



Technical and Business
Documentation for an SLDS

Brief 7
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best practices brief



Statewide
Longitudinal
Data Systems
Grant Program



SLDS Best Practices Brief

Technical and Business Documentation for an SLDS

Technical and business documentation provide a vital record of the purpose, design, use, and practices related to a statewide longitudinal data system (SLDS). Each SLDS team will approach documentation differently depending on the needs of its system, but there are many documents common to information technology and data-related projects that can help ensure effective implementation, ongoing maintenance, and sustainability of an SLDS. This publication provides an overview of documentation processes and deliverables frequently used for SLDSs.

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Why Is Documentation Important?

Writing documentation is not always an easy task. However, it is essential to capture the details of SLDS development and implementation and to record information about what the tasks, procedures, elements, and uses of the data system are, how and why they are carried out, who has responsibility for different parts of the system, and when the tasks or procedures will be performed. More specifically, documentation will help

- record and preserve internal procedures, decisions, and SLDS knowledge over time and in the event of staff turnover;
- promote efficiency and consistency through replication of successful processes and products;
- enable continuous improvement of processes and products by tracking revisions that build on successes and address issues;
- establish a record of requirements and processes for coordinating across agencies and with vendors;
- reduce misunderstandings and confusion by making roles, scope of work, and expectations clear to all parties;
- create a common language and understanding of the SLDS that fosters data use and ownership in the system; and
- lay the groundwork for sharing data and collaborating with other agencies or departments by making all parties aware of the work and progress.

This product of the Institute of Education Sciences (IES) SLDS Grant Program was developed with the help of knowledgeable staff from state education agencies.

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For more information on the IES SLDS Grant Program, additional Best Practices Briefs, or for support with system development or use, please visit <http://nces.ed.gov/programs/SLDS>.

Technical documentation supports the step-by-step processes associated with the data system and describes the technical aspects of how a system works.

Business documentation relates to how the data system is used and the business objectives it meets.



What Are the Different Types of Documents and Documentation?

SLDS documentation will fall into two broad categories: technical documentation and business documentation. Documents in each of these categories serve different needs and may be created and used by different members of the SLDS team.

Technical Documentation

Technical documentation supports the step-by-step processes associated with the system and describes the technical aspects of how a system works. Having this documentation facilitates support, maintenance, upgrades, and enhancements. Technical documentation can include the following types of documents:

- Technical specifications and business rules: detailed descriptions of the requirements for the data system.
- Technical architecture: an illustration of the design for the system and the workflow.
- Data architecture: a picture that shows the data structure, including the entity relationships.
- Data model: a description of the way in which the data relate and are collected and stored.
- Programming code: the actual code that is implemented, with comments.
- Test plans and test cases: detailed documents that describe the way in which a system or application is to be tested.
- Security plan: a detailed description of the privacy and security practices for the system.

Business Documentation

Business documentation relates to how the system is used and the business objectives it meets. It facilitates communication with users and the program area regarding the goals and uses of the system. Business documentation can include the following documents:

- Project charter: a document that describes the scope, objectives, and stakeholders for a project.
- Business needs or requirements: detailed descriptions of the processes that must be supported by the system.

- Workflow diagrams
- Data dictionary or metadata repository: a detailed description of the data element attributes including information about the source and ownership of data for both internal and integrated systems.
- Project plan: a detailed plan that includes all activities needed to meet intended outcomes.
- User manuals: detailed instructions on how to use the system.
- Data governance manuals and processes: detailed documents describing the data governance policies, processes, and procedures.
- Data calendar: a description of when data are collected, validated, finalized, and reported, including the purpose(s) for each action.
- Roles and responsibilities of agency staff: a detailed document describing who is responsible for what tasks related to the system. This document is especially important when roles and responsibilities for the SLDS span multiple agencies, such as when a central IT agency provides hosting and support for the system.
- Training documents and modules: detailed documents or resources that are used to train users of the system.
- Communication plan: a plan that describes all internal and external outreach activities regarding the system.
- Release schedule: a plan that specifies what SLDS data or tools will be available to whom and when.
- Data security: processes and procedures that are used to develop and maintain a data security program to include consistency with program laws, statutes, and regulations.

Documentation Suggestions

Do:

- ✓ Plan the documentation along with the data system.
- ✓ Follow state standards and requirements, if available and applicable.
- ✓ Take advantage of available resources that can make the job of documentation easier.
- ✓ Create documentation that is understandable, easy to use, and written for its intended audience.
- ✓ Consider options for media used for documentation.
- ✓ Be sure that documents are reviewed by all relevant parties before they are released.
- ✓ Ensure documentation is housed in a central, accessible location that is available to all intended users.
- ✓ Have a plan for maintaining and updating documents.

Do Not:

- ✗ Overdo the documentation.
- ✗ Overlook documentation for vendor-developed systems and processes.
- ✗ Lose track of document versioning.

SST Tip: If your state has limited documentation to date for its SLDS, a good way to get started is to identify the most critical processes and systems and begin by documenting those.

Do:

Plan the documentation along with the data system.

Too often, documentation is left for the end of a data system project as an afterthought. When resources and time run short, documentation often does not happen.

Documentation, in written form, should be a part of every phase of the SLDS effort. When specific types of documentation are initially created depends on the type and stage of the SLDS effort. Some types of business documentation, such as project charters and business requirements, should begin during the planning stages of the effort. Technical documentation is often included in later stages of the system development process as the SLDS is designed and built.

Follow state standards and requirements, if available and applicable.

If your state has standards or other technical requirements, it is important to describe how the SLDS effort is aligned to those requirements. It is also important to note any deviations from state standards and requirements and why the deviations are necessary.

Take advantage of available resources that can make the job of documentation easier.

Is there another project that has good documentation that can be a model for the SLDS? Does the agency have a communications director, publication staff, or other personnel with professional training in documentation who can help by mentoring others or reviewing documents?

Create documentation that is understandable, easy to use, and written for its intended audience.

Much of the information that is documented for data systems is complex and can be difficult to understand. One goal of documentation is to present highly technical information in a clear, easy to understand, and usable way. It is important to consider the audience for each document as it is written to ensure that it will be accessible for readers. End users should

be able to discern how to use the system with little or no help. Information technology staff should be able to easily understand how the system was designed and developed and why the system was designed as it was.

Consider options for media used for documentation.

In addition to printable documents, documentation might be created effectively using video or audio recordings, interactive modules, or other formats.

Kansas: Creating Standardized Documentation for IT Projects

The Kansas State Department of Education (KSDE) has established a robust suite of documentation to support its software development lifecycle, and standard templates have been developed for each of the documents. At the beginning of each initiative or project, a Project Start Checklist is used to determine the scope of documentation that is needed for the project. Simple, low-risk updates to an existing system require less documentation than development and implementation of a new, complex system. Further, the practice of peer review and requiring appropriate individuals to sign off on the document help ensure the quality and usability of each document. The Project Plan, Roles and Responsibilities document, and Communication Matrix further describe what is expected in terms of documentation, by whom, and when.



Kansas's Documentation Templates in the Public Domain Clearinghouse (login required):

- **Project Start Checklist:** This template allows the project management team to plan for appropriate documentation based on the complexity and risk associated with the project.
<https://slds.grads360.org/#communities/pdc/documents/2699>
- **Communication Matrix Template:** This template enables the project team to specify the multiple methods of communication that will be used for the project including a description, purpose, author, audience, frequency, and the preferred method for updates/communication.
<https://slds.grads360.org/#communities/pdc/documents/2698>
- **High Level Project Outline Template:** This template allows the project management team to document a high-level outline of the categories and timeline for expected project activities. This is done as a big-picture planning tool, but it does not replace a detailed project plan.
<https://slds.grads360.org/#communities/pdc/documents/2697>
- **Project Charter Template:** This template allows the project team to gain consensus regarding the goals and constraints of the project, including general project information, project contacts, the business need for the project, an official statement of work, specific project outcomes, project risks and success factors, and other background information related to the project. The template can also be used to record revisions to the original project charter.
<https://slds.grads360.org/#communities/pdc/documents/2700>
- **Roles and Responsibilities Template:** This template can be customized to create a detailed list of project responsibilities and to designate the individuals responsible for specific tasks.
<https://slds.grads360.org/#communities/pdc/documents/2701>
- **Project Implementation Checklist:** This template can be customized to create a checklist of activities related to project implementation, ensuring that the technical and business teams are on the same page regarding the timing and responsibilities for implementation tasks.
<https://slds.grads360.org/#communities/pdc/documents/2702>

Be sure that documents are reviewed by all relevant parties before they are released.

Review by appropriate experts and stakeholders is particularly important for publicly released documents.

Ensure documentation is housed in a central, accessible location that is available to all intended users.

Documentation should be easy to find on a state's website, which may include links to the document in multiple places. It is also important to have at least one hard copy of documents housed in a central location within the agency.

Have a plan for maintaining and updating documents.

Specify roles and timing for maintaining documents that will need to be reviewed and updated periodically, as well as how version control will be managed and how updates will be communicated. It is important to reconsider the audience (who), the purpose of the documentation (why), the contents (what), and accessibility (where the document is located). As projects mature, documentation must be updated to reflect the current and historical perspectives. In addition, the audience for the document may broaden over time.

Do Not:

Overdo the documentation.

Although it is hard to imagine, it is possible to have too much documentation. Carefully consider what is needed to effectively support the SLDS. Make those documentation tasks a priority, and plan for time and human resources accordingly.

Overlook documentation for vendor-developed systems and processes.

All systems should be documented whether they are developed by vendors or in-house by an agency. It is essential that vendor-developed systems and processes be clearly documented; at some point in

International Standards for Software Processes, Lifecycles, and Documentation

The International Organization for Standardization (ISO) publishes standards for many types of processes, including software development. ISO 12207 describes stages in the software development lifecycle and the principal deliverables associated with each stage.

- Acquisition stage
 - » Initiation documents
 - » Request for proposal
 - » Contract (and contract updates)
 - » Supplier monitor report
 - » Acquisition report
- Supply stage
 - » Project management plan
- Development stage
 - » Functional requirements
 - » High-level design
 - » Module design
 - » Code
 - » Module test report
 - » Integration test report
 - » System test report
- Operation stage
 - » User manuals/training materials
- Maintenance stage
 - » Enhancement plans
 - » Known issues

time, the vendor will turn over the SLDS to the state, and the responsibility for maintaining and enhancing the system becomes that of the state. Clearly define the expected types and standards of documentation in contracts with the vendor to ensure that essential aspects of the system's development and operation are recorded as needed.

Lose track of document versioning.

Versioning is critical. SLDS leaders need to ensure that the latest documentation can be easily identified and that staff members are not using different versions of the same document.

State Examples of Documentation

Items from the SLDS Public Domain Clearinghouse (<https://slds.grads360.org>) may require a login.

Project Plans and Overview Documents

- P-20 Program Baseline – Washington State (2012)
This document identifies the baseline scope, schedule, budget, and benefits of the P-20 Program. The program will be measured against these baselines throughout the remainder of the program's timeframe.
<https://slds.grads360.org/#communities/pdc/documents/2661>
- Process Definition Template and Activity Table – Tennessee (2007)
A blank template for documenting relevant information about SLDS processes.
<https://slds.grads360.org/#communities/pdc/documents/2948>

Business and Technical Requirements

- EEM-SDS Business-Technical Requirements – Michigan (2007)
A four-document archive of finalized business and technical requirements for the EEM-SDS systems.
<https://slds.grads360.org/#communities/pdc/documents/2960>
- Longitudinal Data System (LDS) Grant Project Business Requirements – Minnesota (2006–2007)
This item documents the business requirements for Minnesota's Longitudinal Data System Grant Project.
<https://slds.grads360.org/#communities/pdc/documents/2961>
- Requirements Document: DSR01285 – SLDS Design and Construction Programming – Texas (2010)
This document describes the requirements for the new elements being added to the current Student Longitudinal Data System (SLDS).
<https://slds.grads360.org/#communities/pdc/documents/2788>

Business Rules

- CEDARS Quick Tip Sheet: Understanding the "As of Date" – Washington State (2010)
This document is part of the training materials for the Comprehensive Education Data and Research System (CEDARS) outlining business rules for a specific data element.
<http://www.k12.wa.us/CEDARS/TrainingMaterials/UnderstandingtheAsOfDate.pdf>
- Definitions of Selected Terms – Colorado
This webpage lists common questions and answers related to terms used in the Colorado Department of Education's data system, including how school dropout and graduation rates are determined.
<http://www.cde.state.co.us/cdereval/rvdefine>
- Business Rules for Standardizing Name Fields – Washington State (2012)
A set of business rules for standardizing name fields prior to performing identity matching.
<https://slds.grads360.org/#communities/pdc/documents/2672>
- Guidelines to Facilitate Consistent Analysis of NSC Data Across Agencies in Connecticut – Connecticut (2010)
Guidelines created to analyze the National Student Clearinghouse data in a consistent manner across state agencies to support common outcomes as much as possible.
<https://slds.grads360.org/#communities/pdc/documents/2786>
- Statistical Process Control – Maryland (2007)
This document describes a process added to the state's education data collection system to ensure the logical nature of the aggregates published for state and federal compliance reporting.
<https://slds.grads360.org/#communities/pdc/documents/2964>
- Alaska Unity Project: Phase II Data Warehouse: Business Requirements and Analysis – Alaska (2006)
This document describes the business requirements gathered during interview sessions with representatives of the program sections involved in the UNITY Data Warehouse project.
<https://slds.grads360.org/#communities/pdc/documents/3140>

System Models

- Data Flow Chart — Minnesota (2014)
A conceptual/technical diagram of the data flow process for Minnesota's P-20W SLDS.
<https://slds.grads360.org/#communities/pdc/documents/5150>

Data Dictionaries

- Education Insight Data Dictionary – Delaware (2012)
Data standards for the Education Insight data warehouse and performance management dashboards.
<http://dedoe.schoolwires.net/cms/lib09/DE01922744/Centricity/Domain/167/EdFiDictionary.pdf>
- Data Definitions and Explanations – Montana
Definitions and explanations for all terms used in Montana's Growth and Enhancement of Montana Students (GEMS) data system. Use the Export button (disk icon) to download the dictionary in a variety of file formats.
<http://gems.opi.mt.gov/TrainingCenter/Pages/DataDefinitions.aspx>
- Student Information System Data Elements, Approved Codes, and Indicators – Illinois (2015)
Definitions of data elements included in Illinois's student information system.
http://www.isbe.net/sis/html/data_elements.htm
- South Carolina LDS Project: Data Dictionary-Data Model – South Carolina (2006)
This document illustrates South Carolina's longitudinal data system's data dictionary and data model.
<https://slds.grads360.org/#communities/pdc/documents/3134>
- Agency-Wide Data Dictionary Planning Project – Wisconsin (2007)
This document details the two projects related to the Wisconsin Department of Public Instruction's Agency-wide Data Dictionary: a planning project and an implementation project.
<https://slds.grads360.org/#communities/pdc/documents/2956>

Data Collection Calendars

- Colorado Department of Education Data Collection Calendar – Colorado (2014–2015)
This calendar, created with the cooperation of the departments at Colorado's state education agency, lists the data collections required from CDE and school districts by state and federal statutes.
<http://www.cde.state.co.us/cdereval/collectioncalender>
- Collections, Deadlines, Notices, and Data Verification Calendar – Montana (2015)
Use the Export button (disk icon) to download the calendar in a variety of file formats.
<http://gems.opi.mt.gov/ReportsAndData/Pages/OPIDataCollectionsDueDates.aspx>
- Tennessee Data Collection Calendar – Tennessee (2005)
A sample data collection calendar from Tennessee.
<https://slds.grads360.org/#communities/pdc/documents/3152>

Data Manuals, User Manuals, and Training Materials

- Texas Data Standards for Data Collection – Texas (2009–2015)
A set of documents including roles and responsibilities, specifications for data submissions, a data dictionary, and codes for multiple years.
http://tea.texas.gov/Reports_and_Data/Data_Submission/PEIMS/PEIMS_Data_Standards/PEIMS_Data_Standards/
- CEDARS Data Manual – Washington State (2014–2015)
A data manual for Washington's Comprehensive Education Data and Research System (CEDARS).
<http://www.k12.wa.us/CEDARS/Manuals.aspx>
- CEDARS Reporting Guidance – Washington State (2014–2015)
A manual for users submitting data to the Comprehensive Education Data and Research System (CEDARS).
<http://www.k12.wa.us/CEDARS/ReportingGuidance.aspx>

- CEDARS Training Materials – Washington State
Training presentations, checklists, guides, and other documents related to the Comprehensive Education Data and Research System (CEDARS).
<http://www.k12.wa.us/CEDARS/Training.aspx>
- Statewide Information System Portal – Arkansas (2014–2015)
An online data system portal with links to data manuals and cycle documentation, including a calendar.
<https://adedata.arkansas.gov/sis/Default.aspx>
- ZoomWV User Guide – West Virginia (2014)
A guide with information about the ZoomWV system for educators, parents, policymakers, and the public.
<http://static.k12.wv.us/zoomwv/user-guide.pdf>
- Maine Education Data Warehouse User Guide – Maine
Detailed guidance for processes related to Maine’s data tools.
<http://dw.education.maine.gov/DirectoryManager/web/MaineEDWHHelp/indexDMAT.htm>
- GEMS Web Portal End User Manual – Montana
A training manual developed to enable users to effectively use the tools and functions in the Growth and Enhancements of Montana Students (GEMS) website.
http://gems.opi.mt.gov/TrainingCenter/Documents/GEMS_User_Manual.pdf
- Student Information System User Manual – Illinois (2013)
A manual introducing users to the student information system and providing instruction to enable each user to utilize the system effectively in a short period of time.
http://www.isbe.net/sis/html/user_manual.htm
- Employment Data Handbook – Washington State (2012)
A guide for incorporating employment information from a state Unemployment Insurance (UI) program into a P-20 longitudinal data system.
<https://slds.grads360.org/#communities/pdc/documents/2668>
- Data Collection Manual – South Carolina (2006–2007)
A manual listing the data elements collected from the School Administrative Student Information System using the SWEET tool, as well as information about how the data were used the previous year.
<https://slds.grads360.org/#communities/pdc/documents/2965>
- Data Sharing Matrix – Washington State (2012)
A matrix detailing who is able and not able to obtain Washington’s personally identifiable data by sector organization type.
<https://slds.grads360.org/#communities/pdc/documents/2663>

Additional Resources

International Organization for Standardization (ISO) Software Resources

http://www.iso.org/iso/home/store/catalogue_ics/catalogue_ics_browse.htm?ICS1=35&ICS2=080&development=on

Kansas State Department of Education

<http://www.ksde.org/>

SLDS Best Practices Brief: Vendor Engagement: Tips from the States

<http://nces.ed.gov/programs/slds/pdf/brief3.pdf>

SLDS Issue Brief: Effective Project Planning and Managing Change

http://nces.ed.gov/programs/slds/pdf/managing_change.pdf