keys	Dimension
Fenr_Dasy_Key	Dim_School_Year
Fenr_Ddst_Key	Dim_District
Fenr_Dsch_Key	Dim_School
Fenr_D504_Key	Dim_504_Plan
Fenr_Deth_Key	Dim_Ethnicity
Fenr_Dfrm_Key	Dim_Farm
Fenr_Dgnd_Key	Dim_Gender
Fenr_Dgrd_Key	Dim_Grade
Fenr_Diep_Key	Dim_Iep
Fenr_Dips_Key	Dim_Instr_Prog_Svc_Type
Fenr_Dlng_Key	Dim_Language_Background
Fenr_Dpai_Key	Dim_Pupil_Attendance_Info
Fenr_Dpsf_Key	Dim_Pub_Schl_Fin_Fund_Type

C.4.10 Discipline Summary

The Fact_Discipline_Summary table provides underlying data for the Accountability Report School Environment and Safety Panel. The table includes counts of offenders by incident and the disciplinary action taken. Although the incident "Habitually Disruptive Students" is captured, it is not included in the totals on the Accountability Report for Safety and Discipline Incidents.

The data is imported from the miscellaneous ADE table annually in June.

Table 4.10.a - Fact_Discipline_Summary

Dimensions	Measures
School Year District School Disciplinary Incident Disciplinary Action	Incident Count

Table 4.10.b – Fact_Discipline_Summary Keys

Column Keys	Dimension
Fenr_Dasy_Key	Dim_School_Year
Fenr_Ddst_Key	Dim_District
Fenr_Dsch_Key	Dim_School
Fenr_Dact_Key	Dim_Disciplinary_Action
Fenr_Dinc_Key	Dim_Disciplinary_Incident

C.5 Archive Staging Tables

Informatica includes archive area where the input data from source file or table are stored as it is. Also staging areas that are intermediate workspaces where source data is integrated and transformed before it is moved to the target warehouse table. Staging tables are stored on the target warehouse server and serve as a temporary holding area for data that has not had transformations applied to it.

Following table lists the staging tables contained in the EDW.

Table 4 - Staging Tables

Table Name	Source
ARC_504_PLAN	SRC_504_PLAN.txt
ARC_ACCOMMODATION	SRC_ACCOMMODATION.txt
ARC_ACT_DETAIL	SRC_ACT_DETAIL.txt
ARC_ACT_SCHOOL_CROSSWALK	SRC_ACT_SCHOOL_CROSSWALK.txt
ARC_ACT_SUBJECT	SRC_ACT_SUBJECT.txt
ARC_ACT_TEST_TYPE	SRC_ACT_TEST_TYPE.txt
ARC_ADM_FIN_RPT_RULES	SRC_ADM_FIN_RPT_RULES.txt
ARC_ADM_SCHOOL_AWARD	SRC_ADM_SCHOOL_AWARD.txt
ARC_AWARD	SRC_AWARD.txt
ARC_BILINGUAL	SRC_BILINGUAL.txt
ARC_COLLEGE	SRC_COLLEGE.txt
ARC_CSAP_CONTENT_PROFICIENCY	SRC_CSAP_CONTENT_PROFICIENCY.txt
ARC_CSAP_DETAIL	Csap_file_loaded.txt
ARC_CSAP_PROFICIENCY	SRC_CSAP_PROFICIENCY.txt
ARC_CSAP_SUBJECT	SRC_CSAP_SUBJECT.txt
ARC_DID_NOT_TEST	SRC_DID_NOT_TEST.txt
ARC_DISABLING_CONDITION	SRC_DISABLING_CONDITION.txt
ARC_DISCIPLINARY_ACTION	SRC_DISCIPLINARY_ACTION.txt
ARC_DISCIPLINARY_INCIDENT	SRC_DISCIPLINARY_INCIDENT.txt
ARC_DISCIPLINE_SUMMARY	SRC_DISCIPLINE_SUMMARY.txt
ARC_DISTRICT	SRC_DISTRICT.txt
ARC_DISTRICT_FINANCE_DETAIL	SRC_DISTRICT_FINANCE_DETAIL.txt
ARC_EDUCATION_LEVEL	SRC_EDUCATION_LEVEL.txt
ARC_EMH_RULES	SRC_EMH_RULES.txt
ARC_ENROLLMENT_DETAIL	ADE Database
ARC_ESL	SRC_ESL.txt
ARC_ETHNICITY	SRC_ETHNICITY.txt
ARC_FARM	SRC_FARM.txt
ARC_FEOY_DROPOUT	SRC_FEOY_DROPOUT.txt

ARC_FEOY_GRADUATION	SRC_FEOY_GRADUATION.txt
ARC_FIN_PERIODIC	SRC_FIN_PERIODIC.txt
ARC_FIN_PERIODIC	ADE Database
ARC_FINANCE_RPT_CAT	SRC_FINANCE_RPT_CAT.txt
ARC_FUND	SRC_FUND.txt
ARC_GENDER	SRC_GENDER.txt
ARC_GRAD_CLASS	SRC_GRAD_CLASS.txt
ARC_GRADE	SRC_GRADE.txt
ARC_GRADE_CALC_EXEMPTION	SRC_GRADE_CALC_EXEMPTION.txt
ARC_GRANT_PROJECT_FUNDING	SRC_GRANT_PROJECT_FUNDING.txt
ARC_IEP	SRC_IEP.txt
ARC_INSTR_PROG_SVC_TYPE	SRC_INSTR_PROG_SVC_TYPE.txt
ARC_JOB_CLASS	SRC_JOB_CLASS.txt
ARC_LANGUAGE_BACKGROUND	SRC_LANGUAGE_BACKGROUND.txt
ARC_LOCATION	SRC_LOCATION.txt
ARC_MIGRANT_STATUS	SRC_MIGRANT_STATUS.txt
ARC_OBJECT	SRC_OBJECT.txt
ARC_PROGRAM	SRC_PROGRAM.txt
ARC_PUB_SCHL_FIN_FUND_TYPE	SRC_PUB_SCHL_FIN_FUND_TYPE.txt
ARC_PUPIL_ATTENDANCE_INFO	SRC_PUPIL_ATTENDANCE_INFO.txt
ARC_REF_STAFF_MEMBER_IDS	SRC_REF_STAFF_MEMBER_IDS.txt
ARC_SCHOOL	SRC_SCHOOL.txt
ARC_SCHOOL_DETAIL	ADE Database
ARC_SCHOOL_EMH	SRC_SCHOOL_EMH.txt
ARC_SCHOOL_YEAR	SRC_SCHOOL_YEAR.txt
ARC_SOURCE	SRC_SOURCE.txt
ARC_STAFF_DETAIL	ADE Database
ARC_STAFF_MASTER	ADE Database
ARC_STAFF_MEMBER	ADE Database
ARC_SUBJECT	SRC_SUBJECT.txt
ARC_TENURE	SRC_TENURE.txt
ARC_TEST_LANGUAGE	SRC_TEST_LANGUAGE.txt
ARC_TIME_IN_DISTRICT	SRC_TIME_IN_DISTRICT.txt
ARC_TIME_IN_SCHOOL	SRC_TIME_IN_SCHOOL.txt
ARC_TITLE_1	SRC_TITLE_1.txt
SSP_CSAP_DETAIL	STG_CSAP_DETAIL
STG_504_PLAN	ARC_504_PLAN
STG_ACCOMMODATION	ARC_ACCOMMODATION
STG_ACT_DETAIL	ARC_ACT_DETAIL
STG_ACT_RITS_ESID	Multiple Source
STG_ACT_RITS_VALIDATION	Multiple Source
STG_ACT_SUBJECT	ARC_ACT_SUBJECT
STG_ACT_TEST_TYPE	ARC_ACT_TEST_TYPE
STG_ADM_FIN_RPT_RULES	ARC_ADM_FIN_RPT_RULES
STG_ADM_SCHOOL_AWARD	ARC_ADM_SCHOOL_AWARD

STG_AWARD	ARC_AWARD
STG_BILINGUAL	ARC_BILINGUAL
STG_COLLEGE	ARC_COLLEGE
STG_CSAP_ATTRIBUTES	ARC_CSAP_ATTRIBUTES
STG_CSAP_CONTENT_PROFICIENCY	ARC_CSAP_CONTENT_PROFICIENCY
STG_CSAP_DETAIL	ARC_CSAP_DETAIL
STG_CSAP_PROFICIENCY	ARC_CSAP_PROFICIENCY
STG_CSAP_RITS_ESID	ARC_CSAP_RITS_ESID
STG_CSAP_RITS_VALIDATION	ARC_CSAP_RITS_VALIDATION
STG_CSAP_SUBJECT	ARC_CSAP_SUBJECT
STG_DID_NOT_TEST	ARC_DID_NOT_TEST
STG_DISABLING_CONDITION	ARC_DISABLING_CONDITION
STG_DISCIPLINARY_ACTION	ARC_DISCIPLINARY_ACTION
STG_DISCIPLINARY_INCIDENT	ARC_DISCIPLINARY_INCIDENT
STG_DISCIPLINE_SUMMARY	ARC_DISCIPLINE_SUMMARY
STG_DISTRICT	ARC_DISTRICT
STG_DISTRICT_FINANCE_DETAIL	ARC_DISTRICT_FINANCE_DETAIL
STG_DM_STAFF_DEPARTS	FACT_STAFF_DETAIL
STG_DM_STAFF_DETAIL	FACT_STAFF_DETAIL
STG_DM_STAFF_DST	STG_DM_STAFF_DETAIL
STG_DM_STAFF_EMH_GRADES	DIM_SCHOOL_EMH
STG_DM_STAFF_ENROLL	FACT_ENROLLMENT_DETAIL
STG_DM_STAFF_PRIN_PREP	STG_DM_STAFF_PRINCIPALS
STG_DM_STAFF_PRINCIPALS	FACT_STAFF_DETAIL, FACT_STAFF_NAMES
STG_DM_STAFF_SCH	STG_DM_STAFF_DETAIL
STG_DM_STAFF_SCH_ATTRIBS	ARC_DM_STAFF_SCH_ATTRIBS
STG_DM_STAFF_ST_RATIOS	STG_DM_STAFF_DETAIL,STG_DM_STAFF_ENROLL
STG_DM_STAFF_STATE	STG_DM_STAFF_DETAIL
STG_EDUCATION_LEVEL	ARC_EDUCATION_LEVEL
STG_EMH_RULES	ARC_EMH_RULES
STG_ENROLLMENT_DETAIL	ARC_ENROLLMENT_DETAIL
STG_ESL	ARC_ESL
STG_ETHNICITY	ARC_ETHNICITY
STG_FACT_FINANCE_EXP	ARC_FIN_PERIODIC
STG_FACT_FINANCE_REV	ARC_FIN_PERIODIC
STG_FARM	ARC_FARM
STG_FEOY_DROPOUT	ARC_FEOY_DROPOUT
STG_FEOY_GRADUATION	ARC_FEOY_GRADUATION
STG_FIN_PERIODIC	ARC_FIN_PERIODIC
STG_FINANCE_RPT_CAT	ARC_FINANCE_RPT_CAT
STG_FUND	ARC_FUND
STG_GENDER	ARC_GENDER
STG_GRAD_CLASS	ARC_GRAD_CLASS
STG_GRADE	ARC_GRADE
STG_GRADE_CALC_EXEMPTION	ARC_GRADE_CALC_EXEMPTION

STG_GRANT_PROJECT_FUNDING	ARC_GRANT_PROJECT_FUNDING
STG_IEP	ARC_IEP
STG_INSTR_PROG_SVC_TYPE	ARC_INSTR_PROG_SVC_TYPE
STG_JOB_CLASS	ARC_JOB_CLASS
STG_LANGUAGE_BACKGROUND	ARC_LANGUAGE_BACKGROUND
STG_LOCATION	ARC_LOCATION
STG_MIGRANT_STATUS	ARC_MIGRANT_STATUS
STG_OBJECT	ARC_OBJECT
STG_PROGRAM	ARC_PROGRAM
STG_PUB_SCHL_FIN_FUND_TYPE	ARC_PUB_SCHL_FIN_FUND_TYPE
STG_PUPIL_ATTENDANCE_INFO	ARC_PUPIL_ATTENDANCE_INFO
STG_REF_STAFF_MEMBER_IDS	ARC_REF_STAFF_MEMBER_IDS
STG_SCHOOL	ARC_SCHOOL
STG_SCHOOL_DETAIL	ARC_SCHOOL_DETAIL
STG_SCHOOL_EMH	ARC_SCHOOL_EMH
STG_SCHOOL_YEAR	ARC_SCHOOL_YEAR
STG_SOURCE	ARC_SOURCE
STG_STAFF_DETAIL	ARC_STAFF_DETAIL
STG_STAFF_MEMBER	ARC_STAFF_MEMBER
STG_STUDENT_EOY_ANALYSIS	STG_FEOY_DROPOUT,STG_FEOY_GRADUATION
STG_SUBJECT	ARC_SUBJECT
STG_TENURE	ARC_TENURE
STG_TIME_IN_DISTRICT	ARC_TIME_IN_DISTRICT
STG_TIME_IN_SCHOOL	ARC_TIME_IN_SCHOOL
STG_TITLE_1	ARC_TITLE_1
WEB_SCHOOL_SUMMARY	Multiple Source

C.6 Calculation Tables

The EDW_Base_Calculations and EDW_Manual_Calc modules in Informatica are used to calculate the academic performance and improvement ratings for each public school. These modules contain various control, input, staging and output tables, which are listed in the following table.

Table 5 - Calculation Tables

Calculation Table	Description	Source
Baserunner	Contains the parameters that control how the grade calculation is performed	Baserunner_Csv.csv
Baserunner_Debug	Contains debugging information captured during the run of a particular stage	*Stage 1 – Stage 11 Procedures*
Baserunner_Errors	Contains errors encountered during the run of a particular stage	*Stage 1 – Stage 11 Procedures*
Baserunner_Stage1_Out	Contains the stage 1 run number, run mode, and indicates if data was logged in Baserunner_Debug, Baserunner_Errors or Baserunner_Statistics	*Stage1_Calc_Raw_CSAP*
Baserunner_Stage2_Out	Contains the stage 2 run number, run mode, and indicates if data was logged in Baserunner_Debug, Baserunner_Errors or Baserunner_Statistics	*Stage2_Calc_CSAP_Norm_Terms*
Baserunner_Stage3_Out	Contains the stage 3 run number, run mode, and indicates if data was logged in Baserunner_Debug, Baserunner_Errors or Baserunner_Statistics	*Stage3_Calc_Norm_CSAP_Score*
Baserunner_Stage4_Out	Contains the stage 4 run number, run mode, and indicates if data was logged in Baserunner_Debug, Baserunner_Errors or Baserunner_Statistics	*Stage4_Calc_Weight_CSAP_Score*
Baserunner_Stage5_Out	Contains the stage 5 run number, run mode, and indicates if data was logged in Baserunner_Debug, Baserunner_Errors or Baserunner_Statistics	*Stage5_Calc_Raw_CSAP*
Baserunner_Stage6_Out	Contains the stage 6 run number, run mode, and indicates if data was logged in	*Stage6_Calc_ACT_Scaling*

Calculation Table	Description	Source
	Baserunner_Debug, Baserunner_Errors or Baserunner_Statistics	
Baserunner_Stage7a_Out	Contains the stage 7a run number, run mode, and indicates if data was logged in Baserunner_Debug, Baserunner_Errors or Baserunner_Statistics	*Stage7A_Calc_ACT_Norm_Score*
Baserunner_Stage7b_Out	Contains the stage 7b run number, run mode, and indicates if data was logged in Baserunner_Debug, Baserunner_Errors or Baserunner_Statistics	*Stage7B_Calc_Weight_ACT_Score*
Baserunner_Stage8_Out	Contains the stage 8 run number, run mode, and indicates if data was logged in Baserunner_Debug, Baserunner_Errors or Baserunner_Statistics	*Stage8_Calc_Overall_Score*
Baserunner_Stage9_Out	Contains the stage 9 run number, run mode, and indicates if data was logged in Baserunner_Debug, Baserunner_Errors or Baserunner_Statistics	*Stage9_Calc_Cutoffs*
Baserunner_Stage10_Out	Contains the stage 10 run number, run mode, and indicates if data was logged in Baserunner_Debug, Baserunner_Errors or Baserunner_Statistics	*Stage10_Calc_Grades*
Baserunner_Stage11_Out	Contains the stage 11 run number, run mode, and indicates if data was logged in Baserunner_Debug, Baserunner_Errors or Baserunner_Statistics	*Stage11_Calc_Improve*
Baserunner_Statistics	Contains statistics captured during the run of a particular stage	*Stage 1 – Stage 11 Procedures*
Base_Act_Exclude_List	Contains the ACT subject/grade combinations that are excluded from the current year's calculation	Stage_Act_Exclude_List
Base_Act_Norm_List	Contains the ACT subject/grade combinations that are included in the current year's calculation	Stage_Act_Norm_List
Base_CSAP_Exclude_List	Contains the CSAP subject/grade combinations that are excluded from the current year's calculation	Stage_CSAP_Exclude_List

Calculation Table	Description	Source
Base_CSAP_Norm_List	Contains the CSAP subject/grade combinations that are included in the current year's calculation	Stage_CSAP_Norm_List
Base_Run_Act_List	Contains the list of valid ACT subject/grade combinations that are included in the current year's calculation.	*Stage7A_Calc_Act_Norm_Score*
Base_Run_CSAP_List	Contains the list of valid CSAP subject/grade combinations that are included in the current year's calculation.	*Stage3_Calc_Norm_CSAP_Score*
Base_Stage1_Out	Stage 1 output table containing the raw CSAP score for each school, grade and subject	Base_View_Stage1_In Base_CSAP_Exclude_List Base_School_Stage Fact_CSAP_Summary_Calc Fact_CSAP_Summary
Base_Stage2_Out	Stage 2 output table containing means and standard deviations required for statistical normalization of the raw CSAP scores	Base_View_Stage2_In Base_School_Stage Fact_CSAP_Summary_Calc Fact_CSAP_Summary Dim_School Base_CSAP_Norm_list
Base_Stage3_Out	Stage 3 output table containing normalized CSAP scores by school, subject and grade	Base_View_Stage3_In Base_Stage1_Out Base_Stage2_Out Base_CSAP_Norm_list
Base_Stage4_Out	Stage 4 output table containing weighted CSAP scores by school and subject	Base_View_Stage4_In Base_Stage3_Out Base_View_Stage4_Py_In Base_Run_CSAP_list
Base_Stage5_Out	Stage 5 output table containing raw ACT scores for each school, grade and subject	Base_View_Stage5_In Base_School_Stage Fact_Act_Summary Base_Act_Exclude_List
Base_Stage6_Out	Stage 6 output table containing the terms required for statistical normalization of the raw ACT scores	Base_View_Stage6_In Base_School_Stage Fact_Act_Summary Dim_School Base_Stage6_Out Base_Act_Norm_list
Base_Stage7a_Out	Stage 7a output table containing normalized ACT scores by school, subject and grade	Base_View_Stage7a_In Base_Stage5_Out Base_Stage6_Out Base_Act_Norm_list
Base_Stage7b_Out	Stage 7b output table containing weighted ACT scores by school and grade	Base_View_Stage7b_In Base_Stage7a_Out Base_View_Stage7b_Py_In Base_Run_Act_list
Base_Stage8_Out	Stage 8 output table containing overall scores for each school	Base_View_Stage8_In Base_View_Stage4_Out_Sum Base_Stage4_Out Base_View_Stage7b_Out_Sum

Calculation Table	Description	Source
		Base_Stage7b_Out
Base_Stage9_Out	Stage 9 output table containing the performance rating thresholds for each grade level	Base_Stage9_Out Base_View_Stage9_In Base_Stage8_Out Dim_School Base_Run_CSAP_list
Base_Stage10_Out	Stage 10 output table containing performance ratings for each school	Base_Stage9_Out Base_Stage8_Out
Base_Stage11_Out	Stage 11 output table containing improvement ratings for each school	Base_Stage10_Out
Stage_Act_Exclude_List	List of ACT subject/grade combinations excluded from the current year's grade calculation.	Base_Act_Exclude_List_Csv.csv
Stage_Act_Norm_List	List of ACT subject/grade combinations included in the current year's grade calculation.	Base_Act_Norm_List_Csv.csv
Stage_CSAP_Exclude_List	List of CSAP subject/grade combinations excluded from the current year's grade calculation.	Base_CSAP_Exclude_List_Csv.csv
Stage_CSAP_Norm_List	List of CSAP subject/grade combinations included in the current year's grade calculation.	Base_CSAP_Norm_List_Csv.csv

Please see section 3.11 for additional information regarding these tables.

C.7 Data Mart Tables

Prior to producing the School Accountability Reports, the necessary data is staged to a series of "panel" tables. Each table corresponds to a particular panel of the Report. By staging the appropriate data in these panel tables, the system reduces the complexity of the Oracle Report program that creates the PDF-formatted Accountability Reports. These tables, described below, make up an Accountability Report Data Mart.

Table 6 - School Accountability Report Data Mart Tables

Tables (Fact & Panel)	Description	Source
Fact_Csap_Analysis	Contains Aggregated CASP data	FACT_CSAP_DETAIl
Fact_Csap_Detail_Emh_Gce	Contains EMH_KEY and Grade calc exemption key for each record in CSAP detail	FACT_CSAP_DETAIl
Fact_Csap_Summary	Contains Aggregated CASP data	FACT_CSAP_DETAIl
Pnl_CSAP_Percent_Counted	Contains the percents of student test scores that were counted in the academic performance ratings. Used in the 'Student Performance' Panel of the Accountability Report	Stg_Pnl_CSAP_Percent_Counted
Pnl_CSAP_Summary	For each school participating in the CSAP, contains the number of students at each proficiency level and the number of students whose scores were not counted. Used in the 'Student Performance' Panel of the Accountability Report	Stg_Pnl_CSAP_Summary
Pnl_CSAP_Stacked_Style	Contains the proficiency levels used in the bar charts in the 'School History' panel of the Accountability Report	Dim_School_Emh Fact_CSAP_Summary Fact_CSAP_Sum_Stacked_View
Pnl_Env_Discipline	Contains type and number of incidents reported and disciplinary actions taken for each school. Used in the 'Safety and School Environment' Panel of the Accountability Report.	Fact_School_Summary
Fact_School_Summary	Contails school level information	Multiple
Pnl_Drop_Attnd_Rate	Contains the student droprates that are calculated for middle and high schools and the attendance rates calculated for elementary schools that appear	FACT_SCHOOL_SUMMARY

Tables (Fact & Panel)	Description	Source
	in the 'Safety and School Environment' panel of the Accountability Report.	
Pnl_School_Summary	Contains school summary data used in the 'Main' panel of the School Accountability Report	Stg_Pnl_School_Summary Participation_Noted_Stage
Fact_Staff_Analysis	Contains Aggregated staff data	FACT_STAFF_DETAIL
Fact_Staff_Summary	Contains Aggregated staff data	FACT_STAFF_DETAIL
Pnl_Staff_Summary	Contains staff data used in the 'About Our Staff" panel of the Accountability Report	Stg_Pnl_Staff_Summary
Fact_District_Finance_Summary	Contains district level finance data used to display in SAR	FACT_DISTRICT_FINACE_DETAIL, FACT_FINANCE_REV, FACT_FINANCE_EXP
Fact_Finance_Rpt	Contans reporting category level finanace data	FACT_FINANCE_REV, FACT_FINANCE_EXP ADM_FIN_REPT_RULES
Fact_Finance_Rpt_Agg	Aggregated data from FACT_FINANCE_RPT	FACT_FINANCE_RPT
Pnl_District_Finance_Use	Contains expense data used to draw graph in SAR	FACT_DISTICT_FINACE_SUMMARY
Fact_Act_Detail_Gce	Contains Grade calc exemption key for each record in ACT detail	FACT_SCT_DETAIL
Fact_Act_Summary	Contains Aggregated ACT data	FACT_ACT_DETAIL

C.8 Help Table

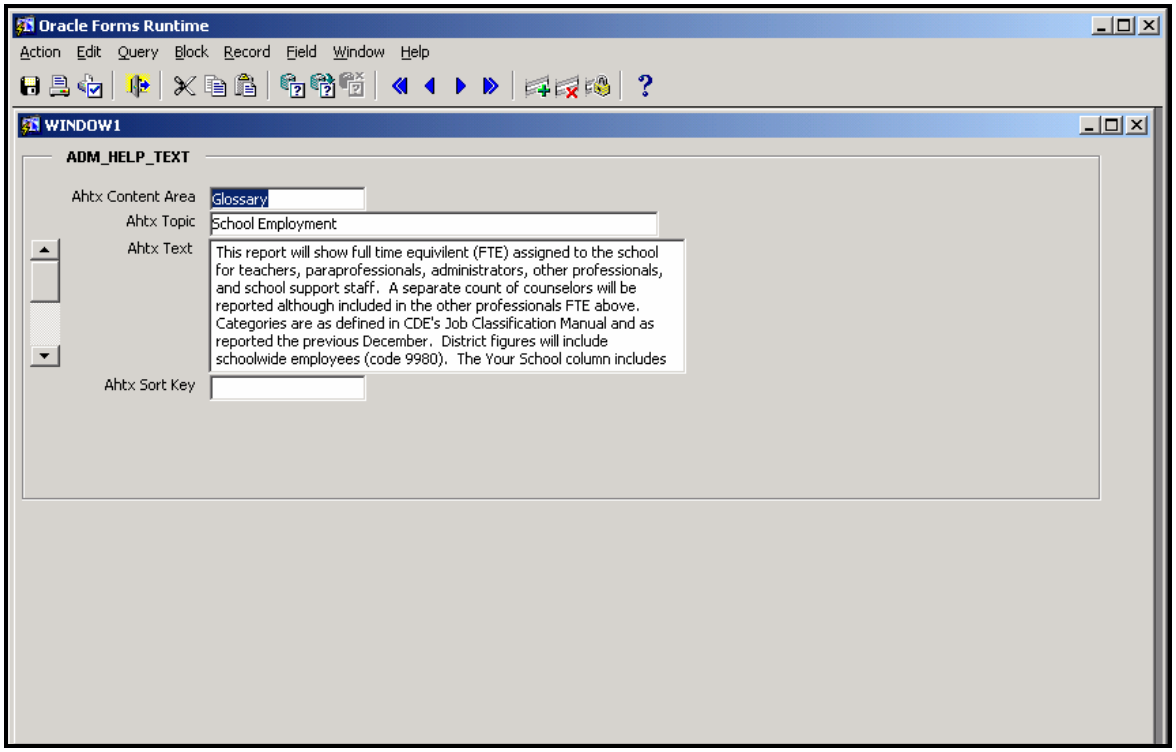
Adm_Help_Text is the table that contains the help text for the School Accountability Report Web Site. The table consists of four columns described as follows:

Table 7 - School Accountability Report Web Site Help Table

Column Name	Data Type	Null	Description
Ahtx_Content_Area	Varchar2(10)	Y	Used for the main content area *Example: How To, Glossary, FAQ_CSAP, etc.*
Ahtx_Topic	Varchar2(150)	Y	Represents the topic *Example: School Search, Map Search, etc.*
Ahtx_Text	Clob	Y	Represents the text for the corresponding topic and content area
Ahtx_Sort_Key	Number	Y	Used to sort the results

This table is updated using an Oracle form, *adm_help_text.fmx* that is maintained on both database servers (BATMAN and AQUAMAN). Currently the form resides in the directory **M:\edw\Forms\adm_help_text.fmx**.

Figure 1 - Adm_Help_Text



C.9 GIS Tables

There are two tables that are used in the interfaces from the data warehouse to the GIS application, CDETools, and from CDETools back to the data warehouse. The first table, GIS_Update, contains school information, which is passed to the GIS from the data warehouse. This information is necessary to generate a new set of school shape files for the GIS application. The second table, Lod_Ref_Nearby_Schools, contains the X and Y coordinates of the ten closest schools for each school. The school's locations are calculated by the GIS and passed to the data warehouse. The table layouts are presented below.

Table 8 - GIS_Update

Column Name	Data Type	Description
GIS_Psum_Key	Number	
GIS_District_Name	Varchar2 (50)	Name of the school district
GIS_Ddst_Key	Varchar2 (4)	Code used to identify the school district
GIS_School_Number	Varchar2 (4)	Number used to identify the school
GIS_School_Title	Varchar2 (50)	Title of the school
GIS_School_Name	Varchar2 (50)	Name of the school
GIS_Country	Varchar2 (50)	Country where the school is located
GIS_Address_1	Varchar2 (50)	School address line 1
GIS_Address_2	Varchar2 (50)	School address line 1
GIS_City	Varchar2 (50)	City where the school is located
GIS_State	Varchar2 (2)	State where the school is located
GIS_Zip_Code_5	Varchar2 (5)	Zip Code of the school
GIS_Zip_Plus_4	Varchar2 (4)	Zip Code plus 4 of the school
GIS_Phone_Number	Varchar2 (10)	School's phone number
GIS_Fax_Number	Varchar2 (10)	School's fax number
GIS_Web_Site	Varchar2 (50)	
GIS_Public_School_Flag	Varchar2 (1)	Y/N flag which indicates if a school is a public school
GIS_Non_Public _Description	Varchar2 (3)	
GIS_Emh_Code	Varchar2 (1)	Code use to distinguish between Elementary (E), Middle (M) or High (H) schools
GIS_Acad_Perf_Cy	Varchar2 (20)	School's current year academic performance rating
GIS_Acad_Impr_Cy	Varchar2 (20)	School's current year academic improvement rating
GIS_Stud_Teach	Number	School's student/teacher ratio
GIS_Avg_Tenure	Number	School's average teacher tenure
GIS_Avg_Attend	Number	
GIS_Avg_Salary	Number	
GIS_Open_Flag	Varchar2 (1)	Y/N flag which indicates if a school is operational
GIS_Report_Card_Home	Varchar2 (255)	
GIS_School_Xcoord	Number	X coordinate of the school's location

Column Name	Data Type	Description
GIS_School_Ycoord	Number	Y coordinate of the school's location
GIS_Student_Count	Number	

Table 9 - Lod_Ref_Nearby Schools

Column Name	Data Type	Description
Rnsc_Dsch_Key_From	Number	
Rnsc_Dsch_From_Xcoord	Number	
Rnsc_Dsch_From_Ycoord	Number	
Rnsc_Dsch_Key_To	Number	
Rnsc_Distance	Number	
Rnsc_Load_Date	Date	Date the table was loaded/updated
Rnsc_Rec_Num	Number	

Data Infrastructure Review

Volume 3: Future State and Recommendations

November 30, 2007
Final

Prepared by

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Highland Worldwide

Table of Contents

Volume 3: Future State and Recommendations

1 Summary of Recommendations and Roadmap

1.1 Scope

The scope of the Future State is limited to recommendations affecting the data collection and reporting processes and systems only. The current process begins with legislation creating the need for a data collection. Major participants in data collection efforts include the school districts, the program units at the Colorado Department of Education (CDE), the Information Management Services (IMS) department at CDE and the Educational Data Advisory Committee (EDAC). Due to the study's time constraints, we were only able to examine a limited view of each issue and formulate high level recommendations. For each recommendation, we suggest a more detailed analysis into the problem and detailed solution development.

Whereas some of our recommendations address organizational issues and the optimization of data related staffing levels, we were not tasked with, nor did we make specific recommendations regarding specific personnel currently involved in data collection.

1.2 Approach

To determine the recommendations, we first sought to understand the current state of the data collection efforts. We gathered data from school districts and CDE as well as vendors and other states' departments of education. Based on our research we identified problem areas and developed recommendations for both the short term, interim, and long term. Interim recommendations aid in the technical transition from the current "data collection" based system to a new "data sharing" system. Some are technical in nature while others affect the entire data collection operation from the school districts to CDE and other stakeholders. See **'Appendix A – Approach Details'** for details regarding our approach.

1.3 Current Situation

Currently, the data collection process is fragmented and does not involve the stakeholders. This leads to confusion, problems with submissions and data collection windows, and complaints by the school districts. Each program unit in CDE conducts all aspects of the data collection process differently. There is no consistency in requirements management, stakeholder involvement, communications, training, or support. There is little coordination between the program units, including with IMS. Prioritization issues are determined by default by IMS as they have resource constraints in regards to programming data collection changes. **'Volume 2 - The Current State'** further defines the current situation regarding data collection.

1.3.1 Current Organization and Processes

CDE and the school districts are somewhat aligned similarly in regards to data collection. The program units and IMS are siloed organizations within CDE. There is little communication between the units regarding data collection as a whole. In cases where a collection has components from multiple program units, there are no formal processes in place to coordinate the requirements definition or support. IMS interacts with each program unit regarding the development of the collections, but there is no interaction between IMS and the school districts or between IMS and the Student Information System (SIS) vendors. There is no consolidated view of all of the collections at CDE and the impact on resources and prioritization.

The school districts are involved to a small degree in the development of the data collection requirements and they interact with the program units during a collection as they receive support. On some level, in the school districts there is a similar silo effect happening among departments. Data collection related information may or may not be

shared with the people in charge of a particular collection. For example, the special education program unit may alert the special education contact at the school district regarding an update to the Student October collection. The main point of contact for Student October may not be aware of the change unless their Special Education contact alerts them to the new requirement. In some cases, the data requirement is not discovered until right before or during a collection window. This can results in the data not being submitted in a timely fashion or not being entirely correct due to the short notification of what to collect.

1.3.2 Current Systems and Technology

As discussed in '**Volume 2 – The Current State'** the IMS department within CDE has developed and deployed a multi-layered, data collection and reporting system. It consists of a series of integrated automated systems that manage the data collection process from beginning (submitting data to CDE) to end (reporting data to stakeholders).

The development of the current automated collection systems began in the late 90's, with the Automated Data Exchange (ADE) system that allows school districts to submit collection data over the internet and was first introduced in 1998. At the time, this was an advanced solution to a difficult technical challenge. Since then the system has grown almost exponentially with:

- The addition of numerous new collections and substantial changes to existing ones as shown in Figure 1-1
- The creation of the Education Data Warehouse (EDW); initially developed for School Accountability Reporting (SAR), it is now a comprehensive repository of state education data, equipped with a sophisticated set of analysis and reporting tools.
- The inclusion of an automated student matching and identification system (RITS). Enhancing the ability to track and accurately count students.

The systems developed are "collection driven", in that they were developed in direct response to fulfill legislative requirements to report specific data collections to given stakeholders. Given the timing and history of data collections in Colorado, their rapid growth, and the resources available, the systems developed by IMS and the architectural approach taken are in line with what would be expected. These systems are working as designed and being maintained as well as could be expected given the resources available.

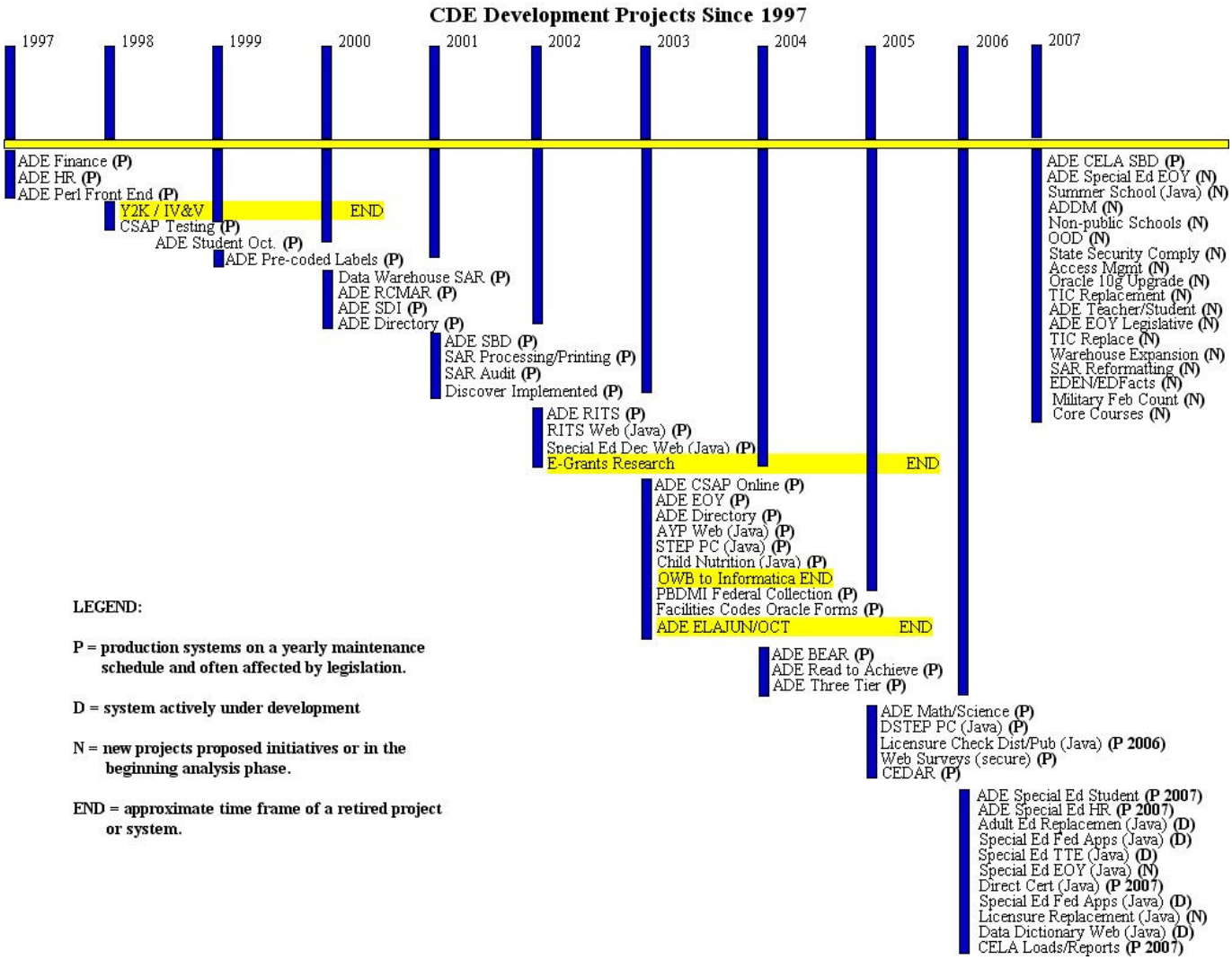

Figure 1-1 The number of data collection and reporting projects has grown over time

1.3.3 Current Resource Constraints

CDE is under constant and increasing pressure to add new collections, make comprehensive changes to existing ones, and make major enhancements in functionality and performance. The volume of new requests, coupled with frequently unrealistic lead times, means it is not possible to make requested deadlines and delivery dates with the resources currently available to IMS.

The program units within CDE are also under increasing pressure to interpret new legislation and react to deadlines. Resource constraints at the program unit level translate to additional delays to collection development if they cannot complete the requirements phase in time.

There is no leadership over the entire data collection process. No one person or organization has a system wide view of all of the data collections or how they interact. Due to resource constraints, no one in CDE has the bandwidth to assess current data collections to analyze whether or not they are meeting the data needs of the corresponding legislation.

1.4 Recommendations and Timing

The recommendations fall into three time periods, short term, interim, and long term. Short term items can be accomplished in less than a year and could be funded by the current budget or possibly with the Longitudinal Education data Action Plan (LEAP) grant funds. Interim recommendations would take at least 1-2 years to implement due to the need for additional funding or staff positions that would have to come through the legislative budget process. Long term items may cost significantly more, requiring additional budget, or may take longer to implement due to the complexity or planning needed.

1.4.1 Organization and Process Recommendations

There is a need for a Data Program Management Office (PMO) to oversee the entire data collection process from legislation to implementation and collection execution. A Data PMO would implement standards across the organization regarding requirements, communication, training, and support and would enforce standardization across the program units and IMS. It would maintain a master schedule and create rules surrounding prioritization, change control, and define impact analysis processes. By having a Data PMO, the entire process would become more streamlined internally providing cost savings to the organization.

The Data PMO could guide a Data Committee that would involve the stakeholders in the data collection process. This would result in a better understanding and acceptance of data collection elements, windows, and processes. The end result would be cleaner data being entered into the system and better results.

The Data PMO and Data Committee could work more closely with stakeholders such as the legislature and third party education associations that drive legislation. By enhancing the coordination between these groups, it may be possible to reduce or consolidate collections.

Several of the short and interim recommendations are building blocks towards a PMO. If, due to resource, budget, or policy constraints, the Data PMO cannot be created in the short term, it is recommended that it be instituted in the interim or as soon as possible. The specific order in which items are standardized is up to the organization.

Additionally, the current staffing at CDE should be assessed for future skill gaps and appropriate staffing level. Like most organizations, over time there will be retirements and attrition requiring additional staff to replace those who have left. Having a roadmap of upcoming technical needs will enable the organization to move forward in a logical fashion.

Another area for investigation is the Family Educational Rights and Privacy Act (FERPA) legislation. Current interpretation is outdated in regards to recent precedents set in other states. It is recommended that CDE work with the Attorney General to reevaluate the state's interpretation of this legislation.

In the long term, it is recommended that CDE take a comprehensive view of the data that is collected and the reports that are generated and work with the legislature and other stakeholders to determine if the data answers the questions as originally intended. Some data may not be meeting the original needs, or the original premise for the data collected may be overcome by current events. Through a comprehensive study of the data and legislation, it may be possible to identify, consolidate, and eliminate duplicate or unnecessary data being reported.

There are many tools that enable collaboration and efficiency in an environment similar to the CDE data collection and reporting system. Procurement of these tools may take more planning and funds to implement than a short term project. Examples include a document repository, requirements tracking tool, and a master scheduling tool.

Additional details regarding the organizational recommendations can be found in '**Section 2 Detailed Recommendations - Organizational.'**

1.5 Technology Recommendations

The IMS department within CDE has developed and deployed a multi-layered, data collection and reporting system. It consists of a series of integrated automated systems that manage the data collection process from beginning, submitting data to CDE, to end, reporting data to stakeholders.

The intent of the technology recommendations is to address areas of:

- Duplication of effort and resources
- Inefficiencies and unnecessary redundancies
- Implementation of industry standards

The systems developed are "collection driven" and were developed in direct response to fulfill legislative requirements to report specific data collections to given stakeholders. Given the timing and history of data collections in Colorado, their rapid growth, and the resources available, the systems developed by IMS and the architectural approach taken are in line with what would be expected. These systems are working as designed and being maintained as well as could be expected given the resources available.

However, a review of the existing data collections systems, and recent improvements in technology have revealed several opportunities for improvement if a longer term, strategic outlook could be taken. These improvements generally fall into three categories:

- **Short Term** - a series of enhancements and changes intended to:
  - Improve Performance
  - Improve the data collection submission and error reporting process
  - Better identify students
  - Improve communications within CDE, between CDE and stakeholders, including districts, across, and within districts
- **Interim** - enhancements and changes that are more comprehensive than short term changes but are designed to improve performance such as implementing parallel processing using Messaging Middleware
- **Long Term** - these recommendations require a different architectural approach than that currently being used. Generally, they move away from the current "collection driven" approach to a new "data sharing" paradigm that takes advantage of technology that has come into common use in the past 5 years.

From a technology standpoint, it is recommended that CDE migrate the data collection system to be "data sharing" based rather than "collection driven". In this type of environment, the data from the school districts is submitted up to CDE when there are changes only. CDE would have a master set of educational data in which they could run reports at will. The school districts would not be required to submit all of their data each time for every collection.

Further information about these recommendations can be found in section '**Section 3 Detailed Recommendations – Technology.'**

1.6 Roadmap

Figure 1-2 outlines graphically the relative timing of each of the recommendations. There are organizational and technical recommendations that could be accomplished in the short term and make improvements on the data collections, "quick-hits."

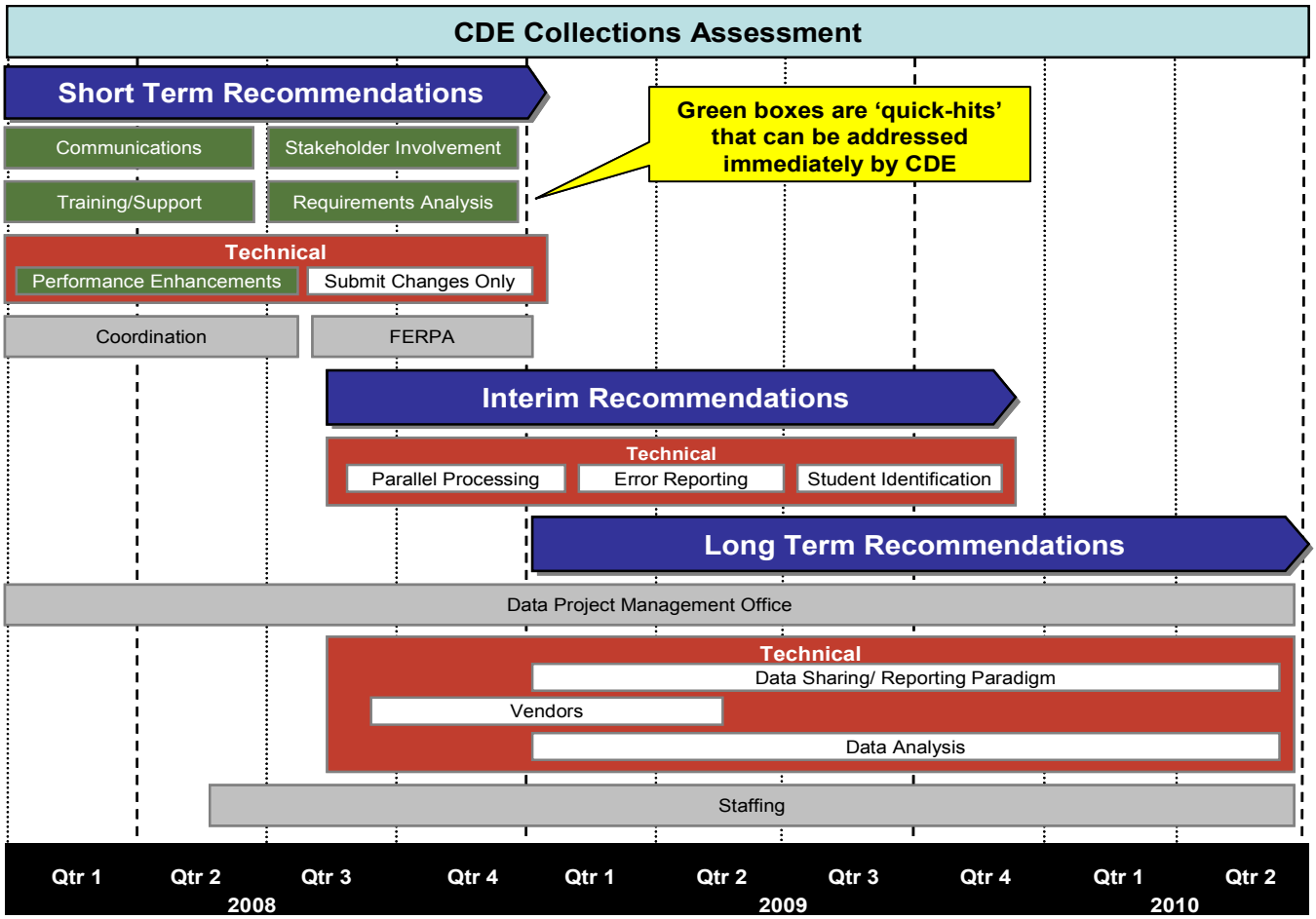

Figure 2-1 The recommendation roadmap outline a potential timeline for each recommendation implementation.

The following tables specify the implementation activities and deliverables, duration, and a high-level cost estimate for each recommendation. While CDE must make significant financial and personnel investments, it should be noted these recommendations will increase data collection efficiency and may result in cost savings due to standardization.

Organizational Recommendation	Description	Time Frame	Benefit	Estimated Costs
Data Program Management Office	Implement a program management office to oversee the entire data collection process	Interim to Long Term	Having a single authority will enable collaboration and streamline the data collection process	1 FTE ($80K -$120K)
Communications	Consolidate communications and have a standard communications plan across collections	Short Term	Will aid in presenting a single view of CDE to the school districts and stakeholder	
Stakeholder Involvement	Involve the data collection stakeholders in the whole data collection process from requirements to implementation via a Data Committee	Short Term	Involving the stakeholders will result in a more collaborative environment and better collection results	
Requirements Analysis	Have a more formalized requirements analysis phase that includes the stakeholders	Short Term	Will result in data quality being better due to data requests being in line with school district data and will increase the understanding of why the data is needed	
Coordination	Implement a data collection master schedule and formal processes for prioritization, change control, and coordination with the legislature	Short Term	An overall view of the data collections from legislation to implementation and collection results in better decisions regarding prioritization and impact analysis	
Training/Support	Standardize training and support across program units for data collections	Short Term	Will result in better data collections	$25K - 50K (T4-Remote training access)
FERPA	Analyze FERPA legislation and recent precedents set to enable a data sharing environment	Short to Interim Term	Clarification of legal trends in FERPA will enable a more collaborative, data sharing environment	$0 - Reallocated costs

Notes:

- T1 – Estimated list cost for remote conferencing is 35¢ per minute

Technical Recommendation	Description	Time Frame	Benefit	Estimated Costs [T4]
Performance Enhancements	Analyze and improve the performance of the systems in place	Short Term	Will enable collection submissions to be processed faster	$15,000-$30,000
Submit Changes Only	Alter the system to allow school districts to only submit changes to the data file rather than the whole file again	Short Term	Will enable quicker submission and error correction cycle	$10,000-$20,000 (T2)
Error Reporting	After a set limit of errors are reached (500), stop processing to allow updates	Short Term	Will minimize processing time and allow for quicker error fixes	$10,000-$20,000 (T2)
Student Identification	Increase the data used to identify a student	Short Term	Will result in better student identification and minimize duplicates IDs, helping to streamline data collection	$20,000-$30,000
District Point of Contacts) POCs	Implement tools to allow more than one District POC for collections	Short Term	Will minimize confusion by the districts and enhance coordination of collections	$2,000-$3,000
Parallel Processing	Split the incoming data file into smaller files and process in parallel	Interim	Will increase processing time of data files	$20,000-$30,000 (T2) $50,000-$100,000 (T3)
Tools	Implement collaboration tools	Interim	Will increase ability of CDE to communicate and collaborate with their stakeholders	$20,000-$30,000
Data Sharing/ Reporting Paradigm	Implement a system that allows school districts to submit changes regularly and have master data reside at CDE and available for reporting purposes	Long Term	Minimizes data submission burden on school districts. Enables greater reporting capabilities at CDE	$2-3 Million

Notes:

- T2 – assumes enhancements are only applied to larger collections such as Student October Count and EOY. Smaller collections would not be affected.
- T3 – Higher costs associated with implementing (re-usable) middleware option.
- T4 – Cost estimates are based on high level estimates of complexity, effort and duration. They are meant as a guideline of scale only. Refined cost estimates will require a detailed analysis of the recommendations, which is outside the scope of this report.

2 Detailed Recommendations – Organizational

These recommendations focus on the organization - people and processes rather than technology improvements to the data collection and reporting operations. There may be a technology component to some of the recommendations to facilitate and enable better coordination. Given the time constraints of this study, only high-level recommendations are given here. Further research and development of each of these recommendations will be necessary before they are implemented.

2.1 Summary

Currently, each of the program units within CDE has their own processes and procedures for creating or updating a data collection, whether it is ADE or non-ADE based. Of the units interviewed, each has a different method of involving the school districts in the requirements generation process. They have different schedules for training and communication. Often communications are lost or misinterpreted in the volume of email that is sent to a school district. The policies for enforcement of collection windows differ from unit to unit. Training formats differ between units and there are no operating procedures for when to conduct in-person training versus online or just updating the training documentation on the web. There is some standardization in regards to the interaction of the program units with IMS to enable IMS to program the collections and reports.

Overall, we recommend that the processes, policies, and procedures related to data collection and reporting be standardized across each program unit and IMS based on current CDE and industry best practices. To facilitate this standardization, we recommend a Data Program Management Office (PMO) be put in place. The Data PMO would be able to view all data collections as a whole system and provide governance over collections, reporting, and analysis. The Data PMO would oversee the creation of the standards and ensure that the processes are followed. In the case that a Data PMO is not put in place first due to budget or resource constraints, it is highly recommended that the individual areas identified for standardization be implemented independent of a Data PMO.

A sample of areas for standardization are illustrated in Figure 2-1 below. These topics are expanded in more detail in the following sections.

Having standardized processes, policies, and procedures across program units will minimize confusion at the school districts as well as aid in setting data collection expectations. It enables better coordination between CDE program units. Program units would not have to "reinvent the wheel" for each new collection, therefore saving time and effort. Consistency in processes can lead to more confidence and acceptance by the school districts.

For each of the areas recommended for standardization, best practices will have to be identified from the program units and standard project management operating procedures and then implemented across the organization. Best practices could be identified via an independent study or by forming an internal committee under the Data PMO to identify and recommend standards.

It may be determined that technology changes are required to enable standardization. Examples of possible tools are Microsoft SharePoint - a collaboration and knowledge sharing tool, EMC Documentum – a content management and document repository tool, DOORS – a requirements management tool, and MS Project Server, a project management tool.

CDE internal policies would have to be assessed to determine any changes needed to require the organization to adhere to the new standards.

As technology improvements and recommendations are put into place and CDE moves from a "data collection" to a "data sharing" paradigm, the recommended organizational and process changes will have to be reassessed. (See **Section 3 – Detailed Recommendations – Technology)**

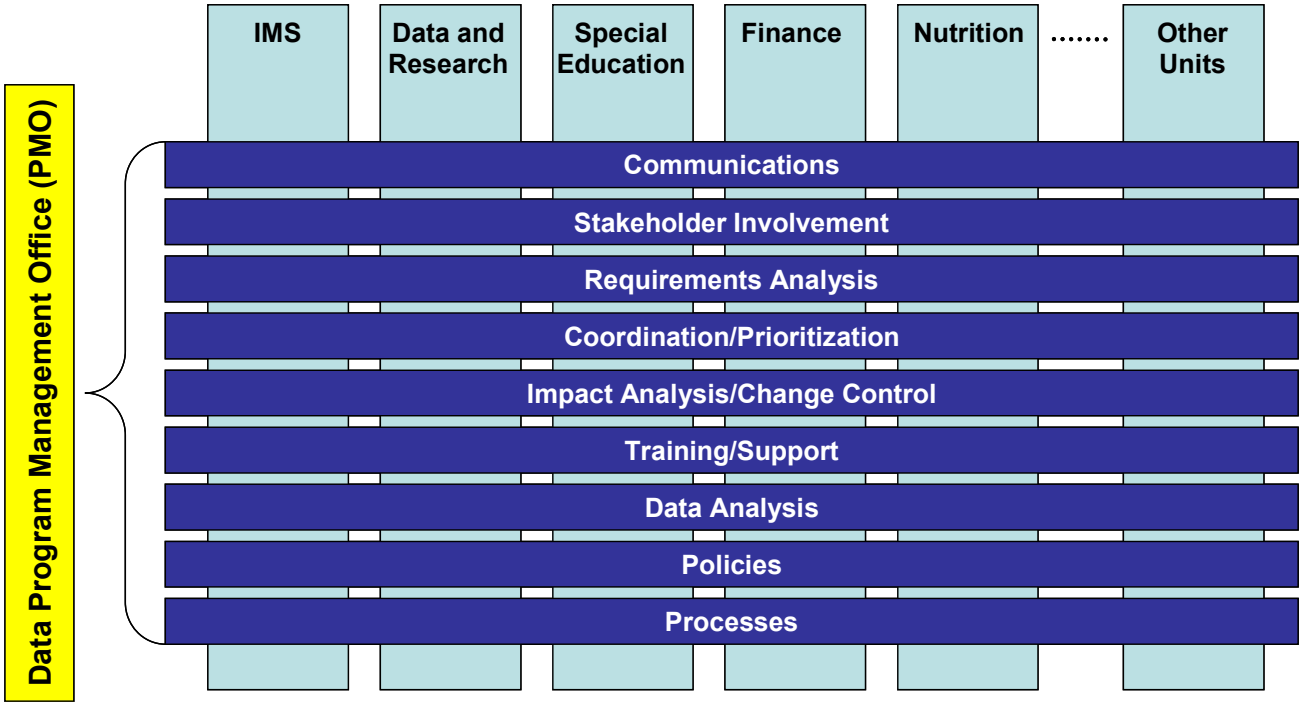

Figure 2-1: CDE processes and procedures should be uniform across the organization to present a unified view to the school districts and other stakeholders.

2.2 Recommendations

2.2.1 Data Program Management Office (PMO)

The historical implementation of individual collections has resulted in a situation where the collections are not aligned, the school districts are burdened with data submissions, and there are inconsistent processes and procedures used among the program units. There is a need for an overarching program office, the Data PMO, to provide governance and standardization over data collection and reporting. The timing of implementing a Data PMO will depend on the staff available. If additional funding, legislation, or policy changes are needed, it may take longer to form. Regardless of the creation date of the Data PMO, it is highly recommended that the processes and procedures recognized for improvement later in this section be implemented as soon as possible.

As CDE moves from a "data collection" to a "data sharing" paradigm, the scope of the Data PMO would change. The PMO's responsibilities would change as new technology minimizes the impact of data collection on the school districts. The focus would move to a data analysis and reporting governance model. As the technology is updated, the mission of the Data PMO will have to be reevaluated.

Sample program office responsibilities listed in the table below are examples of how implementation of standardization of processes and procedures can benefit all of the data collection and reporting stakeholders.

Data PMO Responsibility	Benefit
Monitor, control, and coordinate the end to end process from legislation creation to data collection implementation, and reporting	Reduce the impact of data collections on school districts and CDE, improve the whole data collection, implementation and reporting process
Coordinate closer with the legislature prior to legislation being passed and perform an impact analysis including all stakeholders. Coordinate fiscal notes to take a system wide view instead of a program unit specific view or IMS specific view.	Ensure the legislature receives the data needed to make informed decisions while minimizing impact on school districts and CDE. Improved communication with the legislature may result in a reduction of data collections and duplicate collections.
Create standard process for legislative analysis, interpretation, review, and approval	Comprehensible and consistent interpretations of legislation and resulting data elements to minimize data collection requirements
Monitor the requirements analysis process that includes all stakeholders, better coordination with stakeholders including SIS and other school district system vendors	Minimize impact of collections on school districts, improve data quality
Lead a change control process for assessing time, budget, resource impact of requirements changes	Better understanding the impacts with the development lifecycle and prioritization between competing collections
Standardize estimating of time, people, resources	A more accurate understanding of development and implementation time and resources needed
Prioritization of development efforts	Clearer understanding of data collection system as a whole and how it all works together
Create a master schedule of all collection development efforts, training, collection windows, etc.	Clearer understanding of resource needs and impact of delays, to allow mediation of time and resource conflicts
Create standard training formats, coordinated training – new user, advanced user, updates, new collections, online vs. in person	Improved training delivered to school districts, better data quality, smoother data collections
Standardize communications both internally and externally with stakeholders	Better coordination between program units regarding collections, better acceptance and understanding by stakeholders of processes and results
Standardize documentation, processes, procedures and policies	Streamline the data collection implementation, submission, and reporting process.
Conduct risk and issue management	Better understand the current state of data collections and reporting to minimize impact of delays on potential funding
Sponsor and work with the Data Committee to involve the stakeholders	Ensure the stakeholders are represented to minimize the negative impact of new data collections, processes, procedures, and technology

Risk Management
Another important function of the Data PMO will be to perform Risk Management activities. Risk management formally defines the approach used to identify, assess, and mitigate program-level risks throughout the life of the program. It is a non-scientific art of identifying, analyzing and responding to risk events throughout the life of a program and in the best interest of the program's objectives. Risk management is critical to program management as it allows for proactive measures to be taken to minimize the overall risk of successful completion of the program.

Risks are uncontrollable events/forces, often based on "what-if" analysis, cannot be resolved or escalated, and are often external to the program but may affect it. A risk definition is the cumulative effect of the chances of an uncertain occurrence that will adversely affect program or project objective. It is the degree of exposure to negative events and probable consequences.

Risk and issue management are closely related, but distinct. Risks describe what might happen whereas issues describe what has already occurred. An issue that is left unresolved will have material impact on the collection or project where as a risk might have an impact on the collection or project.

Objectives of risk management:
- Identify key overall program risks which may threaten the data collection, e.g., milestone dates, budget or deliverables
- Assess key risks based on likelihood of occurrence, potential severity of impact, ability to mitigate
- Plan, implement, and monitor risk mitigation plans including mitigation milestone dates and status of mitigation actions

Examples of key data collection and reporting management risks
- Ability to change and sustain the change
    - If CDE doesn't change the collection model then it will become progressively difficult
    - Ability to change the culture
- Resources
    - Adding the organization implementation workload on top of all other work without adjusting schedules
    - Identify excessive workload, reassign tasks or limit activities as required
- Communication
    - Need to articulate the collection changes so that all levels within CDE and other stakeholders understand the changes

Organizational Transition Plan
Based on the recommendations presented in this document, CDE as an organization may transition to a new collection structure. A planned approach to the transformation will provide a better foundation and will achieve a higher level of success. CDE will need to employ a change management plan. The Data PMO will be in a unique position to provide guidance to smoothly affect the transition.

Change management enables an organization to meet its performance goals through focusing on the people side of the change and aligning people, process, technology, and strategy. It is the process of:
- Identifying and articulating a compelling case for change
- Analyzing the impact of change on the organization and its members
- Identifying and performing the activities required to drive change through the organization and bring people to a state of readiness for and acceptance of change

It is recommended that:

- A dedicated resource should be identified to manage the work plan through the transition. This position should report to the PMO and be an integral part of the process.
- The organizational transition plan should be managed and updated on a regular basis to ensure key transition dates are met.
- Continue to build on the communication plan in order to provide adequate change management through an extensive organizational change.

2.2.1.1 Background and Current Situation

Currently there is no centralized coordination between program units regarding collection efforts. There is no coordinated prioritization of development projects between IMS and the program units. Often the unit that vocalizes their needs the most or has the shortest legislative deadline gets their projects implemented first.

Each program unit approaches the legislative interpretation, requirements analysis, communication, training, implementation, and support in a different manner. This leads to confusion at the school district level and inconsistency within CDE. Data collection efforts as a whole are fragmented and conflicting resulting in duplication of effort and delayed collection windows.

Currently the system is viewed as consisting of the CDE program units and IMS. Many of the actual stakeholders are not involved in the process of implementing a collection. Involvement of the end users (the data collection owners at the school districts) in the requirements process varies from unit to unit. For example the Finance unit has a Financial Policies and Procedures (FPP) committee that meets regularly and involves school district representatives in developing the changes that impact the finance related collections. As another example, the Data and Research unit has a group of school district representatives that provide input into the End of Year (EOY) collections. Other units may involve the school districts only minimally in the process. For example, the Assessment unit obtained input for a new field via an email to all of the school districts and assessment points of contacts. Based on the few responses they received, they defined the new field.

Other stakeholder groups are given limited input. The following list is an example of other data collection and reporting stakeholders:

- Board of Cooperative Education Services (BOCES)
- Districts
    - IT departments
    - Departments/programs
    - Schools
    - Data collectors
    - Data entry
    - Vendors
    - School board
    - Auditors
    - Accounting firms
- Parents
- Third party education associations such as CASE, CASEBO, CCC, etc.
- EDAC

Communication between program units is limited. The Data and Research unit seems to have the most communication with other units due to the fact that the Student October and End of Year collection effort contains data for many of the other units. There is not even a regular meeting within CDE with the unit leads and IMS representatives to coordinate collections across CDE. Centralized communication happens only when multiple units are involved in a creating a new or changing a collection.

There have been resource shortages within units and IMS resulting in collection rollout delays and extension of collection windows. No one assess the impact of changes as a result of the delays and extensions. There is also a lack of standards for policies, procedures, and timelines.

2.2.1.2 Implementation

We recommend that the PMO office begin to be implemented in the short term. Given resource, policy, or budget constraints, this may not be possible. If this is the situation, it is recommended that the other improvements described in this document be implemented anyway. The Data PMO is expected to evolve as the organization and technology matures.

The PMO office will need to have the ability and expertise to complete the tasks and process included in Figure 2-2. The objectives to be achieved through the PMO structure are:

- Drive accountability, responsibility, and decision-making throughout the organization
- Maximize the use of available resources to ensure CDE is leveraging experience and individual skill sets to facilitate timely and informed data collection decision making
- Facilitate coordination, communication, and decision-making across CDE and stakeholders
- Avoid placing unrealistic burdens on individuals and program units by putting the appropriate resources in the right roles
- Allow people to focus more in their areas of expertise to provide the most value to the project

Organizational Changes

There will need to be an assessment of a Program Management Office charter, a definition of positions, roles, responsibilities, and authority. There will need to be communication and buy-in from the CDE departments affected, including the program units and IMS.

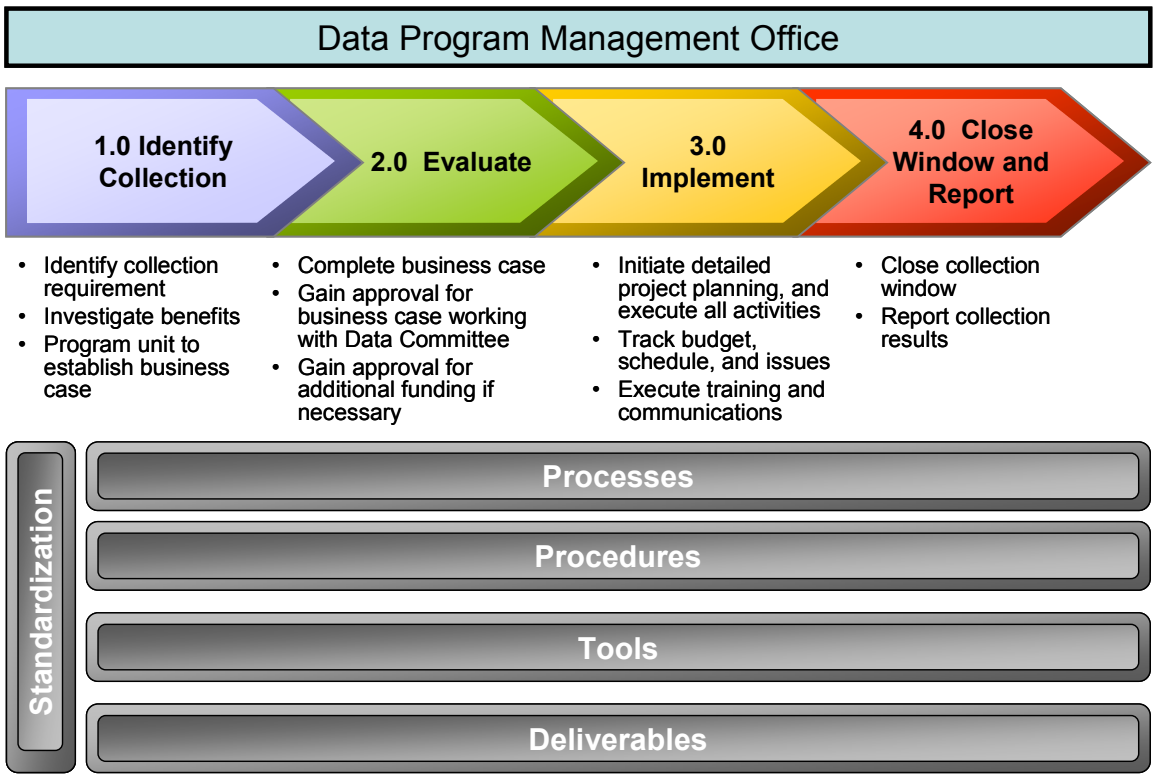

Figure 2-2: The Data PMO will oversee all aspects of data collection and reporting

A program manager and identified staff will have to be hired or appointed. These resources need to have program management experience for programs of similar size and scope. The program manager must be able to understand that the current data collections and reporting are part of a larger system with many stakeholders.

The recommended changes will require training of the staff in standard project management processes.

Process Changes
This will require a complete redo of the processes surrounding the data collection and reporting projects. Many of these areas are described in more detail in future sections.

Technology Recommended for Implementation
There are many program management tools that could be implemented to enable collaboration, standardized processes and governance of the data collection and reporting system. Examples of possible tools include a master scheduling tool, a requirements management tool, a document repository, a collaboration tool, etc.

2.2.1.3 Policy or Legislative Updates

Policies may have to be enacted within CDE to create the Data PMO.

2.2.2 Communications

This recommendation is for standardization of notification of collections and collection status to all stakeholders. CDE currently does not have a standardized process across all units for notification of collection status. By standardizing the notification and communication of a collection, CDE will present and function as one organization, thus improving customer service and execution.

A communications plan should be developed to design specific messages tailored to the needs of each audience. The plan promotes a coordinated communication effort that sends consistent, honest, and credible messages, timed and worded effectively for each audience to build anticipation and facilitate change and acceptance among the stakeholders. An outline, schedule, and specific messages should be drafted and delivered to each audience. Communications are expected to be delivered to stakeholders throughout each collections effort timeline.

This recommendation includes enacting a common communication method for all program units regarding collections. This should include web site improvements, newsletters, weekly status calls, etc. The web site should include the status (on-time, delayed, open closed) of the collection window, contact info, etc. The goal is to have consistent messages from all CDE program units.

Communication is a key to organization success and, as such, requires careful planning and execution to ensure that each impacted audience receives appropriate information. In addition, communication is important to building acceptance for new and changing collections, demonstrating CDE project support, and ensuring that stakeholders know what is expected at key points during and following project implementation. Clear communications also helps on the operational end to improve programming efficiency, data submission, and reduces error rates, thus saving time and money.

2.2.2.1 Background/Current Situation

There is limited communications within in CDE for both internal and external stakeholders. The school districts are receiving splintered messages from each of the units regarding collection details and status. There is partial communications with outside stakeholders, such as school districts, software vendors, legislature, third party education organizations, and school boards. Many of the school districts are also not communicating within in their own organizations.

For example, for the Student October collection, if Special Education has a data element in the Student October collection, they may notify the school district or administrative unit special education coordinator. That coordinator may not forward the information on to the Student October point of contact. When the collection window opens, there is now a data element that must be submitted that the Student October point of contact does not recognize or understand. Therefore, the data submitted may be not what was intended, or there may be a rush to track down the data, therefore opening the collection up to errors.

Another example of a lack of communication is in regards to the “Date first enrolled in the US” field. This was a new field on this year’s Student October collection. The majority of the districts interviewed complained about this field. They did not have the information or have any idea why it was needed. The field was requested by the Assessment Program Unit and related to the Adequate Yearly Progress (AYP) calculations. If a student had arrived and enrolled in the US within the last year, that student could be exempt from the AYP calculations for reading for that year. Having the understanding of the purpose behind the field would have saved the school districts frustration and delays in submitting their data.

Sources indicate that part of the communication issue is that the contact email address field is only long enough to contain two email addresses. One simple solution to this would be to put a distribution group email in the field

rather than individual email addresses. CDE should provide the ability to define more than two district contacts per collection, and to associate those contacts with particular subjects or CDE units.

2.2.2.2 Implementation

This recommendation should be implemented as one of the first changes and implemented in the short term. Standard communications is needed to begin the process of cooperation and collaboration with the stakeholders.

It is recommended that a standard communication plan for all of the program units be coordinated with the CDE Communications Office. In general, having standard communication methods, timelines, distribution lists, and formats would help set clearer expectations within CDE and the school district level. Having all of the collection related communication come from one source, such as the CDE Communication Office would emphasize the importance of the collections and ensure that the messages are clear and concise.

Organizational Changes
There are no organization changes expected.

Process Changes
Enacting a communication plan would require some process changes to the program units. They may have to alter their method of notifying school districts and other stakeholders of upcoming collections. Utilizing the Communications Office would also add a step in sending out communications.

Districts indicated several problems with the points of contact (POC) used by CDE units to inform districts of collection changes, updated materials, and training:

- CDE had the incorrect contact at the district, had difficultly getting CDE to change it, or were not aware of procedures to have the POC changed.
- CDE units usually only allowed one district POC per collection.

To improve communications with the districts the CDE should:

- Review district POCs to ensure the CDE has the correct ones.
- Develop and implement procedures for maintaining and keeping district POCs accurate and clearly communicate those procedures with the districts.
- Allow multiple district POCs per unit/collection to receive email communications

The above would also apply to BOCES or Special Education Administrative Unit contacts.

Technology Recommended for Implementation
To enable better communication with school districts, it is recommended that CDE implement a more comprehensive list-serve or email distribution list for data collections. They should expand the list of people informed of updates or new collections.

2.2.2.3 Policy or Legislative Updates

There may be a CDE policy change needed to require the program units to utilize the CDE Communications office to send out data related collections.

2.2.3 Stakeholder Involvement

There is a need for greater stakeholder involvement in the data collection process. Figure 2-3 illustrates some of the key stakeholders in the data collection process. Of the stakeholders listed, better involvement with the school district vendors and the school districts themselves would make the most impact in the shortest amount of time.

Vendor Involvement

A best practice determined from our interviews with the Student Information System (SIS) vendors and other states is open communications with the vendors of school district administrative systems related to data collection. CDE should communicate requirements changes to the vendors and open a dialog with them as they update their systems to collect and extract data that the school districts need to submit to CDE. The requirements for data collections need to be locked-down in a timely fashion to allow the vendors to update their systems. We heard from the vendors that 6 months – 1 year is optimal, but they can usually implement a change if they are given 3 months advance notice. Current legislation calls for the freezing of data collection changes 90 days in advance of a collection window. This legislation may need to be reevaluated with input from the stakeholders (vendors, school district IT departments, etc.) to validate if this is enough time to implement a change, especially one requiring many new or changed data elements.

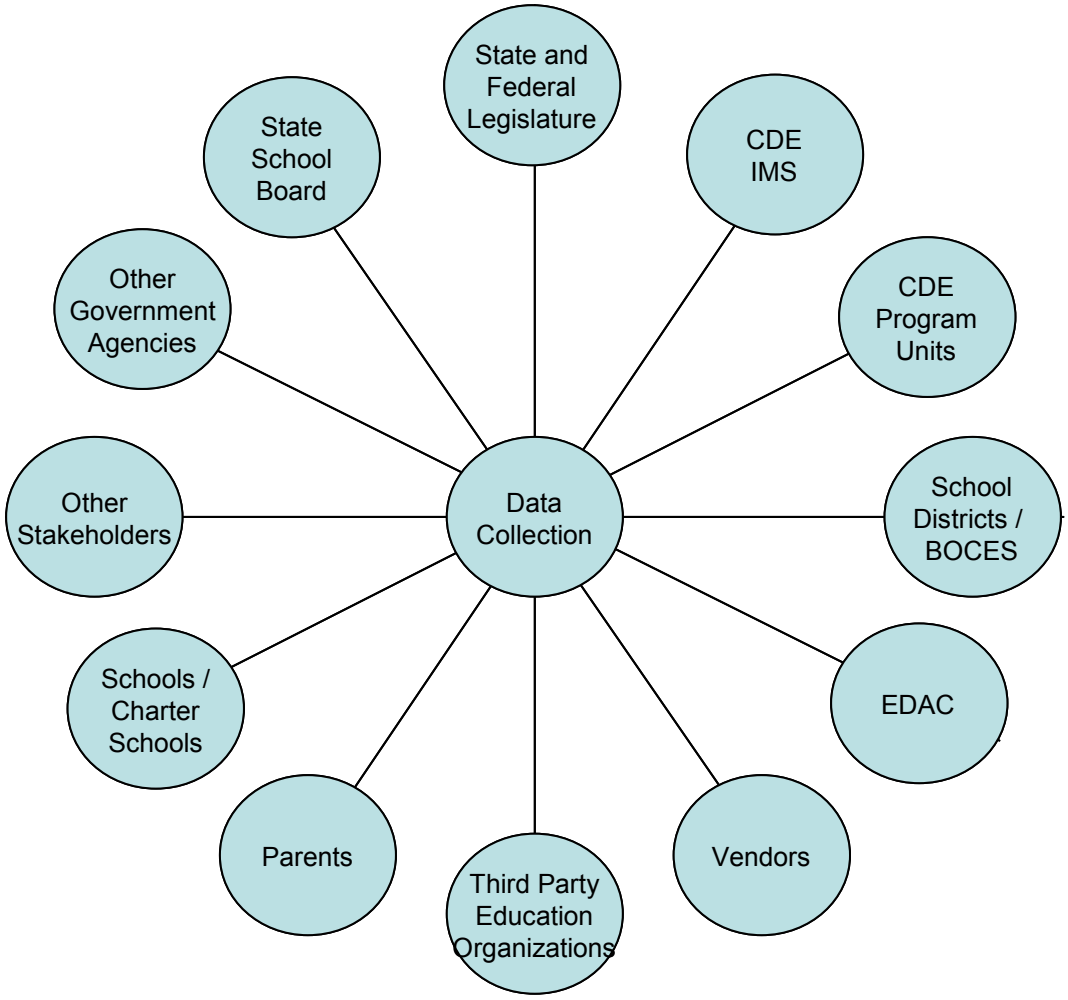

Figure 2-3 The stakeholders of the data collection process include many groups including those who are not impacted directly by the data collection process

To increase involvement with the vendors, we recommend including the vendors on the data collection communications that go out to the school districts. That way they are kept in the loop and not hearing about changes second hand from districts. Another way to increase involvement is to have a vendor conference yearly to increase communication between CDE and the school district vendors.

A concern voiced by CDE is that they need to be vendor neutral. By inviting all existing school district vendors to a conference or allowing all vendors access to data collection communications and information, CDE can remain vendor neutral. The Data PMO can coordinate communications with the vendors.

Data Committee
Another best practice we observed was the Financial Policies and Procedures (FPP) committee. This current committee is made up of 25 representatives. The two permanent members come from the Jefferson County School District and Denver Public Schools, 20 members are rotating members from other school districts, 2 from BOCES and 1 member is from a charter school. Other non-voting members include CDE members and a few other stakeholder organizations. The organization provides a forum for school districts and other stakeholders to discuss topics such as new collections and impacts of other collections on finance, share information, discuss accounting issues, auditing, and policy issues. The FPP committee is recognized by the state legislature as an organization responsible for aiding the state board of education in establishing financial related data reporting systems (State Law 22-44-105(4)(a) and 22-44-105(5)). Often their meetings draw over 70 people – members, alternates, ex-members, and guests from many different stakeholder groups. Anyone may request agenda items in advance

We recommend the formation of a Data Committee modeled after the FPP committee. It would report to and be an extension of the Data PMO. The purpose of the committee would be to increase communication and understanding of the data collection process. It would provide an open and transparent knowledge exchange forum for data collections as a whole. Data Committee subcommittees would work with individual program units to interpret legislation into requirements. They would help CDE assess the impact of data collections on the stakeholders. They could work with the State School Board and legislature to analyze and coordinate collection requests.

The Data Committee would be involved at all levels of the data collection process. In addition to helping define requirements and impacts to stakeholders, they could analyze collection results and past collection legislation to identify areas for consolidation or elimination. There is a need for a review of the results to determine if the data reflects the reality as perceived by the stakeholders and the legislative authors.

One option to create this committee would be to expand the role of the Education Data Advisory Committee (EDAC). Currently EDAC is too limited in scope and membership to address many of the issues that a Data Committee should handle. Their current scope is limited to "determine whether the benefits derived from the reports are outweighed by the increased administrative costs incurred" and making "recommendations to the state board for the repeal or amendment of statutory and regulatory data reporting requirements". They also review data reporting requests to determine if they are mandatory or voluntary. [Senate Bill 05-019] Current membership is four voting CDE members and eight voting members from school districts, BOCES, and charter schools.

Data Committee Alternative
An alternative to the Data Committee would be to standardize across the units how stakeholders are involved in creating data collection requirements. The Data PMO would have to define the standardization. Each unit would be responsible for smaller data focus groups. There would have to be rules enacted regarding membership diversity, communications, and goals of the focus groups. The downside to this alternative is that there is not a system-wide view of data collections by the stakeholders.

Other Associations
CDE should continue and increase their involvement with the national education associations such as the Council of Chief State School Officers (CCSSO), National Center for Education Statistics, and Education Information

Management Advisory Consortium (EIMAC) when developing collection requirements. These education organizations and associations are addressing similar issues and requirements and thus CDE can leverage these associations' experience and expertise.

2.2.3.1 Background/Current Situation

Currently, there is a lack of stakeholder involvement which is reflected in frustration by most of the stakeholders including the school districts, third party education associations such as Colorado Association of School Executives (CASE), Colorado Association of School Business Officials (CASBO), Colorado Education Association (CEA) and Colorado Children' Campaign (CCC), SIS Vendors, the State legislature and the Federal Government. Figure 2-4 demonstrates the stakeholders as we feel are perceived by CDE. Of all of the stakeholders shown previously in Figure 2-3, only the ones highlighted in 2-4 are involved in the data collection process currently.

The districts are involved to some degree as indicated by the partial shading in Figure 2-4. For example, several of the CDE program units that we spoke to involve the school districts in the requirements process by holding focus groups or surveys regarding new or updated data elements. They work with a small group of school districts to interpret the legislation and determine how best to collect a particular data element. For example, the Data and Research program unit held several meetings to determine how best to implement changes to the End of Year collection. They are currently in the process of holding meetings on the new course code collection.

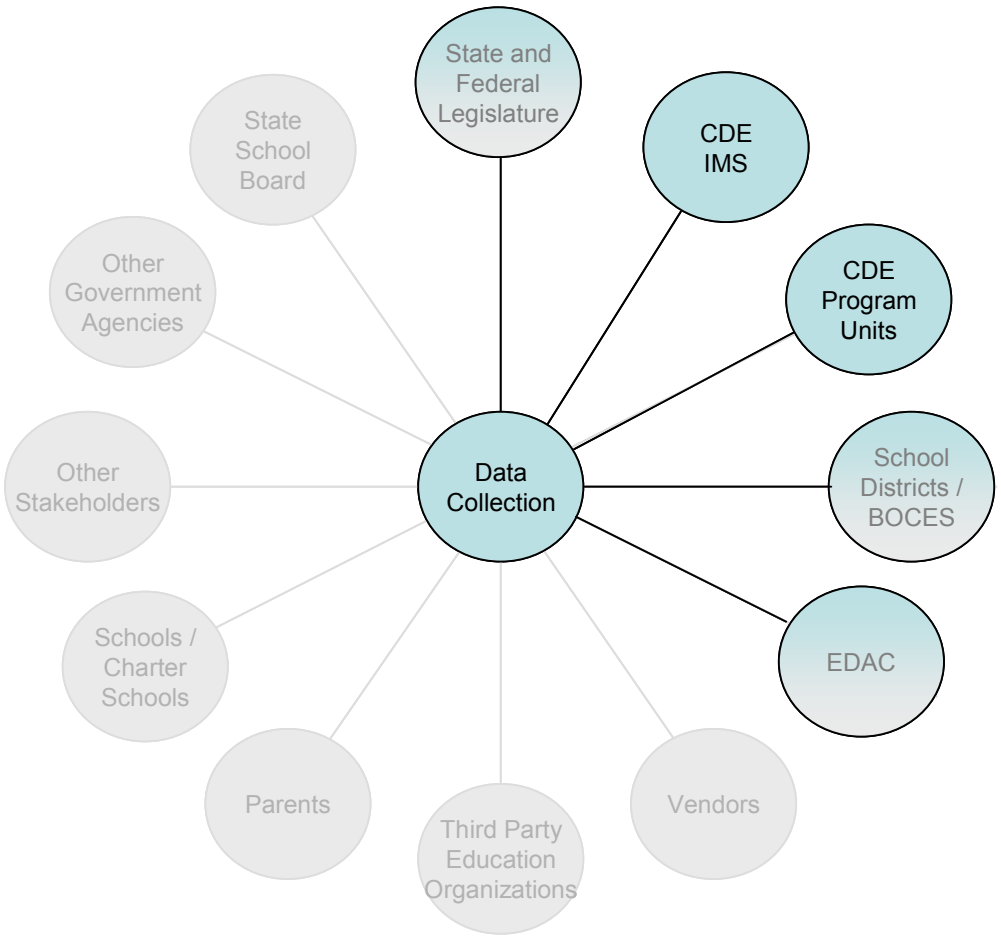

Figure 2-4 The Legislature and CDE's current view of data collection stakeholders is currently limited

As another example, the Finance program unit works closely with the Financial Policies and Procedures (FPP) committee to discuss topics such as new collections and impacts of other collections, share information, discuss accounting issues, auditing, and policy issues.

As an example of a not so successful attempt to involve the school districts, the Assessment program unit asked the school districts if they had information regarding the data a child was first enrolled in the US. The districts that responded said that they had that information. Unfortunately, the information was often not kept in electronic form and easily accessible for most school districts. This field was given often by the school districts we interviewed as an example of lack of understanding by CDE of the effort involved to collect new data elements.
As part of the online survey that was conducted as part of this study, the question was asked: "Does your school district participate in the data collection requirements process?" Only 4% of the school districts responded that they did participate. From our discussions with the CDE program units, we would have expected this number to be higher. There may be a disconnect between the people that participate in the focus groups and the people that completed the online survey. Different people may have filled out the survey, or the districts that responded may not have been the same ones who work with CDE on requirements.

The state legislature and federal government are involved from the standpoint of creating the legislation that drives collection efforts. The interaction between CDE and the legislature in regards to data collection usually comes in the form of fiscal notes that comment on the costs and resources required at CDE to implement a change or a new collection. The impact to other stakeholders such as school districts or other stakeholders is not captured as part of the fiscal note process.

Often third party education related organizations drive legislation through lobbying efforts. These stakeholders may be educators, parents, school or school district executive or business owners, or other interested parties. Due to the lack of communication between CDE and stakeholders, the legislation may call for data collections that may or may not provide the data that is needed to make education better.

The vendors of school district SIS, financial, human resource, and other administrative systems are another group that is not thought of as stakeholders by CDE. As an attempt to be vendor neutral, CDE IMS and the program units usually do not work with the vendors to give them notification of new collections or collection changes. They leave the notification up to the school districts. If the school districts do not notify the vendors in a timely fashion, the new requirements do not get put into their systems in time for the start of a collection window. There is also a lack of understanding by CDE regarding how long it takes a vendor to implement changes in their systems and the school district reliance on their vendors. This results in the systems not being ready for a collection, which adds another level of complexity for the school districts trying to collect and submit their data. The Data and Research program unit is attempting to reach out to the vendors by including them on email communications distributed to school districts. To do this, the vendors must find the information on the CDE website and subscribe to the service, although the vendors that we talked to as part of this study were not aware of this option.

Another example of the lack of stakeholder involvement is in regards to the Colorado Education Data Analysis and Reporting (CEDAR) system. Currently IMS has plans to expand the data that is available in CEDAR as well as increase the number of licenses available for school districts CEDAR has many types of users and many stakeholders find it a useful tool. However, discussions with school districts, and online survey results, indicated the CEDAR system is under utilized by districts. Many districts did not understand the data available of how to access it, indicated the information in it did not reflect the districts operation view, or they could not access data that they would really like to see, either because it was at the wrong level of granularity or because of access restrictions (like seeing data from other districts). Mostly these are not issues with the CEDAR system itself, rather the data that can be accessed with it. A full enterprise data analysis (see Enterprise Data Analysis) will create the opportunity to fully realize the huge potential of the Education Data Warehouse.. Please see **Appendix B: CEDAR Logon and Access Rates** for district usage details.

2.2.3.2 Implementation

This recommendation should be implemented as one of the first changes and implemented in the short term. Collaboration with the stakeholders is absolutely needed to begin to create an environment of cooperation and understanding around data collection and reporting.

Vendor involvement would start with the inclusion of vendors in data collection related communications. Additional vendor involvement, for example in the form of a vendor conference would have to be sponsored by CDE and organized by CDE. The vendor could also be invited to CDE training classes

The formation of a Data Committee could be legislated or created via a new CDE policy. It would require leadership from Data PMO to identify charter members and set up the processes and procedures governing its work.

Organizational Changes
There would be minimal organization change to CDE.

After the Data Committee is in place it would relieve some of the workload off the CDE program units in regards to data collection legislative interpretation and implementation. Care must be taken in creating the processes and procedures to minimize the added time that would be needed to involve the committee.

Process Changes
A process would have to be developed and executed to include the school district vendors.

Processes would have to be developed for CDE program units to collaborate with the Data Committee on data collections. The formation of the committee would require their own set of policy and processes.

Technology Recommended for Implementation
The FPP uses video conferencing to include members and meeting attendees that are located on the Western slope and Eastern plains. Similar technology could be used for both the Data Committee meetings as well as vendor conferences. Additional collaboration technology is recommended to aid in the sharing of information and documents.

2.2.3.3 Policy or Legislative Updates

Vendor involvement could be enacted with or without a CDE policy change.

A Data Committee may have more impact if supported with legislation, although to get it started, a CDE policy change is recommended.

2.2.4 Requirements Analysis

Requirements analysis is the process of understanding the customer needs and expectations from a data collection and is a well-defined stage in the software development life cycle model. Requirements are a description of how a data collection should behave, its properties and attributes. Requirements must be actionable, measurable, testable, related to identified data reporting needs, and defined to a level of detail sufficient for system design.

There are three key components to this recommendation:

First, review new collection requirements with a representation of the stakeholders (customers, school districts, BOCES, vendors and etc). The current development cycle does not include a step for these stakeholders to have input prior to the design and development.

Second, define and lock down requirements prior to design. The amount of re-work done by the program units and IMS is unnecessary. It is causing collection delays and disgruntled school districts and stakeholders. The collection design and requirements must be locked down/frozen prior to collection design and development.

Third, there should also be a scope/change management process initiated after the requirements have been approved and development has begun. This is a process during which any new collection requirement changes are reviewed and evaluated as to benefit, cost and impact to data collection. The changes are then approved. This can be accomplished by establishing a change management committee or using the Data Committee mentioned above for reviewing and approving of all change orders to data collections design and development.

2.2.4.1 Background/Current Situation

Currently there is not a consistent approach or methodology used to gather and document data collection requirements for state and federal education mandates, contributing to inconsistent data collection window delivery and school district and stakeholder dissatisfaction. Additionally, there are missed expectations, gaps and inefficiencies in the transition from requirements to analyze, design and build when requirements are supposed to be passed from business units to IMS that need that information.

The CDE units are currently doing a good job with determination of collection requirements for State and Federal mandates, but there is currently no stakeholder involvement or impact analysis with these requirements. There is no system wide view of mandated deadlines that may have funding impacts.

During the course of this assessment, there was no documentation that clearly mapped collection results to business requirements. For example, the recent additional of “last date enrolled” data field to the ‘Student October’ collection has caused an extreme amount of confusion between CDE and the school districts. CDE had the perception that the district already were collecting the data in a form readily accessible for data submission, but this was not the case.

2.2.4.2 Implementation

This recommendation should be implemented as one of the first changes and implemented in the short term to streamline the legislative interpretation and requirements process.

CDE and the Data PMO should investigate standard project management practices in this area to determine best practices for requirements analysis management.

Organizational Changes

There were no staffing changes noted for the requirements analysis. It may be necessary to develop requirements analysis training to support new processes for interpreting legislation.

Process Changes
New requirement management processes will have to be developed and implemented. Standard timelines and interpretation processes and review procedures will have to be developed.

Technology Recommended for Implementation
There are numerous tools available to assist a requirement management process and track requirements through to development, such as Telelogic's DOOR product, Rational Rose, and CaliberRM.

2.2.4.3 Policy or Legislative Updates

This recommendation may require a CDE policy change to have the program units and IMS follow a standard process.

2.2.5 Coordination

We recommend a system wide view of the data collection and reporting efforts. The data collection and reporting efforts must be viewed as a whole system, not independent collections. Tools must be put in place to integrate all of the pieces. Changes to one collection will impact other collections. A system wide view will aid CDE in deciding development priorities and resource allocations. The Data PMO would be responsible for maintaining a system wide view and the program units, IMS, and Data Committee would use the information gathered.

Master Schedule

Implementing a master schedule would enable a system wide view of data collection and reporting. Including all of the milestones required to implement a new or changed data collection efforts would enable all of the program units to understand the impact of missing deadlines. The schedule would have to be comprehensive and cover all activities related to a data effort including the requirements activities, training, coding, implementation, testing, support, collection period, and reporting timeframe. By having a transparent and open schedule, the understanding between program units and IMS would be improved. Other stakeholders would have better insight into the upcoming data collection and reporting activities.

Prioritization

There is a need for an open and transparent process for prioritizing new and updated collection development and implementation. By having a comprehensive view into the data collection system, it will become easier to prioritize. Priority may be based on funding associated to collection elements, legislative deadlines, resource availability, effort required, or other reasons. The prioritization rules need to be developed and publicized. There will have to be coordination and cooperation between the units to assist in the prioritization process. Having clear rules will minimize the amount of political back and forth that is natural in this type of environment. Having a prioritization process with the collections will allow the organization to allocate resources appropriately to ensure collections are administered on schedule, including the appropriate support. The sample table below demonstrates the impact of potential business drivers on priority.

	Prioritization			
Business Drivers	**High**	**Medium**	**Low**	**None**
Compliance / Regulatory (Federal and/or State)	Required Compliance / Regulatory Initiative; Severe consequences if not met	May impact current year compliance / regulatory goal; Moderate consequences if not met	Required for future Compliance / Regulatory goal; Few consequences if not met	Not required for compliance / regulatory goals
Reduces Costs	Results in CDE commitment to reduce current year budget	Potential cost savings in current year or committed budget reduction in future	Potential cost savings in future years	No identified cost savings
Improves CDE Operational Efficiency	Directly impacts and provides significant CDE operational improvements	Indirectly impacts and / or provides moderate CDE operational improvements	Provides some improvement to CDE operational efficiency	No impact to CDE operational efficiency
Improves School District Operational Efficiency	Directly impacts and provides significant school district operational improvements	Indirectly impacts and / or provides moderate school district operational improvements	Provides some improvement to school district operational efficiency	No impact to school district operational efficiency
Improves Ability to Deliver Quality Data	Direct and measurable impact on Quality Indicators / Quality Measures	Indirectly impacts Quality Indicators / Quality Measures	Minimal impact Quality Indicators / Quality Measures	No impact on Quality Indicators /Measures

Change Control and Impact Analysis
Another tool to aid in coordination and prioritization is a Change Control process. A Change Control process helps an organization assess the impact of changes to schedule, budget, and resources. By assessing the impact, it may be possible to shift resources or deadlines to accommodate delays in a logical fashion. A process should be put into place to assess and communicate the impact of changes to the stakeholders involved in the data collection system. The Data PMO could govern a change control process. Impact analysis goes hand in hand with stakeholder involvement.

Whereas the impact to CDE may be minimal, the impact to the other stakeholders may be much greater. Better coordination with the schools district is needed on the impact of new collection and how school districts have to adjust to collect the data. The impact to the school districts needs to be addressed during the collections requirements determination. A review of how the various school districts will be required to obtain and report the data is imperative with minimizing the effort necessary. This impact analysis would include the technical capability, complexity of data requirement, timing, reason, etc. The table below demonstrates a sample definition of impacts and associated limits on impact levels.

Impacts	High	Medium	Low	None
Cost	Total implementation cost greater than $50,000	Total implementation cost between $10,000 and $50,000	Total implementation costs under $10,000	No monetary investment needed
Timeline	Implementation greater than 9 months	Implement in 3 –9 months	Implement in 1 – 3 months	Implement in 0 – 1 month
Operational	Requires major re-engineering of current process	Requires re-engineering of current process	Requires minimal process changes	Requires no changes to current operational process
	Affects more than two CDE departments, or	Affects two or fewer CDE departments, or	Within one CDE department, or	
	Affects all school districts	Affects multiple school districts	Within one school district	
Technical	Requires changes to critical systems, or	Requires major changes to key non-critical systems, or	Requires minor changes to key non-critical systems	No changes to systems or interfaces
	Impacts two or more systems or interfaces	Impacts at least one system interface	No interfaces impacted	
IT Technology / Skill Requirements	Requires use of significant new technology	Requires use of new technology	No new technology required	No new technology required
	New IT skills will be required	IT has limited availability of needed skills	IT has limited availability of needed skills	IT has depth in needed skills

Legislative Coordination
By having a coordinated view of the data collection system, CDE can better work with the stakeholders to determine the impact of new legislation and create a single comprehensive fiscal note. A single comprehensive fiscal note process would better assess the impact on CDE and stakeholders and enable more appropriate requests for funds or resources. The current process is for the program units and IMS to submit separate fiscal notes for any pending legislature. Through a more comprehensive view of the data collection process, CDE can continue to educate legislatures regarding the collection development and implementation process and better set expectations.

2.2.5.1 Background/Current Situation

Currently there is no CDE-wide view of all of the data collection efforts. Each program unit basically operates independently in regards to data collection. For those collections that have data elements from multiple units, there

is some coordination, but no consistency. There is no coordination across collections or across program units. For example, if one program unit delays their requirements definition, there is no understanding or knowledge of the impact to other collection's development.

By default, the IMS organization prioritizes the collections due to the fact that they are involved with most collections and have limited resources for development activities.

There is no central leadership to assess the impact of delays, resource shortages, or changes to collections. The creation of fiscal notes is disjointed and not really coordinated. There is not master schedule providing insight into all of the activities required to update or create a collection.

CDE as an organization does not take into account the entire impact to school districts, stakeholders, other units, and IMS resources when new or existing collection when there are changes and/or delays with data collections. The current use of fiscal notes is limited to the CDE organization. There have been major delays to collection windows that impact the school districts, vendors, and CDE without a system wide view of the repercussions.

2.2.5.2 Implementation

This recommendation should be implemented as one of the first changes and implemented in the short term. Understanding the impact and workload of all of the data collection and reporting activities will help CDE and the stakeholders understand upcoming collections.

A scheduling tool should be used to compile all of the upcoming new and changed collection efforts. Standard deadlines and milestones should be used for each collection. Rules for prioritization, change control, and impact analysis will have to be developed and enforced. A new process will have to be put into place for coordinating fiscal note responses.

Organizational Changes
It is recommended that a single authority oversee the master schedule, such as the Data PMO. Having a central owner of the master schedule would ensure it is updated in a standard manner. All of the program units and IMS would have the responsibility to communicate changes to the Data PMO.

An option to coordinate the fiscal note process, may be to shift the responsibility to the legislative liaison or someone else familiar with the education legislation. That person would be responsible for working the unit heads, IMS and other stakeholders to gather and consolidate the appropriate information.

Process Changes
There will need to be process updates for prioritization, change control, impact analysis, and fiscal note coordination.

Technology Recommended for Implementation
It is recommended that CDE implement a scheduling program that crosses all program units and IMS such as MS Project Server, Primavera Project Planner, or Project Workbench. There are many project management tools available online.

2.2.5.3 Policy or Legislative Updates

Policy changes may be needed to ensure all of the program units and IMS adhere to the new processes.

2.2.6 Training/Support

The goal of this effort is to provide an efficient and effective training program that will prepare the CDE stakeholders to be fully operational with the implementation of new and updated data collections. Consistent training is also required on the data reporting options. As CDE moves from a "data collection" paradigm to a "data sharing" paradigm, data reporting and analysis training will become more important.

This initiative will be performed in conjunction with the support activities to insure that they are aligned. A specialized training group may be developed to facilitate these changes, or the changes may be implemented by process standardization.

Training
Following are specific implementation goals of training:

- Develop a training curriculum that ensures CDE users understand the new collection and audit processes, their roles and responsibilities, and how to use CDE tools and resources to perform their jobs. Develop and list courses that school districts need to attend to become proficient with CDE processes and the collection systems (ADE, CEDAR, etc.). Train school districts on new and modified collection and audit processes, critical and complex collection transactions and edits; and provide learning aids for less critical transactions so that school districts can self-train back at their district.
- Develop detailed training materials that fully explain how to execute new and existing collections. Also improve the coordination between units (combined collection training), through understanding the skill level of the audience, continue/increase the amount of regional training and online training. One-page summaries of courses should contain delivery strategy, prerequisite information, length, objectives and description. These activities also include processes for instructor preparation, course evaluation, issue resolution, etc.
- Deliver training classes using tools and materials that educate school districts and BOCES on all relevant information; provide appropriate assessment tools to ensure end-users are ready to perform new data collection job tasks. Train school district to proficiency by providing classroom training, on-line classes, practice labs, on-the-job reference tool, recorded training and other courseware prior to collection windows.
- Manage logistics of all training classes for example, manage enrollment, class set up, on-line setup, class materials, training environment, etc. Create a listing of courses and schedule of course times and dates. All of these activities assist school districts and instructors for training.
- Promote knowledge transfer on all materials/tools to CDE team members to ensure that capabilities are in place to conduct future training and support (i.e., refresher, new collections, changes, reporting, etc.)

Support
Support during collection windows should be updated to meet peak volume. Cross training of resources within a program unit is recommended. Program units should be aware of the time impact of responding to support requests and set into place service level agreements. For example, during a collection window, if a school district calls with a support issue, the call should be returned within 24 hrs. It should be standard practice to put Frequently Asked Question (FAQ) answers on the web. Solutions to reoccurring problems should be sent out the school districts via high priority emails.

2.2.6.1 Background/Current Situation

During this study, there was a mixed response to CDE data collection training. The skill level of the audience needs to be assessed and understood. The various CDE units deliver collection training as needed and determined by their unit. This is due to the uniqueness of each area, but needs to be coordinated and delivered as a common/single format and message from CDE. The updating of training material during training has created a process in which some district wait until the final training is completed before review materials and/or only attend

the final session. One cause is a disconnect during the validation of requirements, design/build and adequate testing prior to collection roll-out.

Many of the school districts are siloed and fractured when it comes to collections and require yearly training. Some larger districts have dedicated groups for the delivery of CDE collections and are less impacted with collection changes, thus only have a need for training/notification that only address the incremental changes. Other districts have high turnover and require additional beginner level training.

Overall, support has been adequate during the collection windows, but there are limited resource within CDE during some collection windows peak periods (i.e. EOY, Student October, etc.). Due to overlapping collection windows, there is a resource shortage to adequately support, the program units are unable to provide backup support.

2.2.6.2 Implementation

This recommendation should be implemented as one of the first changes and implemented in the short term to improve the current data collection and reporting efforts.

Further identification of training best practices within CDE will have to be undertaken. Alternate methods of delivering training to remote locations should be investigated. The data collection audience should be understood better before new training is developed.

Additional resources will need to be allocated during peak collection times for support.

Organizational Changes
Some resources may need to be cross trained and shifted around to provide backup support during a collection window.

Process Changes
Develop a detailed training strategy and plan that are implemented and executed across the CDE units for data collections. Also develop standard processes for cross training and SLAs during support windows.

Technology Recommended for Implementation
Additional online training sessions should be utilized to provide an alternative to travel. Most of the training sessions are less than three hours, but require a greater commitment from remote school districts due to the commuting requirements. By offering more on-line training options, the school districts can eliminate travel time and better accommodate their schedules. There should be multiple sessions and varied times to accommodate the districts. For in-person training, the agenda, audience, and expectations should be communicated early and clearly. Beginner level training can be recorded for users to watch multiple times if needed.

Develop a training practice database that utilizes real data to support training activities prior to and post-implementation of collection windows.

2.2.6.3 Policy or Legislative Updates

A CDE policy may need to be put in place to standardize training across the program units.

2.2.7 Staffing

This study is recommending several business and technological changes which are expected to impact the IMS and program unit staff during the next couple of years. These changes will place significant additional load on the IMS staff and IT infrastructure. The current staff, both in number and skill set probably will not be able to absorb the increased workload. Significant changes in the areas of technology upgrades and new software implementations are expected. An increased volume of work which will impact the IT staff will result from the recommendations.

An increase in skill sets is also expected from these recommendations that will impact the program units. Shifting to a more standardized method of accomplishing their work, whether it be training, requirements analysis, etc., will require additional training in the area of project management and system development.

2.2.7.1 Background/Current Situation

Skills

It is important to note that the current IMS is appropriately skilled for today's workload. They are highly regarded by the entire organization, are responsive to requests, and have a good customer service focus. These are qualities which must be maintained as IMS expands to accommodate the recommendations.

With the business and technological changes recommended, the current IMS staff will become more overloaded and will be unable to maintain its current service levels and focus. Training will have to be provided for the current staff for new business processes and technology. Moving to more modern technology may require current skills that are sought after in the marketplace, maybe requiring higher compensation incentives or salary.

Staffing Levels

The current IMS group is not staffed adequately for the current data collection work load. There are concerns regarding the ability of the current staff to meet future business requirements. These concerns stem predominately from the small size of the staff and the significant amount of data collection and technological change which is recommended. . Specific IMS staffing recommendations are discussed in section **3.3.6 Technical Capabilities**

2.2.7.2 Implementation

This recommendation should be started in the interim to assess the updated skills and staff needed to implement these recommendations, but will extend into the long term.

The next steps and short term recommendations are as follows:

- Define and estimate IT recommendations
- Prioritize recommendations and understand staffing levels
- Formalize IT staffing plan
- Initiate recommendations and projects as appropriate

Organizational Changes

New skills will be required to fulfill this study's recommendations. Assuming suitable replacements can be found for the employees leaving the IMS group through retirement and attrition, the current staff should be able to obtain these new skills. Workload will however necessitate additional staffing. A complete staffing approach is recommended to determine the most appropriate mix of resources to meet future business needs.

The overall recommendation is that an IT staff augmentation plan be finalized and implemented. Staff augmentation can be accomplished through:

- Hiring additional fulltime staff – for ongoing highly-skilled needs
- Temporary staff augmentation (interns and contractors) – to absorb peak workloads
- Project related staffing – for intermittent or specialized project work

All three of these approaches are recommended.

Process Changes
No process changes were noted during this assessment for staffing.

Technology Recommended for Implementation
There are no technology changes needed to implement this recommendation.

Staffing Risks
There will be staffing risk related to attracting and retaining highly skilled staffing resource to implement the technologies recommended. These highly skilled resources do command higher salaries. Below are some additional staffing risks:

When the collections processes change there maybe some people transferred to jobs for which they have no previous experience; also, there maybe some jobs that are left vacant which CDE will still requires
Addition of overhead positions may detract from main focus of CDE
Positions that are going away need to be transitioned, positions created need to be understood
There may not be enough people supporting this initiative and the new roles opening up

2.2.7.3 Policy or Legislative Updates

Additional funding will have to be found to fund additional staff and training. This may require a policy change or new legislation.

2.2.8 FERPA

The Family Educational Rights and Privacy Act (FERPA) applies to schools and local educational agencies (LEAs) that receive grant funds from the U.S. Department of Education (USED). FERPA (20 U.S.C. § 1232g; 34 CFR Part 99) is a Federal law that protects the privacy of student education records. The law applies to all schools that receive funds under an applicable program of the U.S. Department of Education.

FERPA gives parents certain rights with respect to their children's education records. These rights transfer to the student when he or she reaches the age of 18 or attends a school beyond the high school level. Students to whom the rights have transferred are "eligible students."

Generally, schools must have written permission from the parent or eligible student in order to release any information from a student's education record. However, FERPA allows schools to disclose those records, without consent, to the following parties or under the following conditions (34 CFR § 99.31):

- School officials with legitimate educational interest;
- Other schools to which a student is transferring;
- Specified officials for audit or evaluation purposes;
- Appropriate parties in connection with financial aid to a student;
- Organizations conducting certain studies for or on behalf of the school;
- Accrediting organizations;
- To comply with a judicial order or lawfully issued subpoena;
- Appropriate officials in cases of health and safety emergencies; and
- State and local authorities, within a juvenile justice system, pursuant to specific State law.

We recommend that FERPA legislation be reevaluated by Colorado. There is a need to establish a clear directive regarding how FERPA is interpreted across the state and CDE. There is evidence that CDE is claiming FERPA interpretation as justification for business and operational decisions. We strongly recommend the Commissioner or the Deputy Commissioner act as the liaison to the Attorney General to reinterpret statutes, especially for those decisions that impact the scope of new and existing collection and reporting projects.

2.2.8.1 Background/Current Situation

During the data gathering portion of this study, it was determined that a majority of the school districts in Colorado do not have the same interpretation of FERPA as CDE. The impression gathered is that CDE believes FERPA prohibits any centralized student data sharing between school district. This has caused a conflict and misunderstanding with how the data is collected, shared and reported by CDE. There were situation noted that student were required to retake various placement test after transferring between districts.

During this assessment, it should be noted that several states including Florida have not viewed FERPA as a restriction to sharing and maintaining data at the state level. There is a specific notation under Subpart D – of FERPA that details an exception for student information disclosure:

§ 99.31 Under what conditions is prior consent not required to disclose information?

(a) An educational agency or institution may disclose personally identifiable information from an education record of a student without the consent required by § 99.30 if the disclosure meets one or more of the following conditions:

(1) The disclosure is to other school officials, including teachers, within the agency or institution whom the agency or institution has determined to have legitimate educational interests.

There have been other precedents set for sharing student data with school districts at the state level.

Under a 2002 decision of the U.S. Supreme Court in Gonzaga University v. Doe, parents and others may not sue a school or LEA for alleged violations of FERPA.

2.2.8.2 Implementation

This recommendation should be started in the short term to enable CDE to move to a "data sharing" paradigm.

In light of changing attitudes regarding data sharing and information gathering, an updated interpretation of FERPA needs to be made. CDE in conjunction with the Attorney General would be the logical parties to initiate this study.

Organizational Changes
No organizational changes required.

Process Changes
No process changes needed.

Technology Recommended for Implementation
There were no technology changes recognized.

2.2.8.3 Policy or Legislative Updates

- Initiate a formal review of state laws and regulations to ensure that they do not preclude the state from acting for schools and LEAs in maintaining and analyzing students' education records.
- Develop and issue regulations or guidelines (or enact state laws) that clarify the role of the state in acting for schools and LEAs in maintaining their students' education records and the range or types of records covered.
- Develop and issue regulations or guidelines (or enact state laws) that establish standards for a school, LEA, or the state on their behalf, to "authorize a study" initiated by another organization for the purpose of improving instruction and establish procedures for entering agreements with organizations to ensure the disclosure comes within the FERPA provisions and complies with FERPA safeguards, perhaps modeled on the licensing procedure used by the Institute for Educational Sciences, and perhaps including sanctions for any unauthorized re-disclosures
- Review state privacy laws to determine that the collection and disclosure of personally identifiable information from student education records by the state complies with these laws as well as FERPA.

3 Detailed Recommendations - Technology

The recommendations in this section are technology based, however, none of these recommendations should be considered independent of the comprehensive people, process, and organizational recommendations made throughout the document.

A review of the existing data collection and reporting systems, and recent improvements in technology has revealed several opportunities for improvement. These improvements generally fall into three categories:

- **Short Term**: enhancements and changes that can be made within the exiting architectural bounds of the current systems that could be implemented within 6 months to a year within the existing resource and budgetary constraints of IMS.
- **Interim**: enhancements and changes that can be made within the exiting architectural bounds of the current systems but either include a significant change to some part of the overall process, or require additional resources not currently within the IMS budget.
- **Long Term**: these recommendations require a different architectural approach than that currently being used. Generally they move away from the current "collection driven" approach to a new "data sharing" paradigm that takes advantage of technology that has come into common use in the past 5 years.

3.1 Short Term Recommendations

3.1.1 Performance Enhancements

The time and resources allotted to this study did not permit the comprehensive review of systems and processes needed to make specific technical recommendations for improving performance.
However, it is clear there are performance issues, with some school districts reporting collection submission processing times of over 12 hours. This coupled with the sheer number of times (sometimes over 80, see **'Appendix C – Collection Submission Counts'** for details), schools districts are submitting some of the more complex collections (October Count, End of Year (EOY)), to get them to pass all edits, makes collection submission and extremely lengthy process.

Performance enhancement must be undertaken as an integral part of the development process, using systematic, measurable and repeatable processes. A performance enhancement strategy should include:

- Defined performance or service level requirements, e.g. a 50,000 record collection file should be processed within 20 minutes.
- A Load Test Environment – create a testing environment in which:
    - The collection submission process can be tested end to end.
    - Production type loads can be simulated.
    - Enhancements options can be tested for effectiveness.
- A Test Strategy – develop a performance test plan that contains repeatable and measurable test cases.
- Identification of components of the overall collection submission process that may be contributing to performance issues:
    - Network:
        - File Submission Over the Internet – Are there communication issues between school districts and CDE. How long is it taking to submit large files over the internet?
        - Firewall and DMZ - Network communications between the DMZ and internal systems can frequently be bottlenecks. In the case of ADE, communication between the ADE Web Server and the ADE Database Server may be affected by this.
        - Between internal CDE servers.
        - Between CDE servers and SAN devices.

  - ADE Web Server – is it CPU, I/O or Memory bound?
  - ADE Database Server – is it CPU, I/O or Memory bound?
- Metrics – define and collect metrics of actual production performance.
- Tools – implement/use tools that can help identify:
  - Processing times and bottlenecks.
  - Memory and CPU usage.
  - I/O performance.
  - Database access and query performance.
  - Network performance issues.
- Determine cost effective performance enhancements methods. Sometimes the simplest and most cost effective method is simply to add more hardware.

A high level review of the Data Collections architecture indicates the following as the most likely candidates of causes for performance issues:

- **ADE Database**: the ADE database may be I/O or process bound. It is not possible to discuss the myriad of tuning tools and techniques available in an Oracle/Unix environment in this document. However, some major areas to consider should include:
  - Is the archive log destination filling up? Are objects getting close to their max extents? Are table spaces running low on free space? Are Objects unable to extend. Are User and process limits being reached?
  - Application Tuning: Experience shows that approximately 80% of all Oracle system performance problems are resolved by coding optimal SQL. Explain Plan and Trace are excellent tools to help with this process.
  - Memory Tuning: Properly size database buffers (shared pool, buffer cache, log buffer, etc) by looking at buffer hit ratios. Pin large objects into memory to prevent frequent reloads.
  - Disk I/O Tuning: Database files need to be properly sized and placed to provide maximum disk subsystem throughput. Look for frequent disk sorts, full table scans, missing indexes, row chaining, data fragmentation, etc.
  - Eliminate Database Contention: Look for database locks, latches and wait events, and eliminate where possible.
  - Some tools to consider would include:
  - Autotrace and TKProf – traces statistics on query I/O, CPU and memory usage.
  - UTLBSTAT.SQL and UTLESTAT.SQL - Begin and end stats monitoring
  - Statspack - a set of performance monitoring and reporting utilities provided by Oracle from Oracle8i and above.
  - Oracle Enterprise Manager – comprehensive tuning package.
- **ADE Web Server**: all the processing of submitted collection files is performed on this server, most of it written in Perl. Various tools are available for measuring and identifying performance issues in a Web environment. The first step is to identify if the server processes are in fact the problem:
  - Monitor I/O performance, CPU and Memory usage:
    - Are processes constantly waiting on I/O to complete?
    - Is the CPU pegged?
    - Is there a lot of page swapping?
    - Which processes take the longest?
  - Consider load balancing and parallel processing:
    - Are the right mix and number of server processes available?
    - Would additional CPUs or memory improve performance?

IMS Plans

IMS currently has plans in progress to implement Oracle 10g (currently using 9i). This will include implementing Grid Control, an extremely useful performance testing and tuning tool that can trace and monitor a process's

resource usage (CPU, Memory, I/O) from end to end. Using this tool to trace the resources usage of the various processes from reading in the collection file, running all the edits and validation, through to inserting the data into the Education Database will be extremely helpful in identifying problem areas and determining the appropriate fix.

Scalability
Under advice from Oracle and other server and database experts, IMS is choosing the non RAC version of Oracle 10g. RAC provides the ability to create a single database across multiple servers or a server cluster. This is a much more scalable option, providing the ability to add additional servers to process database access requests. IMS may wish to reconsider this choice once some of the performance testing has been performed. If specific correctable tuning issues are not identified, adding more servers may be the only choice. Given IMS plans to sharply increase the use and number of users of the Education Data Warehouse, RAC would be more suited to the data warehouse environment. In addition, recommendations made later in this document, if implemented, will increase the load on the EDW.

The Perl based ADE system is scalable in the sense that faster, more powerful hardware could be added, allowing more files to be processed at the same time at a faster rate. However, the architecture of the application itself is not scalable. No matter how much hardware is put into place, in the end, an individual collection file must be processed sequentially, record by record. If it takes 12 hours to process a single large file, while no other files are being processed, then no matter how much hardware is used, this time period will not be greatly affected. The introduction of message processing middleware would provide the ability to process large amounts of data in parallel. However, this is not a short term option and is discussed in the Interim and Long Term recommendations sections.

Resources
Some of the tasks described in this section will require the short term use of specialist technical resources that do not currently exist in IMS. Hence, some aspects of these recommendations may fall within the Interim category. Additional technical resources required would include:

- Oracle Database Tuning Specialist

3.1.2 Submit Changes Only

Many of the larger districts have requested the ability to submit changes only, especially for the larger collections. This changes only approach could be addressed at multiple levels:

- After a collection is submitted and an error report generated. Only those records in error need to be re-submitted.
- Allow districts to submit collection files that contain only records of information that have changed since the last collection window.
- Allow districts to submit records that contain only data that has changed for any given record, e.g. constant data that has not changed need not be re-submitted, like a student's gender.

The possible complexities in achieving this type of approach should not be understated. Many collection submission files have complex inter-relationships and between different records and fields in the same submission. Processes developed for this would have to take into account these interdependencies and complexities.

3.1.3 Error Reporting

The ADE currently reports data collection errors back to districts in an online report made available via the Web. Many districts have made requests for changes to these error reports that would greatly improve their ability to process and correct errors:

- Make the errors available in a structured file, delimited, fixed length, etc. The file should contain the SASID and/or Record ID along with the error code.
- Provide an error table that contains each error code and a description of the error.
- Put warnings in a separate report or file.
- Provide the ability for districts to set error limit cutoff points. Let districts set a number of errors, that once reached, stops file processing and error reports/files are generated. It is a common occurrence, that a data file contains the same error for all or most records (incorrect format or element value). Having the ability to stop processing the file quickly, once this type of situation has been identified, would greatly reduce processing times on files that are never going to pass.

The details of what the structured error file should look like should be determined through discussions with the districts. Many smaller districts will continue to want to use the report or both.

3.1.4 Student Identification

CDE took a large step in the right direction in developing the RITS system to help uniquely identify students in the state and assign them an ID (SASID) in 2002. However, there continues to be problems with duplicate student records, the same SASID given to more than one student (due to similar names), the same student given more than one SASIS, and difficulties determining whether a student identified in one district is the same as a student identified in another.

RITS includes systems that help in the research of issues such as those above, but a core of the problem is in how students are identified as unique. RITS uses locators to uniquely identify a student. Students with the same locators would be identified as the same student. At this time the locators are (all mandatory):

- First Name
- Last Name
- Middle Name
- DOB
- Gender

Districts indicated that these locators are not enough to uniquely identify a student within districts, or even schools, hence they use additional information to identify their students, but are unable to use this additional information when reporting students to CDE. A review of these locators and identification of additional locators, such as parent's name, address, or biographical data would greatly enhance the accuracy of RITS.

CDE has worked with districts and should continue to work with them to determine the most appropriate locators, which would be mandatory, and which optional. Most districts are already collecting other student identity information which may be very useful in uniquely identifying students state wide.

3.2 Interim Recommendations

3.2.1 Overview

Performance issues with processing large collections were discussed earlier. The short term approach was essentially to identify major bottlenecks and make minor changes or add hardware to alleviate them. Another method would be to change the way in which files are processed. Individual collection submission file are currently processed sequentially, one record at a time. As discussed earlier, this approach is not scalable, if all tuning options have been implemented and the file still takes 6 hours to process there is nothing that can be done.

One solution would be to process multiple records within a file simultaneously, rather than sequentially. This type of processing is commonly achieved using Messaging Middleware. Messaging Middleware provides methods by which processes can communicate with each other asynchronously via queues. A commonly used messaging

middleware is Java Messaging Service (JMS). JMS is not an application, rather an industry specification that has been implemented in Java by many vendors. The success of this approach is dependent upon ensuring other bottleneck areas have been addressed. If the database is I/O bound, processing more input records simultaneously would create more issues within the database. Hence, implementing parallel processing depends on successfully addressing performance issues identified in section 3.1.1 Performance Enhancements.

3.2.2 Parallel Processing

Figure 3-1 Parallel Processing illustrates how messaging middleware can be used to process many records from a collection file simultaneously:

- Data Collection files are submitted by districts and stored by the CDE as usual.
- A process is developed using messaging middleware that reads records from the collection file and writes the record into queues, distributing them across multiple queues.
- Multiple instances of collection processes process multiple data records in parallel. These would be much like the existing ADE collection file edit and validation processes described in **'Volume 2 – The Current State'** except they would read collection records from queues using messaging middleware rather than files.
- The instances of the processes could all be running on one server or distributed across multiple servers. The number of instances can be tuned to get the performance results desired. The instances are managed via tools found in typical Web Server container software.

The messaging middleware described here is the same as that discussed in section 3.3 Long Term, where the use of messaging middleware is an integral part of the long term recommendations. Hence, much of what is developed for this interim solution would be re-usable for the long term option.

Another alternative would simply be to have a pre-process that breaks large files into several smaller files. The smaller files are then processed as normal, but in parallel. This would be a kind of in-house developed messaging middleware.

Implementation of such an approach may require the addition of more processors or servers. Analysis of server processor utilization as described in section 3.1.1 Performance Enhancements will determine this.

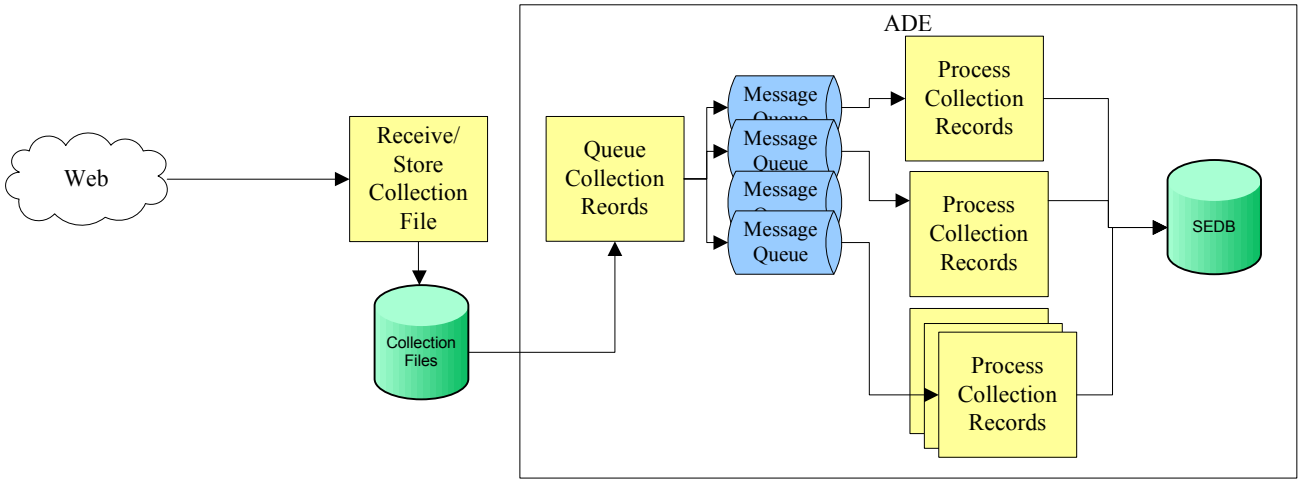

Figure 3-1 Parallel Processing

3.2.3 Tools

The most frequent issues raised during research and interviews with school districts, CDE units and other groups, were communication based. These are discussed in detail in other sections of this document, but most seem to fall into the following categories:

- Lack of communication between groups within the same organization:
  - Between units with the CDE
  - Between departments within schools districts
- Difficulty in identifying the correct person or group responsible for a given activity, project, collection, etc.
- Difficulty in locating information on collections
  - Schedule
  - Format
  - Content
  - Business Rules
  - What has changed
- Lack of communication between different organizations
- Lack of timeliness and accuracy of information

All of the above presented varying degrees of concern and difficulty to districts. Any single category is not meant as an indication of total breakdown of communications in the category, rather an opportunity for improvement and automation.

These issues must be addressed through process and organization, discussed elsewhere in this document. However, there are tools available that help address many of these issues through technology. These collaboration tools provide functionality that support the sharing of information, and closing communication gaps.

Implementing such systems at the CDE and districts would help solve many communications issues through automation. Such a system should include the following functionality:

- Hold a repository of many types of information in many formats, documents, spreadsheets, schedules, web pages, images, diagrams, data dictionaries, etc.
- Ability to share information in the repository over the web with defined sets of users and groups, with definable access rights.
- Ability to define individuals and multi-structured organizations, and associate them with objects of interest; collections, schedules, training, legislation, etc.
- Ability to identify and highlight additions and changes to information, and notify interested individuals and groups.
- Ability to publish information contained in the repository to web sites.
- Provide individuals and groups with the ability to collaborate on the development of material stored in the repository:
  - Define who has what type of access, add, change, view, etc.
  - Allow simultaneous access and updates to information by multiple users and groups. Tracking who made what changes, when, and notifying members of the group of those changes.
- Ability to store multiple versions of objects in the repository, and the ability to role back to previous versions.

3.3 Long Term Recommendations

3.3.1 Data Sharing and Reporting Paradigm

The data collection systems developed by CDE and consequently, the school districts, are “collection driven”. Legislation has identified collections of data that must be reported to stakeholders. The systems developed are a

direct response to the one-off data collection legislation that has accumulated over time, and the architecture and flow of the resulting systems are "collection driven":

- Data Collections are defined based on what must be reported to the stakeholder:
- School Districts are asked to collect and submit the data within a given time window.
- The CDE processes and validates data collections submitted by districts.
- The CDE generates reports from the data collected and distributes these reports to the stakeholders.

Figure 3-2 Current Collection Process, shown below, illustrates how the architecture of the CDE and districts systems has been driven by the collection process. This has resulted in a number of issues:

- Districts must allocate large amounts of resources, people and systems to the collections process. Diverting resources that might otherwise be used for normal district operations and education.
- Districts must put together a large number of different collections through out the year.
- Districts indicated that collection time windows force them to cut corners and submit inaccurate data.
- CDE is constantly under pressure to meet frequently unrealistic time constraints to support new and changing collections. This often results in even smaller time windows in which districts are forced to submit collection data. There is new legislation requiring CDE to freeze collection requirements 90 in advance of a collection window, but the effectiveness of this new requirement as not been determined yet.
- The data collected is necessarily tightly coupled with the original legislative reporting requirements, and frequently not usable for other purposes.
- Data collection effort and resources must be applied over a small window both in the districts and CDE. The resulting systems must support large processing capacity during collection windows, but then sit almost idle at other times.
- The rules regarding the interpretation of data, usually those required by other external entities such as the federal government, are forced onto the school districts. Forcing the district to either, operate according to these rules, or manipulate their data that is taken from their operational system to conform to these rules. Typically districts end up doing a combination of both.
- Collections are constantly changing and new collections being added.

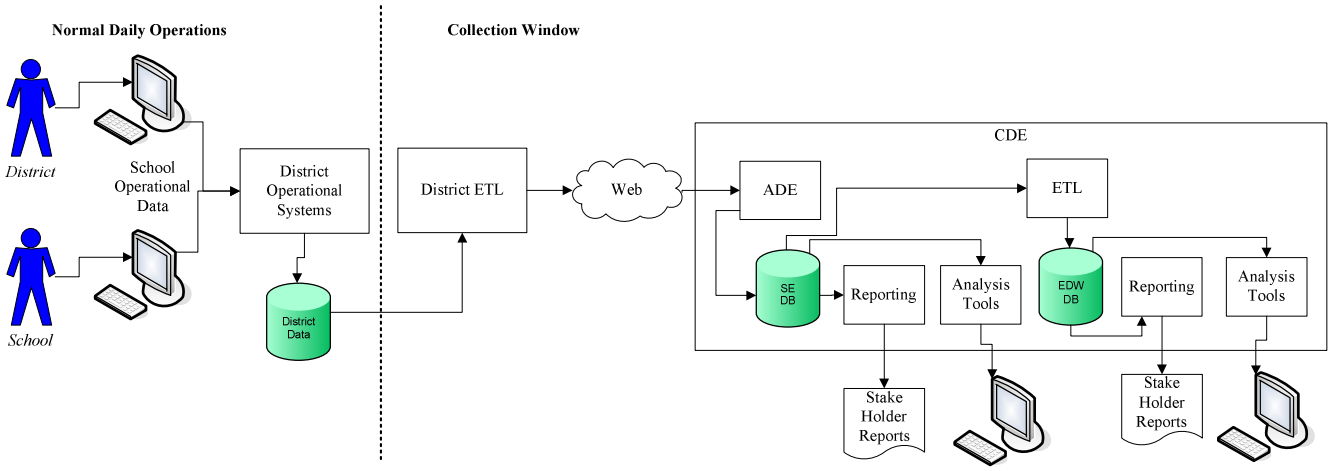

Figure 3-2 Current Collection Process

An alternative would be to approach data collections from a Data Sharing and Reporting paradigm, breaking the current tight coupling between the collection of data, and reporting that collection.

Figure 3-3 Data Sharing Paradigm illustrates an alternative approach by which school districts share their data with the CDE simply as a result of the normal operation of their district:

- Uses an architecture that allows districts to automatically submit data to the CDE as they are entering it into their own operational systems.
- The CDE stores the district data in a transactional database in real-time.
- The CDE continues to use the Education Data Warehouse and data analysis tools to perform data analyses, generate reports and make data available to stakeholders.

The data sharing approach does not replace organization and process. Procedures must still be set in place by which data becomes formal and approved by districts for use by CDE for official reporting purposes.

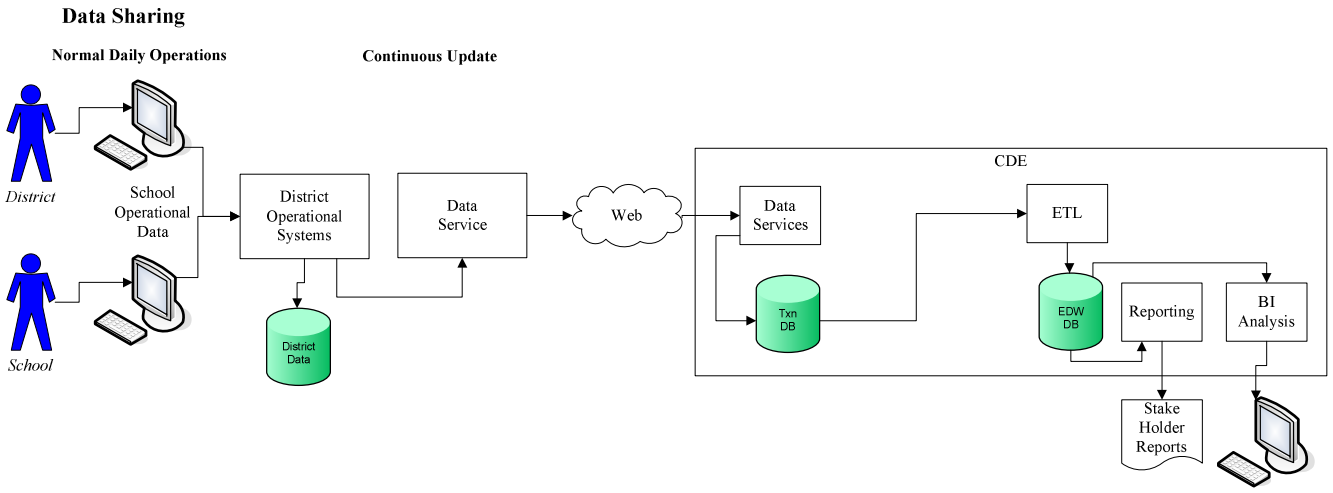

Figure 3-3 Data Sharing Paradigm

The advantages the data sharing approach are many:

- The entire concept of a collection window goes away. School districts supply data to the CDE as a result of performing their normal daily operations. Dedicating people and resources to data collection is no longer required.
- Data arrives at the CDE at a steady rate meaning the CDE does not need to build systems that must support huge volumes of data for short windows and be idle at other times.
- There will only be a few types of "data message" (discussed later) defined, as apposed the hundreds of collections. These "data messages" would have far fewer changes over time. A data message would be a bundle of data transmitted to the CDE, and would be associated with an entity, e.g. a message might be defined that contains all student data, and might be based on the School Interoperability Framework (SIF) (discussed later).
- Changes would only be required if legislation required new data elements to be provided by school districts that they do not currently collect as part of their normal operation.
- The interpretation of data and how it is reported is managed almost entirely within the CDE. Hence, rules, that don't conform to how districts operate, are moved out of the districts and into the data analysis and reporting process.

The details behind these advantages are covered later.

3.3.2 Enterprise Data Analysis

The first step in the data sharing approach is understanding the data that is available, a process sometimes called enterprise data analysis. Before any technical implementation of data sharing can be completed, the CDE, with the

cooperation of the districts, other program units, and stakeholders, must perform an analysis of all the data currently being collected and other data that might be available. The intent of this analysis is to:

- Define standards:
  - Format
  - Naming conventions
- Identify every data element and have consensus of what it means and its valid values.
- Place data elements into logical groups or objects. Currently data is associated with collections but these are artificial groupings created by legislation. Logical groups would revolve around real world objects like Districts, Schools and Students.
- Define Messages – logical groups of data elements that will be sent in the form of messages from districts to the CDE via the Web. These may be similar to the groups described above. A message may contain multiple logical groups. XML has become the global standard for this type of message, a message definition may consists of:
  - The data elements it contains.
  - The format of the data elements.
  - Edit and validation rules of the data.
  - Format and encoding of the message.
  - Encryption and other security measures.

School Interoperability Framework

The School Interoperability Framework (SIF) is a set of messaging standards and guidelines, developed by the School Interoperability Framework Association, specifically for the purpose of sharing school operational data between systems and organizations. These standards are an excellent starting point for the development and definition of messages. The SIF website, http://www.sifinfo.org/ is a tremendous resource for any educational organization embarking on such a process.

Databases

This analysis will also have effect on existing databases and define new ones:

- Transactional Database – this will be a new database that will be used to store raw transactional data transmitted by school districts. The schema for this database will be a direct reflection of the logical grouping of data performed during the analysis process.
- Education Data Warehouse – will become the primary source of data for reporting and analysis, and will likely undergo some degree of schema change and conversion.
- State Education Database – will eventually be replaced by the Transactional Database and the Education Data Warehouse.

More details of the effects of the data sharing approach on databases are discussed in section 3.3.4 Databases.

Involvement / Consensus

Success in this endeavor requires the involvement of all parties concerned, Districts, CDE, the State, other stakeholders, etc. There must be consensus and agreement on the definition and meaning of data shared, as well as how that data may later be interpreted. This is no different than the situation today.

Granularity / Placeholders

An extremely important part of the data analysis process is to determine the right degree of granularity of data being collected. The flexibility of the questions that can be asked of data is directly related to the degree of granularity of the data available. Granularity also provides the ability to push more interpretation to reporting and analysis and out of the data, e.g. collecting a data element that defined what cohort a student is in would put the definition of a student cohort in the data, collecting lots of data elements that may be used to determine a cohort (DOB, Grade, Date 1st Enrolled, etc), allows the definition of cohort to be changed without changing the data collected.

Message definitions should also take future requirements into consideration. The definition should include data elements that are not currently needed or used but may be in the future.

IMS Data Dictionary
IMS has completed an important first step in this process, in developing a Data Dictionary. The Data Dictionary developed by IMS is a repository of all the data elements collected by CDE across all data collections. The dictionary is currently collection oriented and CDE would still need to go through the enterprise data analysis process described above.

3.3.3 Data Sharing

Figure 3-4 Data Sharing Process is a generic illustration of how data from a district's Student Information System (SIS) could be transmitted via the Web to CDE. There are many mechanisms through which this might be achieved, most of which are generically called Service Oriented Architecture (SOA) and/or Messaging Middleware. In this case:

- The district and schools update student records using their own SIS. Typically provided by a vendor.
- At the time the SIS updates the student data in the district systems, a message containing the student data is generated and sent to the CDE via the Web. Messages may also be sent on some periodic basis, every 15 minutes, once a day, etc. Most SIS systems include a messaging interface and support SIF to various degrees. This message could be generated in a number of ways, common options would include:
  - Sent as an XML string via HTTPS.
  - Sent by calling a Web Service deployed by the CDE.
- The student message is received by CDE systems, processed and stored in the Transaction Database. While processing the message, CDE systems may, perform edits and validation and send reply messages. There are excellent tools available (especially in Java), that transform XML messages into Java objects, perform edits and validation (built right into the message definition), and insert the message data into databases.

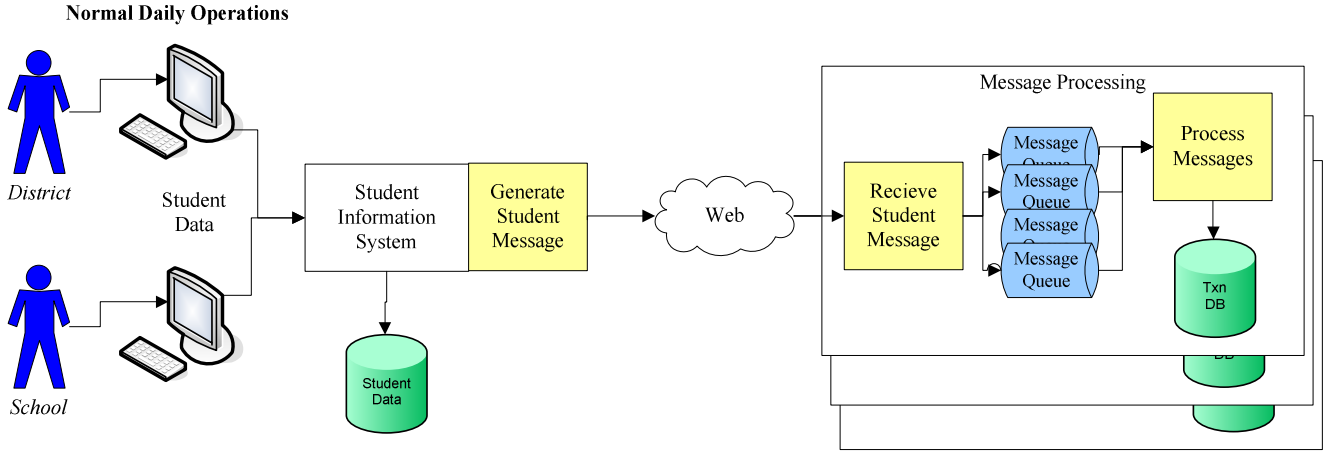

Figure 3-4 Data Sharing Process

The illustration also shows how this approach is scalable. In this instance, it shows the use of Messaging Middleware to distribute inbound messages across multiple processes, allowing multiple messages to be processed in parallel. Higher message throughput can be established by adding more message processors, on additional servers if necessary. JMS (Java Message Service) is built into most Web Servers and could be used for this process.

3.3.4 Databases

Currently, stake holder reports and data analysis are produced from both the State Education Database (SEDB) and the Education Data Warehouse. The data sharing approach puts even greater importance on the Education Data Warehouse (EDW). It will become the primary mechanism for the reporting and analysis of data. The SEDB would eventually be phased out as reporting functions using it are moved to the EDW. The SEDB would need to be archived or kept available in some fashion for historical research and analysis purposes.

The Transaction Database will need to be defined, and processes developed to load data, contained in messages sent by the districts, into it. The Transaction Database schema should be a direct reflection of the messages defined during the Enterprise Data Analysis phase (see section 3.3.2). The closer this schema is in structure to the messages, the quicker and easier it will be to load the message data into it.

The EDW will need to undergo a transformation:

- A new schema will need to be developed, or the existing schema modified, that is more reflective of the data sharing approach (see section 3.3.2 Enterprise Data Analysis earlier). The degree of change required will depend on how tightly coupled the existing schema is the collections and existing SEDB. The time constraints of this project did not allow the detailed analysis necessary to determine the scope of this effort.
- New ETL processes would have to be developed to source the data from the Transaction Database rather than the SEDB. This could be done with the existing tool set (Informatica).
- Conversion:
    - Existing data contained in the EDW would need to undergo a conversion and loaded from the existing schema into the new one. Again existing ETL tools could be used for this purpose.
    - This conversion may also involve data contained in the SEDB. Not all the data contained in the SEDB is currently loaded into the EDW. An analysis would have to be performed to determine what of the remaining data would need to be loaded into the EDW. IMS is doing this as an ongoing project and is constantly adding more data from the SEDB to the EDW.
- Data Marts: will be affected in two ways:
    - The source of data for the Data Marts is the EDW. As it is changing, it is likely that the Data Marts will also require change.
    - New data marts will need to be developed to support additional reporting requirements, as reports currently sourced from the SEDB are moved to the EDW.

3.3.5 Data Analysis and Reporting

As stated earlier, under this model, very little reporting would be done from the transactional database. At a minimum, school districts should have access to this data for the purposes of accuracy confirmation.

Data analysis and reporting would be provided via the Education Data Warehouse (EDW), and various data analysis and reporting tools. Much as it is done today, except:

- Some stakeholder data analysis and reports are generated from the State Education Database, these would be moved to the EDW.
- The underlying schema of the EDW and Data Marts will have changed, hence existing reports would need to be modified to use the new schemas.

Data Usability

The EDW is “report driven”. Its schema, data marts, and reports are centered around the production of state and federal reports. It also contains the flexibility to meet many ad-hoc reporting needs. It has enormous potential for many uses, including providing districts and other stakeholders with valuable decision support and operational data. A huge amount of data is collected and stored in the EDW. CDE has provided school districts, CDE units, and other

stakeholders with the ability to access the EDW data via a system called CEDAR. However, interviews and surveys of school districts (the primary contributors of the data), indicated that the districts are under utilizing its potential. Actual logon rates and specific report access rates are shown in **Appendix B: CEDAR Logon and Access Rates.** There are several reasons given for this:

- Inadequate training and understanding of the data and how to access it.
- Data is not available at the right degree of granularity or detail.
- Districts cannot access other district data for comparison purposes, or at least not at the levels of detail or for categories of information they wish to use.
- Interpretation – many districts indicted that reports generated via CEDAR provide interpretations of the data that do not conform to the districts view of the data's meaning.
- Districts find they cannot use the data for longitudinal analysis. Most districts indicated they use other external vendors to perform this type of analysis on their data.

A situation exists to more effectively use the enormous amount of data collected in the EDW, and make that data useful and available to a much wider audience. The first step involves the cooperation and involvement of the school districts and other interested stakeholders. An output of the processes described in section 3.1.2 Enterprise Data Analysis should be a detailed understanding of the ways in which schools districts would like to be able access, analyze and use the data contained in the EDW. The information gained from this process should be used as feedback into the design of the EDW schema, data marts and data analysis tools.

IMS has projects planned to provide far greater, and more flexible access to EDW to the districts. The project involves the acquisition of more access licenses and the development more sophisticated analysis tools. However, this project must involve a great deal of analysis on what it is the districts actually want before embarking on providing the technical capabilities to access the data.

3.3.6 Technical Capabilities

A review of the existing technical capabilities of the IMS staff has revealed a highly competent group with a broad range of skills and the flexibility to develop new ones.

The IMS staff responsible for collections are essentially divided into 2 groups:

- Input Group – those dedicated to the process of collecting data from the districts and other sources. They are responsible for systems like ADE, RITS and the State Education Database (SEDB).
- Output Group – those dedicated to the process of analyzing and reporting data to districts, stakeholders and other internal groups. They are responsible for systems like the Education Data Warehouse (EDW), Federal and other stakeholder reports, like SARS, and CEDAR.

Input Group

This group's skill sets include:

- Web application development.
- Perl
- Java
- Oracle
- Relational Data Modeling
- Data Analysis

These skills are readily transferable into the data sharing type architecture discussed in this section.

Output Group

This group's skill sets include:

- Web application development.
- Cognos/Business Intelligence
- Oracle
- Data Analysis
- ETL
- Dimensional Data Modeling

The need for this skill set would continue on, and would in fact, become even more important as the EDW undergoes transformation, and becomes the primary source for data analysis and reporting. However, the current staff have mostly technical backgrounds. For this method to be successful, resources with a strong background in education data and business analysis skills will be required.

Staffing Levels

The IMS unit is already facing resource constraints, and it is clear they do not currently have the resources required to address such a project. While the approach described in this section will greatly reduce the resource requirements of the schools districts, it will result in a net increase in resources needed within IMS and possibly other units. Specifically the addition of two types of resources to IMS would greatly enhance their ability to deliver relevant, durable and quality systems:

- Enterprise Architect – this person would be responsible for the "Big Picture", the overall architecture of systems developed within IMS. They would ensure that these systems not only meet the needs of IMS's customers, but that they also are well integrated and cohesive, both within IMS and with their customers.
- Data/Business Analysts – as discussed in section 3.3.2 Enterprise Data Analysis, a major key to the success of IMS systems, both in the short and long term, will depend on their ability to understand educational data, collect it and make it available to stakeholders. These positions would be responsible for working with IMS, CDE units, stakeholders and schools districts to understand and analyze their data requirements, capabilities, and issues, and act as a bridge between IMS technical staff and those who manage the business of education. More details of the types of tasks a Data/Business Analysts would perform can be found in section **3.3.2 Enterprise Data Analysis.**

3.3.7 Evolving Process

Data sharing will substantially reduce the load on school districts, and, if done right, substantially reduce both the impact of, and amount of change. However, regardless of the approach taken, collection driven or data sharing, the key to success is people, process and organization.

The technical options discussed in this section cannot be taken or implemented in isolation of the broader people, process and organization recommendations made in other sections.

3.3.8 Solution Flexibility

School districts in Colorado range enormously in size, student population, and technical capability. As with the current data collection process, one size does not fit all.

Most medium to large sized (student count) school districts have vendor provided Student Information and other systems, that either currently support the data sharing concept or could be modified to support it. These districts also have the technical resources to implement and support such changes.

There are also many school districts that operate with very basic technical capabilities (those that fall into the Low Automation category described in the Current State **('Appendix D – The Current State).** For this option to work,

other simpler alternatives must be offered to these districts. One option would be to provide these districts with Excel templates that correspond to the messages described earlier. This is very similar to options currently provided by the CDE for some collections, and corresponds with what many of the smaller school districts already do.

Figure 3-5 Low Tech Excel Approach illustrates a low tech option for smaller districts:

- CDE provides the districts with a set of Excel templates that would be closely related to the messages defined earlier. In this case Student Data. . Messages would usually be kept in a repository and maintained with automated tools. The spreadsheets and the processes to manage them could be generated from the message definitions themselves, reducing the effort needed to maintain two approaches,
- On some periodic basis (weekly, monthly):
    - The district either manually fills in the spreadsheet or develops basic processes to extract data from their own systems to populate the spreadsheet.
    - The spreadsheet is sent to the CDE via the Web, a process already supported.
    - The CDE puts the spreadsheet through a pre-process that converts the data in the spreadsheet to the standard message format used by other districts.
    - The message is then processed like any other message received from a high automation district.

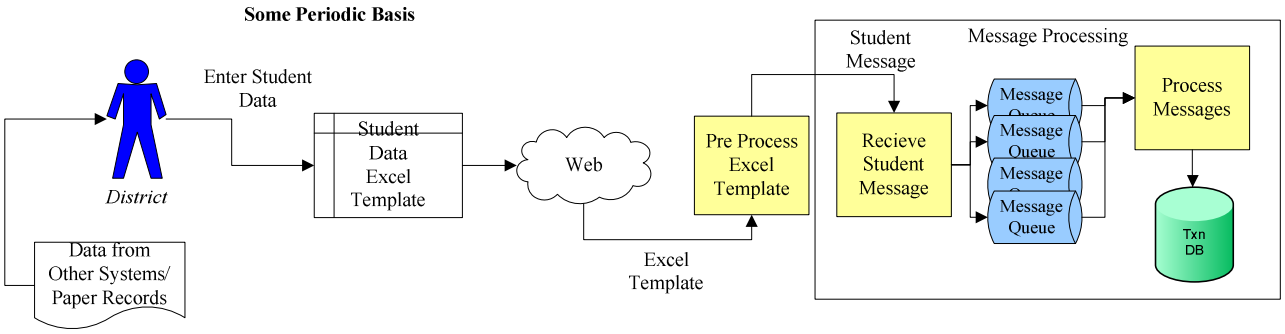

Figure 3-5 Low Tech Excel Approach

3.3.9 Phased Approach

The adoption of data sharing should be approached in phases. The existing collection driven system and data sharing could operate in parallel.

The first phase should address student data, as this accounts for the bulk of data collected, and is associated with the largest and most difficult collections (as defined by the districts), October Count, EOY, etc. Most Student Information Systems come with this data sharing/messaging capability, making it likely to be the simplest to implement by the districts.

During this phase, collections that contain strictly student data would be phased out and replaced by data sharing. There are collections that contain a mix of student and other data, the student data could be removed from these collections and replaced by data obtained from data sharing.

Operating two different systems at the same time raises issues of complexity and resources, requiring additional resources while the transition takes place.

3.3.10 Vendors

There are many options for implementing the technology needed for the data sharing concept. Much of it is technology the CDE is already using, particularly on the data warehouse side. Much of the systems and technology has already been developed by vendors, some may need to be developed in-house.

CDE should communicate with the vendors the districts are using to determine what options are available, and gain vendor insight into the details of how such systems could be developed and deployed. Much of what has been discussed in this section has already been developed by vendors.

This document will remain vendor agnostic, hence no specific vendors will be mentioned. However, in general, the following types of vendors should be approached:

- SIS Vendors – for student information, many have developed most, if not all of the data sharing approach described in this section.
- SOA/Middleware Vendors – these vendors provide systems that are the backbone upon which the data sharing systems could be built:
    - Web Services
    - Messaging Middleware
    - XML message definition and management
- Data Dictionary Vendors:
    - Analysis tools
    - Repositories
    - XML message definition and management

Appendices

Appendix A: Approach Details

The data sources we utilized in our research are as follows:

- Interviews w/School Districts
- Online survey
- Interviews w/CDE staff
- CDE technical documentation
- CDE data collection related documentation
- Current State document
- Student Information System vendor interviews
- Interviews with other states and industry experts

School District Survey and Interview Summary

The evaluation team interviewed via phone or in person 30 school districts and received online responses back from an additional 60 school districts. Of the 60, 50 completed the survey in its entirety. The interviews and surveys focused on four areas of data collection: communications, submissions, technology, and reporting.

Communications

The communication questions were broken down into four separate areas. The first concerns communications from CDE to the school districts regarding new collections or updates to current collections. The second concerns training for collection efforts. The other two are related to documentation and support during a collection window.

Collection Related Communications

Based on the survey results, 100% of districts receive collection related information via email. Districts also learn about collection information via conferences, workshops, committees such as the Financial Policies and Planning committee, and education related organizations such as the Colorado Student Information System User's Group. Whereas there are sometimes presentations related to collections during these meetings, most of the information is spread via word of mouth.

The respondents agreed for the most part that the emails are effective, timely, and relevant although not always clear. Most of the respondents felt that they were getting the right amount of emails regarding a collection.

Problems reported regarding the email communication varied. In some cases, no emails were received regarding a collection until shortly before the collection started. Sometimes, they are getting duplicate emails that are being forwarded from various different departments and people. In other cases, due to the limit of one district point of contact per collection, certain information regarding a large collection was not known prior to a collection. For example if there is a special education requirement for the October Count collection, the special education point of contact may not think to share that information with the person responsible for October Count. The result is that the school district may have trouble meeting that data requirement during the collection.

Another problem reported is related to the timing of new data collection requirements. Often notification of new requirements comes too late for a district to adequately plan for and implement the new data collection processes and technology. For example, in larger districts, it can take up to a year to implement a new data element. The student information system must be updated, which requires requirements analysis, programming by the staff or the vendor, and testing before implementation. The schools and data entry people must be trained regarding the new

information needed and the information must then be collected for more than 10,000 students. At smaller districts, the systems and processes must still be updated and the data collected, but the volume of students is lower, so the collection phase is shorter. At the smaller school districts, they often do not have the resources or the resources have multiple other job duties and do not have the spare time to implement the changes.

50% or less of the respondents understood the basis for why the data or collection was being requested. There is the feeling that the reason "because it was legislated" is not sufficient. One district mentioned that they would like to have the legislation attached along with the rational behind how each data element satisfies the legislation.

Only 7% of the districts reported that they are involved in the gathering of requirements for collections. Most of the involvement is related to the Financial Policies and Procedures committee or EDAC. There is a general desire to be involved in the requirements process, but the concern is that they usually do not have enough staff to handle the data collection process now, and there fore would not have the bandwidth to be involved in the requirements process. This sentiment is particularly strong at the smaller districts.

Training
From the survey, 67.9% of respondents are satisfied or somewhat satisfied with the training and training materials given by CDE for collections. Some respondents are content with the training and materials given by CDE. Others have expressed issues and they tend to vary by collection. Some feel that the timing of the training could be improved. It may conflict with busy times such as the beginning of the school year. Others feel the timing is fine but some feel it is too late in relation to the collection period. Training location is also an issue for many of the rural districts. It is often difficult for them to reach a training location, or the time it takes to get there has a greater impact on the other jobs they also have to do at the district. One desire expressed by some of the respondents was for more on-line training to cut down on travel. Another issue expressed was that the level of the training should be directed to the experience level of the audience. Many respondents expressed the need for comprehensive new-user training. They felt the current training assumed a certain knowledge level of CDE data collection processes that a new user would not know. Several new superintendents also desired additional training surrounding data collection as part of new superintendent training.

Documentation
In the survey, the majority of the respondents were satisfied with the documentation, but a common request is that they would like to have changes or updates to collections be clearly annotated in the documentation. This would reduce the need to re-read a document in its entirety each time it is released and would help ensure that the changes are identified and implemented.

Support during windows
92.9% of the respondents receive support during a collection window by phone. 82.1% also use email to receive support. Other means of support that districts rely on are the CDE Website, FAQ documents, and other districts.

The districts have expressed confidence in the CDE personnel that they deal with for support. They feel they are genuine in their desire to help and very patient with the districts. In general, they feel support has improved over time, especially in regards to End of Year.

The support function is not without problems. Districts have expressed frustration, especially with the End of Year collection support. They understand that the support personnel are overwhelmed, but are often unable to leave voice messages due to voice mail boxes being full. Emails are sometimes not responded to for weeks. Districts employ alternate methods to get their questions answered and problems resolved. Some districts have a network of other people within CDE and from other districts that they rely on to get answers to their questions.

Submissions

Submission questions on the survey related to how school districts collect their data from their schools, actual submission of data to CDE, problems related to that submission, and perceptions surrounding data collection.

How school districts collect data from their schools vary by the size of the school district. Small to medium sized districts have few schools or only one school. Therefore they only have one or two people handling enrollment and entering data into their student information system. At larger districts, each school may have one or two people handling enrollment.

94.3% of respondents verify the data collected from the schools in some way. The degree to which they verify the data varies. Some rely on the verification built into the ADE system. Others take proactive steps to ensure correctness.

In general, small districts usually have one or two people entering the student data and have a small enough student population that they can manually verify the data.

Some medium districts have the specialty teachers such as special education, ESL, or Title I, review a file of the specialty students in the system. In some cases they have them check the prior year's list to the current year's information. The medium sized districts are also proactive in training the primary data entry people such as the secretaries, registrars, counselors, administrators and teachers regarding the importance of data entry and the impact on the reporting and data collections. In some cases they disaggregate the data then send back down to the schools to verify.

In general, larger districts employ the techniques of the medium districts, but in some cases they have their own data warehouse in which they run queries against to identify bad data. The student information systems have some degree of validation build into them. Some have more built in logic than others.

Technology

The school districts in Colorado range enormously in size, student population, and technical capability. As with the current data collection process, one size does not fit all.

Most medium to large sized (student count) school districts, have vendor provided student information and other systems that either currently support the data sharing concept or could be modified to support it. These districts also have the technical resources to implement and support such changes.

The larger districts have dedicated student information systems and staff to accommodate data collection changes and technology improvements.

Reporting

There is a limited amount of CDE reporting that the school districts are using. These appear to be limited to the School Accountability Reports (SAR) and assessment data. The school districts are currently using their own data systems or external vendors for additional reporting or data analysis. The CEDAR system was used by very few districts and the feeling was it was not adequate for their needs.

CDE Interview Summary

IMS

Information and data was collected from IMS through a series of interviews and documentation of existing systems provide by IMS. IMS staff where found to be extremely cooperative and open during the various interviews and discussions, and providing documentation promptly when requested.

IMS staff where asked questions about the current systems, performance, organization and technical capabilities.

IMS staff where included in discussions about possible future recommendation and asked to provide input into future technology directions that might be taken.

Program Units

We gathered information from several of the program units involved with the larger data collections. These included Data and Research, School Finance, Assessment, Nutrition, and Special Education.

Vendor Summary

We talked to two of the largest student information system (SIS) vendors (GoEdu.com and Infinite Campus) in Colorado. There is currently limited or no direct communication with the school districts' SIS vendors. CDE has preferred to discuss data collection information with the school districts only.

Other States/Industry Summary

To determine best practices across the country regarding educational data collection, we talked to representatives from Florida and Illinois.

Appendix B: CEDAR Logon and Access Rates

April 2006 thru March 2007

Report name	Report Run Count
AY02 Student Level AYP	2160
CS04 Class Performance Over Academic Years	2080
CS03 Proficiency Level Over Academic Years	2021
CD02 Student Subject Performance Over Academic Years	1564
CD03 Student Subject Performance with Content and Sub content Area	1425
CD03 Student Subject Performance with Content and Sub content Area (Multiple Schools)	1313
CD04 Percentile Analysis of Students (Multiple Schools)	1298
CD02 Student Subject Performance Over Academic Years (Multiple Schools)	1003
CD04 Percentile Analysis of Students	949
WTI-010 - District Rank by Average Assessment	925
CS07 Comparison of Schools vs. District and State Averages	907
CD06 Student Summary Report	844
CSAP Matched Cohort District	755
CD06 Student Summary Report (Multiple Schools)	673
WTI-020 - District Proficient and Advanced	671
CS06 Comparing Districts By Year	550
WTI-030 - Weighted Index District by Subgroup	545
CS05 Comparing Districts By Proficiency Level Per Academic Year	488
CS03 Proficiency Level Over Academic Years2	469
WTI-070 Statewide Comparison	428
AY03 School Level AYP Determination	380
WTI-050 - District Proficient and Advanced (Short Version)	344
CS06 Comparing Districts by Year (Multiple Grades)	305
AY06 District Level AYP Trend	288
CS07 Comparison of Schools vs. District and State Averages2	269
AY04 School Level AYP Trend	267
AY05 District Level AYP Determination	263
AY07 AYP Searchable School Data	183
CS04 Class Performance Over Academic Years2	173
CS05 Comparing Districts By Proficiency Level Per Academic Year2	169
CS06 Comparing Districts By Year2	168
CD05 Subject Correlation Scatter Plot	154
WTI-120 - Weighted Index Region by Subgroup	153
CSAP Matched Cohort State	150
AY08 AYP Searchable District Data	130
Minority Achievement GAP - District	94
CD05 Subject Correlation Scatter Plot (Multiple Schools)	92
WTI-040 - Weighted Index State by Subgroup	87
Poverty Achievement GAP - District	81
WTI-040 - Weighted Index State by Subgroup	73

Jan 2007 thru Oct 2007

User name	Login Counts
Haley, Bernie - 3080 – Weld County RE-1 Gilcrest	102
Garcia, Reginalde - 9055 - SAN LUIS VALLEY BOCES	77
Dewayne, Chuck - 1550 - POUDRE R-1	65
Vannoy, Terri - 3100 - WINDSOR RE-4	63
Gann, Linda - 2180 - MONTROSE COUNTY RE-1J	62
Anderson, Laura - 2770 - STEAMBOAT SPRINGS RE-2	61
Kleiber, Larry - 3120 - GREELEY 6	60
Sanger,Nancy - 3130 – Platte Valley Re-7	58
Barnes, Larry - 1010 - COLORADO SPRINGS 11	55
Gray, David - 1390 – Huerfano Re-1	55
Flores, Susie - 0870 - DELTA COUNTY JOINT	50
Crow, Donald - 3210 - WRAY RD-2	47
May, Amy - 2620 – Holyoke Re-1J	47
Florian, Judy - 2405 - MORGAN COUNTY RE-3	46
Neel, Steven - 2515 – Wiggins RE-50J	46
Layland, Allison - 1570 - PARK(ESTES PARK)	46
Edgar, Kevin - 0560 –Sanford 6-J	45
Weber, Terry - 0310 - MC CLAVE RE-2	39
Kenney, Kelly - 1750 – Branson Re-82	39
Noyes, Kim - 1000 - FOUNTAIN 8	39
Villers, Lance - 0860 - CUSTER COUNTY C-1	37
Chesney, Greg - 1010 - COLORADO SPRINGS 11	34
Garcia, Marcella - 0580 - South Conejos RE-10	34
Oates, Nancy - 9000 - COLORADO DOE	33
Bankes, Paul - 1560 – Thompson R2J	32
Kohl, Peggy - 2190 - WEST END	31
Mahaney, Constance - 3090 - Keenesburg RE-3J	31
Atencio, Brenda - 2730 - DEL NORTE C-7	29
Goss, John - 2010 - CREEDE CONSOLIDATED 1	29
Gotto, Jeni - 2395 - BRUSH PUBLIC SCHOOLS RE-2J	28
Abromski, Jennie - 3090 - KEENESBURG RE-3J	27
Crews, David - 2840 - NORWOOD R2-JT	27
Bryant, Tom - 0890 - DOLORES COUNTY RE-2J	26
Archuleta, Carla - 0110 - SANGRE DE CRISTO RE-22J	25
Rheinberger, Cathy - 2600 - PLATTE CANYON 1	25
Eickhoff, Linda - 2800 - MOFFAT 2	24
Dowell, Art - 1760 – Kim 88	23
Keck, John - 2000 – Mesa 51	22
Evig, Dan - 2710 - MEEKER RIO BLANCO RE-1	22
Showalter, Heath - 1460 - HI-PLAINS R-23	21
Highland, Sue Ann - 3145 – Ault Highland RE-9	20
Liddle, Eddy - 1340 - WEST GRAND 1ST	20
Wetzler, Tracy - 0100 - ALAMOSA RE-11J	20
Mustoe, Keri - 2035 – Montezuma-Cortez Re-1	20

User name	Login Counts
Anderson, Randi - 0980 - HARRISON SCHOOL DISTRICT 2	19
Turner, Patti - 0140 – Littleton 6	19
Oden, Dirk - 2740 - MONTE VISTA C-8	19
Haynes, Linda - 1340 - WEST GRAND 1ST	19
Bryson, Tamis - 1540 - IGNACIO 11 JT	18
Smith, LeAnn - 3147 - PRAIRIE SCHOOL RE-41J	18
Cronk, Rose - 3070 - WOODLIN	17
Wilson, Fred - 3140 - WELD RE-8	17
Pfau, Doug - 1980 - DeBeque	17
Sheldrake, Lauren - 2010 - CREEDE CONSOLIDATED 1	17
DeGraw, Bev - 1530 - BAYFIELD 10 JT-R	17
Colebank, Will - 1000 - FOUNTAIN 8	16
Royer, Suzanne - 0990 - WIDEFIELD 3	16
Knowles, Julie - 1195 – Garfield Re-2	16
Kimmel, Joe - 3147 - PRAIRIE SCHOOL RE-41J	16
Hauke, Yvonne - 0030 – Adams 14	16
D'Amour, Jeri - 1050 – ELLICOTT 22	16
Graham, Diane - 2570 - SWINK 33	15
Jennings, Marion - 0540 - CLEAR CREEK RE-1	15
Kern, Sandra - 2580 - OURAY R-1	15
Murray, Linda - 3020 - WOODLAND PARK RE-2	15
Rodriguez, Dianna - 0100 - ALAMOSA RE-11J	15
McMillan, Ramona - 3030 – AKRON R-1	15
Gabbard, Gerald - 1590 – Primero RE-2	14
Gile, Anne - 0740 - SIERRA GRANDE R-30	14
Purkiss, Christine - 1360 - GUNNISON WATERSHED RE-1J	14
Knez, Marlene - 2020 – Moffat Re-1	13
Lightle, Nathan - 1860 - BUFFALO RE-4J	13
Robertson, Peggy - 0040 - 27J BRIGHTON	13
Eastin, Dave - 3230 - LIBERTY J-4	12
Edgar, Darren - 0740 - SIERRA GRANDE R-30	12
Ward, Elizabeth - 0930 - KIOWA C-2	12
Stumpf, Kyle - 1860 - BUFFALO RE-4J	12
Middleton, Bob - 0900 Douglas County Re-1	12
McGrew, Sheri - 1110 – Falcon 49	12
Hebberd, Kyle - 0230 - WALSH RE-1	12
Bissonette, Douglas - 2590 – Ridgway R-2	11
Deltonto, Rosi - 2700 - Pueblo County Rural 70	11
Cook, Deniece - 9035 - Centennial Boces	11
Stagner, Brady - 2790 – Mountain Valley Re-1	11
Hall, Caryn - 8001 – Charter School Institute	11
Dahl, Rik - 0940 – BIG SANDY 100J	10
Miller, Joseph - 0030 – Adams 14	10
Totten, Cathleen - 2770 - STEAMBOAT SPRINGS RE-2	10
Romine, Larry - 2660 - LAMAR RE-2	10
Matter, Kevin - 0130 - CHERRY CREEK 5	10
Dever, Nancy - 1180 - ROARING FORK RE-1	10

User name	Login Counts
Bandy, Shirelle - 1790 – LIMON RE-4J	9
Weidemueller, Robin - 1570 - PARK(ESTES PARK)	9
Tallman, Mary Jo - 0520 – Cheyenne Re-5	9
Skerjanec, Joseph - 1850 - FRENCHMAN RE-3	9
McMahon, Doreen - 1130 - MIAMIYODER JT-60	9
Engelker, Jim - 2865 - PLATTE VALLEY RE-3	9
Covelli, Fran - 2505 - WELDON VALLEY RE-20(J)	9
Brown, BJ - 2180 - MONTROSE COUNTY RE-1J	9
Cooper, Walt - 1020 – Cheyenne Mtn. 12	8
Gazaway, Gary - 2190 - WEST END	8
Gilbert, Dee - 0050 - BENNETT 29J	8
Zimbelman, Amy - 1420 - JEFFERSON COUNTY R-1	8
Wenzel, Cindy - 1040 - ACADEMY 20	8
Holmen, Randy - 1780 - GENOA-HUGO C-113	8
Anderson, Don - 1500 - BURLINGTON RE-6J	7
Boyce, Leslie - 1080 - Lewis-Palmer 38	7
Turrell, Tom - 0190 - BYERS 32J	7
Thormalen, Karen - 1380 - HINSDALE COUNTY RE 1	7
Thompson, Tami - 0500 – Salida R-32J	7
Smith, Chris - 1050 – Ellicott 22	7
Graham, Phillip - 3148 – Pawnee Re-12	7
Fulton, Cathi - 3146 - BRIGGSDALE	7
Brown, Carole - 1140 - CANON CITY	7
Bachicha, Olivia - 1580 - TRINIDAD 1	7
McGrane, Mary - 9035 – Centennial BOCES	6
Jones, Michele - 1600 - HOEHNE SCHOOL DISTRICT R3	6
Ivers, Rick - 0550 - NORTH CONEJOS RE-1J	6
Grasmick, Steven - 2540 - FOWLER R-4J	6
Vise, Robert - 2690 - PUEBLO CITY 60	6
Tecsi, Carrie - 2610 – PARK COUNTY RE-2	6
Fetzer, Rose Mary - 3030 – Akron R-1	6
Cooper, Lori - 2810 - CENTER 26 JT	5
Campbell, Beth - 1030 - MANITOU SPRINGS 14	5
Coulter, Garry - 1440 - PLAINVIEW RE-2	5
Cuckow, Scott - 0290 – Las Animas Re-1	5
Dings, Jonathan - 0480 - BOULDER VALLEY RE-2	5
Eaton, Carol - 1420 - JEFFERSON COUNTY R-1	5
Webb, Darryl - 2515 – WIGGINS RE-50J	5
Seidel, Cynthia - 9060-SOUTH CENTRAL BOCES	5
Reed, Kelly - 2780 - SOUTH ROUTT RE 3	5
Noll, Carol - 2520 - EAST OTERO R-1	5
Hoyt, Mike - 1520 – Durango 9R	5
Gellett, Lewis - 1410 – North Park R-1	5
Foster, Joel - 1480 – Stratton R-4	5
Esser, Jenni - 1060 - Peyton 23 Jt	5
Dellacroce, Paul - 0920 – Elizabeth C-1	5
Allen, Jeanette - 2070 - MANCOS RE-6	4

User name	Login Counts
Moser, Eric - 1480 – Stratton R-4	4
Seaney, Dave - 1400 - LA VETA RE-2	4
Revas, Sara - 1620 - AGUILAR REORGANIZED 6	4
Paul, Rachel - 1120 - EDISON 54 JT	4
White, Kim - 2820 - SILVERTON 1	4
Werner, Todd - 2535 - MANZANOLA 3J	4
Vendetti, Rhonda - 1150 - FLORENCE RE-2	4
Vandertook, Ed - 9030-MOUNTAIN BOCES	4
Thomas, David - 1010 - Colorado Springs 11	4
Muse, Bridgette - 3085 - EATON RE-2	4
McDowell, Verna - 2660 – Lamar RE-2	4
Haptonstall, Ken - 1220 – GARFIELD NO. 16	4
Baltierrez, Brenda - 0910 - EAGLE COUNTY	4
Escarcega, Lisa - 0180 - ADAMS-ARAPAHOE 28J	4
Dawson, J P - 0110 - SANGRE DE CRISTO RE-22J	4
Adams, Martin -1810 - KARVAL RE-23	3
Bond, Jo - 1130 - MIAMIYODER 60JT	3
MacHale, Mark - 2055 – DOLORES RE-4A	3
Gilmore, Nancy - 2580 - OURAY R-1	3
Gerk, Geoff - 1160 – Cotopaxi RE-3	3
Garrison, Brenda - 3200 – Yuma District 1	3
Ford, Julie - 1580 - TRINIDAD 1	3
Durham, Debbie - 0120 – Englewood Schools	3
Brainard, John - 2690 - PUEBLO CITY 60	3
Bullock, Bette - 1510 - LAKE COUNTY R-1	3
Book, Sharla - 1810 - KARVAL RE-23	3
Turner, Curtis - 2680 - WILEY RE-13 JT	3
Tempel, Staci - 2630 - HAXTUN RE-2J	3
Ring, Robert - 1780 - GENOA-HUGO C-113	3
Rea, Brian - 1060 – Peyton 23 Jt	3
Purdy, Robin - 0960 – Agate 300	3
Hoffman, James - 2840 - NORWOOD R2-JT	3
Hesting, Stan - 0020 - ADAMS 12 FIVE STAR SCHOOLS	3
Allen-Morley, Carole - 1550 - POUDRE R-1	3
Barela, Christine - 1620 - AGUILAR REORGANIZED 6	3
Baumgartle, Al - 1980 - DE BEQUE 49JT	2
Johnson, Nikki - 0270 - CAMPO RE-6	2
McAuliffe, Nita - 9055 - SAN LUIS VALLEY BOCES	2
Ziperman, Robin - 3000 – Summit Re-1	2
Yerkman, Jane - 1330 - GILPIN COUNTY RE-1	2
Walter, Richard - 1130 - MIAMIYODER 60JT	2
Revak, Marie - 1080 - LEWIS-PALMER 38	2
Lovato, Rick - 2560 - CHERAW 31	2
Kohman, Karla - 0010 - MAPLETON 1	2
Green, Sharon - 0970 – Calhan RJ-1	2
Haug, Carolyn - 0070 – WESTMINSTER 50	2
Glassman, Karen - 1570 - PARK(ESTES PARK)	2

User name	Login Counts
Ehnes, Shawn - 2862 - JULESBURG RE-1	2
Brilliant, David - 1010 - COLORADO SPRINGS 11	2
0010 - MAPLETON 1 - Karla Kohman-MQ	1
Stephens-Carter, Sherri - 0470 – ST VRAIN RE-1J	1
Schmidt, Dan - 3220 - IDALIA RJ-3	1
Salyards, Arlene - 9040 - NORTHEAST BOCES	1
Roman, Henry - 1070 – HANOVER 28	1
Patton, Joe - 0270 - CAMPO RE-6	1
Miller, Linda - 0970 – Calhan RJ-1	1
Mayfield, Troy - 1750 - BRANSON RE-82	1
Good, Robert - 0880 – DENVER PUBLIC SCHOOLS	1
Froman, Ellen - 1780 - GENOA-HUGO C-113	1
Freed, Sean - 0260 – Vilas Re-5	1
Esser, Karla - 0123 – Sheridan 2	1
Dingman, Jake - 0540 - CLEAR CREEK RE-1	1
Westfall, Tana - 0930 - KIOWA C-2	1
Wailes, Terri - 3110 – Johnstown-Milliken Re-5J	1
Bohlander, Randy - 2570 – Swink 33	1
Anderson, Hal - 1020 – Cheyenne Mtn. 12	1
Beebe, Bob - 0950 - ELBERT 200	1
Birden, Larry - 1750 - BRANSON RE-82	1
Bissell, Todd - 3145 – AULT/HIGHLAND RE-9	1
Bates, Russell - 2540 - FOWLER R-4J	1
Aschermann, Nancy - 2530 - ROCKY FORD R-2	1

Appendix C: Collection Submission Counts

2007 Collection File Submission counts for Student October Count

DISTRICT NAME	# SUBMISSIONS
MAPLETON 1	12
ADAMS COUNTY 14	43
BRIGHTON 27J	23
BENNETT 29J	15
STRASBURG 31J	11
WESTMINSTER 50	26
ALAMOSA RE-11J	20
SANGRE DE CRISTO RE-22J	14
ENGLEWOOD 1	50
SHERIDAN 2	26
DEER TRAIL 26J	12
ADAMS-ARAPAHOE 28J	8
BYERS 32J	8
ARCHULETA COUNTY 50 JT	33
WALSH RE-1	10
PRITCHETT RE-3	2
SPRINGFIELD RE-4	13
VILAS RE-5	75
CAMPO RE-6	6
LAS ANIMAS RE-1	15
MC CLAVE RE-2	14
BOULDER VALLEY RE 2	48
BUENA VISTA R-31	31
SALIDA R-32	6
CHEYENNE COUNTY RE-5	17
CLEAR CREEK RE-1	6
NORTH CONEJOS RE-1J	45
SANFORD 6J	7
SOUTH CONEJOS RE-10	41
CENTENNIAL R-1	9
SIERRA GRANDE R-30	10
CROWLEY COUNTY RE-1-J	61
CUSTER COUNTY SCHOOL DISTRICT C-1	12
DELTA COUNTY 50(J)	43
DENVER COUNTY 1	22
DOLORES COUNTY RE NO.2	16
DOUGLAS COUNTY RE 1	84
EAGLE COUNTY RE 50	21
ELIZABETH C-1	70
KIOWA C-2	17
ELBERT 200	11
AGATE 300	5
CALHAN RJ-1	17
HARRISON 2	59

DISTRICT NAME	# SUBMISSIONS
WIDEFIELD 3	38
FOUNTAIN 8	38
COLORADO SPRINGS 11	19
CHEYENNE MOUNTAIN 12	14
MANITOU SPRINGS 14	10
ACADEMY 20	28
ELLICOTT 22	55
PEYTON 23 JT	11
LEWIS-PALMER 38	7
FALCON 49	29
EDISON 54 JT	8
MIAMI/YODER 60 JT	5
FLORENCE RE-2	43
COTOPAXI RE-3	6
ROARING FORK RE-1	36
GARFIELD RE-2	9
GARFIELD 16	15
GILPIN COUNTY RE-1	16
WEST GRAND 1-JT.	20
EAST GRAND 2	12
GUNNISON WATERSHED RE1J	20
HINSDALE COUNTY RE 1	4
HUERFANO RE-1	35
LA VETA RE-2	9
NORTH PARK R-1	12
EADS RE-1	8
PLAINVIEW RE-2	11
ARRIBA-FLAGLER C-20	6
HI-PLAINS R-23	8
STRATTON R-4	5
BETHUNE R-5	6
BURLINGTON RE-6J	22
LAKE COUNTY R-1	9
DURANGO 9-R	44
BAYFIELD 10 JT-R	16
IGNACIO 11 JT	48
POUDRE R-1	12
THOMPSON R-2J	15
PARK (ESTES PARK) R-3	32
TRINIDAD 1	31
PRIMERO REORGANIZED 2	16
HOEHNE REORGANIZED 3	11
AGUILAR REORGANIZED 6	14
BRANSON REORGANIZED 82	17
KIM REORGANIZED 88	5
GENOA-HUGO C113	14
LIMON RE-4J	16
KARVAL RE-23	10
VALLEY RE-1	42
FRENCHMAN RE-3	7

DISTRICT NAME	# SUBMISSIONS
BUFFALO RE-4	7
PLATEAU RE-5	17
DE BEQUE 49JT	3
PLATEAU VALLEY 50	22
CREEDE CONSOLIDATED 1	16
MOFFAT COUNTY RE:NO 1	9
DOLORES RE-4A	16
MANCOS RE-6	20
MONTROSE COUNTY RE-1J	58
WEST END RE-2	15
BRUSH RE-2(J)	45
FORT MORGAN RE-3	24
WELDON VALLEY RE-20(J)	29
WIGGINS RE-50(J)	26
EAST OTERO R-1	48
ROCKY FORD R-2	33
FOWLER R-4J	6
CHERAW 31	12
SWINK 33	14
OURAY R-1	16
RIDGWAY R-2	11
PLATTE CANYON 1	19
PARK COUNTY RE-2	33
HOLYOKE RE-1J	23
HAXTUN RE-2J	30
GRANADA RE-1	11
LAMAR RE-2	15
HOLLY RE-3	6
WILEY RE-13 JT	10
PUEBLO CITY 60	28
PUEBLO COUNTY RURAL 70	18
MEEKER RE1	48
RANGELY RE-4	18
DEL NORTE C-7	24
MONTE VISTA C-8	32
SARGENT RE-33J	17
HAYDEN RE-1	12
STEAMBOAT SPRINGS RE-2	18
SOUTH ROUTT RE 3	9
MOUNTAIN VALLEY RE 1	29
MOFFAT 2	24
CENTER 26 JT	53
SILVERTON 1	13
TELLURIDE R-1	14
JULESBURG RE-1	13
PLATTE VALLEY RE-3	12
SUMMIT RE-1	15
AKRON R-1	25
LONE STAR 101	8
WOODLIN R-104	11

DISTRICT NAME	# SUBMISSIONS
WELD COUNTY RE-1	35
EATON RE-2	49
KEENESBURG RE-3(J)	29
WINDSOR RE-4	30
JOHNSTOWN-MILLIKEN RE-5J	32
PLATTE VALLEY RE-7	31
WELD COUNTY S/D RE-8	62
AULT-HIGHLAND RE-9	19
BRIGGSDALE RE-10	16
PRAIRIE RE-11	12
PAWNEE RE-12	10
YUMA 1	12
WRAY RD-2	26
IDALIA RJ-3	9
LIBERTY J-4	8
CHARTER SCHOOL INSTITUTE	83
MOUNTAIN BOCES	12
NORTHWEST COLO BOCES	4

Appendix D: On-line Survey Results

Q1. Please provide contact information and information about your school district.		
Answer Options	Response Percent	Response Count
District Name	100.0%	75
Data Collection Contact Person	96.0%	72
Phone Number	98.7%	74
Email Address	94.7%	71
Number of Students in your District (Estimate)	98.7%	74
Number of Schools in your District	98.7%	74
	answered question	75
	skipped question	3

Q2. How are you notified of new data collection requirements? These could be updates to current collections or new collections. (Please check all that apply)		
Answer Options	Response Percent	Response Count
Email	98.5%	64
Phone	4.6%	3
Conferences	27.7%	18
Newsletters	9.2%	6
Word of mouth	21.5%	14
Website	23.1%	15
Other (please specify)	16.9%	11
	answered question	65
	skipped question	13

Q3. I feel these communications are:							
Answer Options	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Rating Average	Response Count
Timely	6	29	13	11	3	2.61	62
Clear	4	22	20	13	1	2.75	60
Relevant	6	28	20	4	1	2.42	59
Too Many	6	9	29	11	3	2.93	58
Not Enough	3	10	23	15	3	3.09	54
Comments							11
						answered question	63
						skipped question	15

Q4. I feel there have been clear expectations set as to why the data has been requested.							
Answer Options	In all cases	In most cases	In some cases (50% of the time)	In few cases	Never	Rating Average	Response Count
New Data Collections	2	19	20	18	2	2.98	61
Updates to Current Collections	0	25	17	19	1	2.94	62
Comments							8
						answered question	62
						skipped question	16

Q5. Is your district ever involved in defining the requirements for new collections or updates to current collections?		
Answer Options	Response Percent	Response Count
Yes	7.9%	5
No	92.1%	58
Comments		22
	answered question	63
	skipped question	15

Q6. In regards to training and support given by CDE for collections please rate your satisfaction level.								
Answer Options	Satisfied	Somewhat Satisfied	Neutral	Somewhat Unsatisfied	Unsatisfied	N/A	Rating Average	Response Count
Training	9	34	9	5	4	0	2.36	61
Training Materials	11	25	16	6	3	0	2.43	61
Technical Support prior to collection window	7	23	13	13	5	0	2.77	61
Support during a collection window	19	21	6	11	4	0	2.34	61
Documentation	9	29	14	4	4	0	2.42	60
Comments								16
							answered question	61
							skipped question	17

Q7. How do you receive support during a collection window? (Please check all that apply.)		
Answer Options	Response Percent	Response Count
Phone	93.4%	57
Email	83.6%	51
FAQs (Frequently Asked Question document)	32.8%	20
Web Site	39.3%	24
Other Districts	34.4%	21
Other (please specify)	6.6%	4
	answered question	61
	skipped question	17

Q8. How do your schools submit their data up to the school district? (Please check all that apply.)		
Answer Options	Response Percent	Response Count
Paper	42.6%	26
Email	50.8%	31
Web Entry	19.7%	12
Text File	13.1%	8
Centralized computer system	34.4%	21
Direct database entry	37.7%	23
Phone	19.7%	12
Microsoft Word or other word processing program	19.7%	12
Microsoft Excel or other spreadsheet program	34.4%	21
Microsoft Access	1.6%	1
Other (please specify)	19.7%	12
	answered question	61
	skipped question	17

Q9. Do you verify that the data you receive from the schools is accurate and complete?		
Answer Options	Response Percent	Response Count
Yes	93.3%	56
No	6.7%	4
Comments		33
	answered question	60
	skipped question	18

Q10. How does your district collect and submit data to CDE? (Please check all that apply.)		
Answer Options	Response Percent	Response Count
Web page	23.3%	14
ADE	85.0%	51
File Submission	61.7%	37
Excel or other spreadsheet files	40.0%	24
Access database	6.7%	4
Word or other word processing program	15.0%	9
Email	33.3%	20
Paper	23.3%	14
Phone	13.3%	8
Other (please specify)	11.7%	7
	answered question	60
	skipped question	18

Q11. As illustrated in the picture above, please estimate the following percentages:			
Answer Options	Response Average	Response Total	Response Count
Percent of total data collected that is used for normal school district operations (a)	36.76	2132	58
Percent of total data collected that is used for CDE collection purposes (b)	68.45	3970	58
Percent of CDE collected data that is useful for school district purposes (c)	26.14	1516	58
		answered question	58
		skipped question	20

Q12. What are the five most difficult collections to complete in terms of time, data compilation, effort required, resubmissions, edits, etc.	
Answer Options	Count
ADE End of Year	44
ADE Student October	37
ADE December Human Resources	29
ADE Safety and Discipline Indicator	18
Consolidated Federal Programs Application	17
ADE Financial December	15
ADE Student Biographical Data Review Form CSAP/CSAPA	13
ADE Report Card March Miscellaneous	9
Accreditation Report	7
ACT Student Biographical Data	4
ADE Precoded Labels	4
Education Technology-Information Literacy (ET-IL) Plan & Form	4
Colorado Reading First BEAR Assessment	3
Colorado English Language Assessment Student Biographical Data Review	2
Certification of Eligibility for Counting Pupils Enrolled in On-Line Educational Programs	2
Colorado Preschool Program Expansion Application	2
Highly Qualified Teacher Plans	2
NCLB Consolidated State Performance Report Data Collection (Next collection 2008)	2
CSAPA Online	1
ADE Directory	1
CSAP Oral Transcripts Translation Survey	1
Title III Desk Review (Every 2 Years Next one 2009)	1
Record Integration Tracking System	1
Expelled/At Risk Student Serve Final and Continuation Report	1
Year End Performance Report Title IV-A Safe and Drug Free Schools	1
CO Preschool Program Reapplication and Annual Report	1
Public School Transportation Fund Reimbursement Claim	1
Report of Children with Disabilities Unilaterally Removed Suspended/Expelled More than Ten day, FY 03-04	1
Special Education End-of-Year Revenue and Expenditure Report, 2004-2005	1
Annual Count of Eligible Students under Part B of the Individuals with Disabilities Education Act	1
Federal Application Project Narrative	1
Application for Federal Special Education Funds	1

Q13. What part of the data submission process is the most problematic? (For example, the collection windows, edits, file creation, etc.)	
Answer Options	Response Count
	50
answered question	50
skipped question	28

Q14. Do you have a computer system that is used to collect, store, and generate CDE data? This may be the same or a different system than that is used to run school district operations.		
Answer Options	Response Percent	Response Count
Yes	84.6%	44
No	15.4%	8
Comments		41
	answered question	52
	skipped question	26

Q15. Was your system created in-house or by a vendor?		
Answer Options	Response Percent	Response Count
In-House	12.2%	6
Vendor	87.8%	43
Comments		38
	answered question	49
	skipped question	29

Q16. What operating system does it run on?		
Answer Options	Response Percent	Response Count
Hosted System	16.3%	8
Unix	0.0%	0
Linux	0.0%	0
Windows	69.4%	34
Mac	6.1%	3
DOS	0.0%	0
Other (please specify)	8.2%	4
	answered question	49
	skipped question	29

Q17. What computer hardware platform does it run on? (Intel based, Mac based, IBM Servers, Sun Servers, etc.)	
Answer Options	Response Count
	48
answered question	48
skipped question	30

Q18. Are you planning to install a new software system or upgrade your current system in the next 2 years?		
Answer Options	Response Percent	Response Count
Yes	22.0%	11
No	78.0%	39
Comments		12
	answered question	50
	skipped question	28

Q19. Do you have an Information Technology department or staff that supports your CDE data collection efforts? (Please check all that apply.)		
Answer Options	Response Percent	Response Count
Yes	56.9%	29
No	37.3%	19
Part-Time	25.5%	13
Full-Time	21.6%	11
Comments		31
	answered question	51
	skipped question	27

Q20. What tools to you use to look at the final results of the data collection efforts? These are the reports or results that are disseminated by CDE after the collection is submitted and approved. (Please check all that apply.)		
Answer Options	Response Percent	Response Count
CEDAR	53.8%	28
Paper	59.6%	31
Cognos	0.0%	0
Emailed reports	42.3%	22
Posted on a Web site	63.5%	33
Other (please specify)	23.1%	12
	answered question	52
	skipped question	26

Q21. From the school district, who views or makes use of the CDE reported data?	
Answer Options	Response Count
	50
answered question	50
skipped question	28

Q22. How is this information used?		
Answer Options	Response Percent	Response Count
Planning	90.2%	46
Research	37.3%	19
Information only	54.9%	28
Reporting to other stakeholders	72.5%	37
Grant Writing	64.7%	33
Strategy Development	68.6%	35
Other (please specify)	9.8%	5
	answered question	51
	skipped question	27

Q23. How would you rate the following aspects of the reporting of data collection results?							
Answer Options	Excellent	Good	Neutral	Poor	Very Poor	Rating Average	Response Count
Timeliness of results	0	23	10	13	4	2.96	50
Relevance	2	20	18	9	1	2.74	50
Accuracy	6	30	10	3	1	2.26	50
Content	0	26	19	3	1	2.57	49
Accessibility	4	18	21	3	4	2.7	50
Ease of Use	0	15	16	11	4	3.09	46
Comments							15
						answered question	50
						skipped question	28

Q24. What improvements or recommendations would you make to CDE in regards to the data collection process and data collection systems?	
Answer Options	Response Count
	41
answered question	41
skipped question	37

Q25. Do you feel there is a duplication of effort within the data collection process? Please describe.	
Answer Options	Response Count
	42
answered question	42
skipped question	36

Q26. What improvements/recommendations would you make to CDE in regards to the distribution of the results of the Data Collections? Is there any results in particular you would like to see?	
Answer Options	Response Count
	34
answered question	34
skipped question	44

Q27. Please provide us with any relevant process flows, system documentation, data specifications, job aids, tools, in-house training documentation, etc. that you use for the data collection process.	
Answer Options	Response Count
	9
answered question	9
skipped question	69