

U.S. Department of Education

Washington, D.C. 20202-5335



**APPLICATION FOR GRANTS
UNDER THE**

Statewide, Longitudinal Data Systems

CFDA # 84.372A

PR/Award # R372A120026

Grants.gov Tracking#: GRANT11026332

OMB No. , Expiration Date:

Closing Date: Dec 15, 2011

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This application was generated using the PDF functionality. The PDF functionality automatically numbers the pages in this application. Some pages/sections of this application may contain 2 sets of page numbers, one set created by the applicant and the other set created by e-Application's PDF functionality. Page numbers created by the e-Application PDF functionality will be preceded by the letter e (for example, e1, e2, e3, etc.).

Application for Federal Assistance SF-424

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| * 1. Type of Submission: <input type="checkbox"/> Preapplication <input checked="" type="checkbox"/> Application <input type="checkbox"/> Changed/Corrected Application | * 2. Type of Application: <input checked="" type="checkbox"/> New <input type="checkbox"/> Continuation <input type="checkbox"/> Revision | * If Revision, select appropriate letter(s): <input type="text"/> * Other (Specify): <input type="text"/> |
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| | |
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| * 3. Date Received: <input type="text" value="12/15/2011"/> | 4. Applicant Identifier: <input type="text"/> |
|--|--|

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| 5a. Federal Entity Identifier: <input type="text"/> | 5b. Federal Award Identifier: <input type="text"/> |
|--|---|

State Use Only:

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|---|---|
| 6. Date Received by State: <input type="text"/> | 7. State Application Identifier: <input type="text"/> |
|---|---|

8. APPLICANT INFORMATION:

| | |
|---|--|
| * a. Legal Name: <input type="text" value="Arizona Department of Education"/> | |
| * b. Employer/Taxpayer Identification Number (EIN/TIN): <input type="text" value="86-6004791"/> | * c. Organizational DUNS: <input type="text" value="8047460970000"/> |

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| d. Address: | |
| * Street1: | <input type="text" value="1535 West Jefferson Street"/> |
| Street2: | <input type="text"/> |
| * City: | <input type="text" value="Phoenix"/> |
| County/Parish: | <input type="text"/> |
| * State: | <input type="text" value="AZ: Arizona"/> |
| Province: | <input type="text"/> |
| * Country: | <input type="text" value="USA: UNITED STATES"/> |
| * Zip / Postal Code: | <input type="text" value="85007-3280"/> |

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|---|--|
| e. Organizational Unit: | |
| Department Name: <input type="text" value="Information Technology"/> | Division Name: <input type="text"/> |

f. Name and contact information of person to be contacted on matters involving this application:

| | |
|---|---|
| Prefix: <input type="text"/> | * First Name: <input type="text" value="Mark"/> |
| Middle Name: <input type="text"/> | |
| * Last Name: <input type="text" value="Masterson"/> | |
| Suffix: <input type="text"/> | |

| |
|---|
| Title: <input type="text" value="Chief Information Officer"/> |
|---|

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|---|
| Organizational Affiliation: <input type="text"/> |
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| | |
|---|----------------------------------|
| * Telephone Number: <input type="text" value="602-542-3542"/> | Fax Number: <input type="text"/> |
|---|----------------------------------|

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|---|
| * Email: <input type="text" value="Mark.Masterson@azed.gov"/> |
|---|

Application for Federal Assistance SF-424

*** 9. Type of Applicant 1: Select Applicant Type:**

A: State Government

Type of Applicant 2: Select Applicant Type:

Type of Applicant 3: Select Applicant Type:

* Other (specify):

*** 10. Name of Federal Agency:**

U.S. Department of Education

11. Catalog of Federal Domestic Assistance Number:

84.372

CFDA Title:

Statewide Data Systems

*** 12. Funding Opportunity Number:**

ED-GRANTS-092011-001

* Title:

Institute of Education Sciences (IES): Statewide, Longitudinal Data Systems Program CFDA Number 84.372A

13. Competition Identification Number:

84-372A2012

Title:

14. Areas Affected by Project (Cities, Counties, States, etc.):

Add Attachment

*** 15. Descriptive Title of Applicant's Project:**

Arizona K-12 SLDS Project

Attach supporting documents as specified in agency instructions.

Add Attachments

Application for Federal Assistance SF-424

16. Congressional Districts Of:

* a. Applicant

b. Program/Project

Attach an additional list of Program/Project Congressional Districts if needed.

17. Proposed Project:

* a. Start Date:

* b. End Date:

18. Estimated Funding (\$):

| | |
|---------------------|---|
| * a. Federal | <input type="text" value="1,948,933.00"/> |
| * b. Applicant | <input type="text" value="0.00"/> |
| * c. State | <input type="text" value="0.00"/> |
| * d. Local | <input type="text" value="0.00"/> |
| * e. Other | <input type="text" value="0.00"/> |
| * f. Program Income | <input type="text" value="0.00"/> |
| * g. TOTAL | <input type="text" value="1,948,933.00"/> |

*** 19. Is Application Subject to Review By State Under Executive Order 12372 Process?**

- a. This application was made available to the State under the Executive Order 12372 Process for review on .
- b. Program is subject to E.O. 12372 but has not been selected by the State for review.
- c. Program is not covered by E.O. 12372.

*** 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes," provide explanation in attachment.)**

- Yes
- No

If "Yes", provide explanation and attach

21. *By signing this application, I certify (1) to the statements contained in the list of certifications and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)**

** I AGREE

** The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.

Authorized Representative:

Prefix: * First Name:
Middle Name:
* Last Name:
Suffix:

* Title:

* Telephone Number: Fax Number:

* Email:

* Signature of Authorized Representative: * Date Signed:

ASSURANCES - NON-CONSTRUCTION PROGRAMS

Public reporting burden for this collection of information is estimated to average 15 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0040), Washington, DC 20503.

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.

NOTE: Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the awarding agency. Further, certain Federal awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant, I certify that the applicant

1. Has the legal authority to apply for Federal assistance and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project cost) to ensure proper planning, management and completion of the project described in this application.
2. Will give the awarding agency, the Comptroller General of the United States and, if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the award; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.
3. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.
4. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.
5. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§4728-4763) relating to prescribed standards for merit systems for programs funded under one of the 19 statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).
6. Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C. §§1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U.S.C. §§6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended, relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. §§290 dd-3 and 290 ee- 3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made; and, (j) the requirements of any other nondiscrimination statute(s) which may apply to the application.
7. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal or federally-assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases.
8. Will comply, as applicable, with provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.

9. Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§276a to 276a-7), the Copeland Act (40 U.S.C. §276c and 18 U.S.C. §874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§327-333), regarding labor standards for federally-assisted construction subagreements.
10. Will comply, if applicable, with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is \$10,000 or more.
11. Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq.); (f) conformity of Federal actions to State (Clean Air) Implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. §§7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended (P.L. 93-523); and, (h) protection of endangered species under the Endangered Species Act of 1973, as amended (P.L. 93-205).
12. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271 et seq.) related to protecting components or potential components of the national wild and scenic rivers system.
13. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), EO 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq.).
14. Will comply with P.L. 93-348 regarding the protection of human subjects involved in research, development, and related activities supported by this award of assistance.
15. Will comply with the Laboratory Animal Welfare Act of 1966 (P.L. 89-544, as amended, 7 U.S.C. §§2131 et seq.) pertaining to the care, handling, and treatment of warm blooded animals held for research, teaching, or other activities supported by this award of assistance.
16. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. §§4801 et seq.) which prohibits the use of lead-based paint in construction or rehabilitation of residence structures.
17. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act Amendments of 1996 and OMB Circular No. A-133, "Audits of States, Local Governments, and Non-Profit Organizations."
18. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations, and policies governing this program.

| | |
|---|---|
| <p>* SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL</p> <p>Peter Laing</p> | <p>* TITLE</p> <p>Deputy Superintendent of Public Instruction</p> |
| <p>* APPLICANT ORGANIZATION</p> <p>Arizona Department of Education</p> | <p>* DATE SUBMITTED</p> <p>12/15/2011</p> |

Standard Form 424B (Rev. 7-97) Back

CERTIFICATION REGARDING LOBBYING

Certification for Contracts, Grants, Loans, and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

Statement for Loan Guarantees and Loan Insurance

The undersigned states, to the best of his or her knowledge and belief, that:

If any funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this commitment providing for the United States to insure or guarantee a loan, the undersigned shall complete and submit Standard Form-LLL, "Disclosure of Lobbying Activities," in accordance with its instructions. Submission of this statement is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required statement shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

| | |
|---|--|
| * APPLICANT'S ORGANIZATION <input style="width: 90%;" type="text" value="Arizona Department of Education"/> | |
| * PRINTED NAME AND TITLE OF AUTHORIZED REPRESENTATIVE | |
| Prefix: <input style="width: 100px;" type="text"/> | * First Name: <input style="width: 250px;" type="text" value="Elliott"/> Middle Name: <input style="width: 150px;" type="text"/> |
| * Last Name: <input style="width: 350px;" type="text" value="Hibbs"/> | Suffix: <input style="width: 100px;" type="text"/> |
| * Title: <input style="width: 300px;" type="text" value="Deputy Superintendent of Public Instruction"/> | |
| * SIGNATURE: <input style="width: 350px;" type="text" value="Peter Laing"/> | * DATE: <input style="width: 150px;" type="text" value="12/15/2011"/> |

SUPPLEMENTAL INFORMATION
REQUIRED FOR
DEPARTMENT OF EDUCATION GRANTS

1. Project Director:

Prefix: * First Name: Middle Name: * Last Name: Suffix:

Address:

* Street1:
 Street2:
 * City:
 County:
 * State:
 * Zip Code:
 * Country:

* Phone Number (give area code) Fax Number (give area code)

Email Address:

2. Applicant Experience:

Novice Applicant Yes No Not applicable to this program

3. Human Subjects Research

Are any research activities involving human subjects planned at any time during the proposed project Period?

Yes No

Are ALL the research activities proposed designated to be exempt from the regulations?

Yes Provide Exemption(s) #:

No Provide Assurance #, if available:

Please attach an explanation Narrative:

Abstract

The abstract narrative must not exceed one page and should use language that will be understood by a range of audiences. For all projects, include the project title (if applicable), goals, expected outcomes and contributions for research, policy, practice, etc. Include population to be served, as appropriate. For research applications, also include the following:

- Theoretical and conceptual background of the study (i.e., prior research that this investigation builds upon and that provides a compelling rationale for this study)
- Research issues, hypotheses and questions being addressed
- Study design including a brief description of the sample including sample size, methods, principals dependent, independent, and control variables, and the approach to data analysis.

[Note: For a non-electronic submission, include the name and address of your organization and the name, phone number and e-mail address of the contact person for this project.]

You may now Close the Form

You have attached 1 file to this page, no more files may be added. To add a different file, you must first delete the existing file.

* Attachment:

5. Project Abstract

Project Title

Arizona K-12 Statewide Longitudinal Data System (SLDS) Project
CFDA #84-372A2012

Priority Addressed by the Project

Priority 1: to design, develop, and implement a statewide, longitudinal kindergarten through grade 12 (K-12) data system.

Participating Agencies

- a. Arizona Department of Education (ADE)
- b. Arizona State University (ASU)
- c. Maricopa County Education Service Agency (MCESA) and other county education agencies.
- d. Local Educational Agencies (LEAs)

Project Description

ADE has used previous federal grant funding through the SLDS program to construct a data warehouse where many of the required data elements for a statewide longitudinal data system are currently in place. However, the current systems cannot effectively support increasing demands for timely, transparent, accessible, and actionable data across the K-12 continuum. Despite the depth of student data collected, Arizona is only able to provide a limited amount of actionable data back to stakeholders. Through this project, Arizona will be able to make significant progress toward meeting several key elements identified as requiring action, based on a needs assessment of the current state of the SLDS as aligned to the 16 capacity requirements defined in the RFA, as well as the recent 2011 *Data Quality Campaign* survey.

Expected Deliverables

ADE's SLDS proposal is focused on deliverables that will increase:

- a. Identity management and access security (**Privacy Protection and Data Accessibility, Enterprise-wide Architecture, Secure Access to Useful Data for Key Stakeholder Groups**);
- b. Provide user-friendly, multi-layered data visualizations (**Data Use Deliverables**);
- c. Complete the data collection required to realize Arizona's vision for a comprehensive longitudinal framework (**Need and Uses, Data Quality, Interoperability, Enterprise-wide Architecture, Partnerships with Research Community**); and,
- d. Embark on a training program that will enable stakeholders to effectively access information (**Training on Use of Data Tools and Products, Professional Development on Data Use Evaluation of Data Products, Training, and Professional Development Sustainability**).

Project Narrative File(s)

* Mandatory Project Narrative File Filename:

To add more Project Narrative File attachments, please use the attachment buttons below.



Grant Application

Arizona's K-12 Statewide Longitudinal Data System (SLDS)

CFDA Number 84.372

Submitted to:
National Center for Education Statistics
Institute of Education Sciences
U.S. Department of Education
December 14, 2011

6. Project Narrative

6. a. Need for Project

Arizona's Priority 1, K-12 Statewide Longitudinal Data System (SLDS) grant will provide the Arizona Department of Education (ADE) with the means necessary implement mission-critical, needed tools that, coupled with a developed training and support framework to support effective implementation, will serve to advance the ongoing education reform efforts of all Arizona's educational stakeholders (led by major initiatives by State Superintendent of Public Instruction John Huppenthal and Governor Jan Brewer). The goal is to ensure that all Arizona students graduate high school and are career ready. Arizona's education reform plan, *Arizona Ready*, has established specific, measurable goals that hold students, teachers, administrators, and schools to higher expectations with the intention and expectation to:

- Increase the percentage of third graders meeting state reading standards to 94% in 2020 from 73% in 2010;
- Raise the graduation rate to 93% in 2020 from 75% in 2010;
- Increase the percentage of eighth graders achieving at or above basic on the National Assessment of Educational Progress (NAEP) to 85% in 2020 from 67% in math and 68% in reading in 2010; and,
- Double the number of students receiving baccalaureate degrees to 36,000 per year.

A robust, fully-developed identity and access management system along with web-based dashboards will provide ADE the capability to collect, measure, and evaluate critical data to realize strategic objectives of reform efforts. All stakeholders will be provided with controlled access to resources that comply with FERPA requirements that will provide visualization and analysis of meaningful, actionable, accurate, and timely data analytics. These data will serve to support ongoing state accountability and monitoring efforts through providing significantly enhanced capacity to conduct ongoing analysis of data to drive instructional, programmatic and policy decisions as well as help the state and schools identify best practices. Program effectiveness evaluations can then be evaluated, providing a strong foundation for future education research efforts.

The *2011 Data Quality Campaign (DQC)* state survey results analysis has identified key areas still for ADE to address. This project has been designed to address each of the following areas of need:

- Implement systems to provide timely access to information
- Create progress reports using individual student data to improve student performance
- Create reports using longitudinal statistics to guide system-wide improvement efforts
- Promote educator professional development and credentialing
- Promote strategies to raise awareness of available data
- Student-level course completion (transcript) data

IMS - Overview of the Arizona Landscape and Current System

ADE has multiple Identity Management Systems (IMS), each of which requires its own access management. Current users have a unique ID to access functions; however, they may have several IDs depending on how many roles they have or how many entities for which they work. These multiple IDs are problematic in that ADE is unable to authenticate who is accessing the data and if he/she is accessing the appropriate information. In its current state, ADE does not have the ability to review, evaluate and update external user and data access on a regular basis. The agency also cannot report or review current user access by user or by application. The security risks are amplified by the fact that the agency currently stores user credentials within the database.

Access to ADE's systems is not an easy, user-friendly endeavor. New users looking for initial access to ADE services must go through a labor-intensive provisioning process. Additionally, a simple task like initiating a name change or new role within an entity is a highly-manual process. These hindrances are complicated by a redundant, cumbersome log on process. Because ADE currently lacks an Enterprise-wide identity solution, user identities are scattered across Common Logon, EduAccess, and other systems. In the end, users are burdened with maintaining multiple identities for getting access to services provided by ADE. This duplication exacerbates the security issues because it encourages password sharing, multiple user IDs, and simplistic passwords that are easily compromised.

As with the initiation and maintenance processes, the current user termination process is an onerous one. Data access is not completely revoked after a termination due to the inability to easily determine user access. There is not an automated process to ensure that all system and data access are deactivated during user termination. Finally, existing sign-on and authentication mechanisms are stand alone and cannot share user information between external systems (ie SharePoint).

Dashboards

In 2006 ADE embarked on an ambitious project to create a data warehouse with student-level, school-level, and district-level data. The result of that project, the Arizona Education Data Warehouse (AEDW), contains this information; however, few users are successful in both accessing the data and extracting meaningful data. The AEDW also does not interface well with the research community. Ideally, ADE would have a consistent, easy policy in place to process the requests for data for research purposes and for communicating the scope of data available for analysis. Unfortunately, the current practice is a labor-intensive, manual process that has taxed the established relationships with internal and external research groups.

Student Related Data

The AEDW collects student data as submitted by schools. This data includes student personal and demographic data, absence/attendance figures, year-end outcome (integration of all possible outcomes for the school year), and withdrawal rates. Schools also report data on programs and needs participation. There are over 80 programs addressing the needs of the students in the public school system in Arizona. These programs are grouped into three areas: Special Education, Language, and Support. There are over 40 needs defined for the students in the public school system in Arizona. Categorized in nine groups, these needs are generally to economic

disadvantage, social disadvantage, and health groups. In addition to the data submitted by Arizona schools, some data like limited English proficiency and Arizona's Instrument to Measure Standards (AIMS) results is input into the warehouse by contracted vendors.

School Related Data

The AEDW contains data on school descriptors like geographic, educational, and organizational data. Data is also collected, though not currently included in the AEDW, on school district and charter schools annual budgets and expenditure data. State and federal grants awards, including allocations of federal titles money, are also collected by other ADE program areas. Other measures currently unavailable in the AEDW include state student-based equalization, and other appropriations and school performance indicators (AYP, AZ LEARNS, and school improvement). The AEDW needs to integrate these pieces to ensure the ability to provide and analyze longitudinal data.

Teacher and School Staff Related Data

ADE does collect some teacher-related data, but the data warehouse is incomplete. At this time, teacher, principal, and educational professional certifications are not housed in the AEDW, nor is Highly Qualified Teachers data. Additionally, the student-teacher connection is not complete. ADE has begun a pilot program to begin implementing course mapping to CEDS standards. This endeavor, coupled with mapping teachers to those courses, will eventually build that critical link to meaningful longitudinal data.

While the warehouse contains a significant amount of useful educational data, it has not resulted in a user-friendly system. Those willing to attempt access, which can be sporadic at times, must be able to construct and understand complex Excel pivot tables. As such, the number of actual users is quite low. The operational systems support ongoing operation and annual reports, but the data in these systems is not organized in a manner that enables long term analysis. ADE staff has created ad hoc static reports for operational data for longitudinal (historical) views. The original intent of the AEDW has not been realized, as students, parents, teachers, administrators, and policy makers are not able to use the data to make meaningful educational decisions.

Training and Support

The economic downturn has severely impacted ADE's ability to provide AEDW training and support resources for stakeholders. Funds for external training activities have been eliminated in the previous 18 months, causing the divide between the goals of the AEDW and the actual usage to widen.

6. b. Project Deliverables Related to System Requirements and Implementation

Identity Management and Access System

ADE has already embarked on creating an identity management and access system to safeguard personal data, comply with state and federal privacy laws, and provide reporting and auditing access and security. This standards-based IMS will manage access requirements for SLDS dashboards and portal, and provide a single sign on authentication system to support access to all

the dashboards/applications by logging in once only. These changes will allow ADE to have auditing capabilities to report and track access to dashboards and other data. At final deployment, IMS training will be available for administrators and end users, complete with user guides and web-based tutorials.

Once implemented, ADE will know who is using the system, what data he/she is accessing and will provide assurances that data is only being viewed by appropriate users. ADE will employ the following security best practices:

- a) Ensure that access granted to internal and external users is documented and authorized. Internal users should only be granted access rights that are compatible with their job responsibilities
- b) Ability to periodically evaluate and update access granted to all of its applications and systems
- c) Enforce password complexity standards
- d) Enforce password change frequency
- e) Maintain authorization and change history for user and data access
- f) Ensure that responsibilities are adequately separated and appropriate for the user's job responsibilities
- g) Ensure that access granted to external users is authorized and maintain change history

The new IMS will contain identification and credential information to verify the user's unique identity and support the user's authentication for any secondary domains with interaction may be required. It will also provide a single user account management interface through which all the component domains may be managed. The new IMS will be used to provide full identity and access management and authentication services for trusted external partners that do not have the technical capabilities for full federation (such as small school districts). Additional development will be needed to provide appropriate user interfaces to post-secondary entities, preschools, and other data providers not currently submitting data to ADE.

As part of the deployment of a new IMS, a robust, user-friendly self-service portal will be developed. A user will be able to gain access to dashboards and portals, by using Active Directory Security groups. The level of access will be also assigned at this portal, by employing role-based access. These safeguards allow quick and easy access to appropriate users while controlling access to sensitive data like student demographics, grades, and teacher evaluations.

ADE is consolidating multiple Active Directory domains down to two domains based on user role and access for a more secure and streamlined provisioning process. ADE has begun integrating user sign-on and account management for the domains, as well as externally provided resources, by establishing an agency-wide IMS. The new IMS will provide a scalable, single user account management interface to manage access to all ADE-provided resources. It will also federate identity management and authentication services with trusted partners such as school districts. The result will be faster access to distributed resources by reducing the user's need to remember and deal with multiple usernames and passwords, lower sign-on failure rate, upgraded system security (including the ability of administrators to change a user's access to all system resources in a coordinated, consistent way), and improved administrator response when adding/removing users and modifying access rights. The new IMS will provide self-servicing features for password reset and new access requests for reduced cost and better user experience.

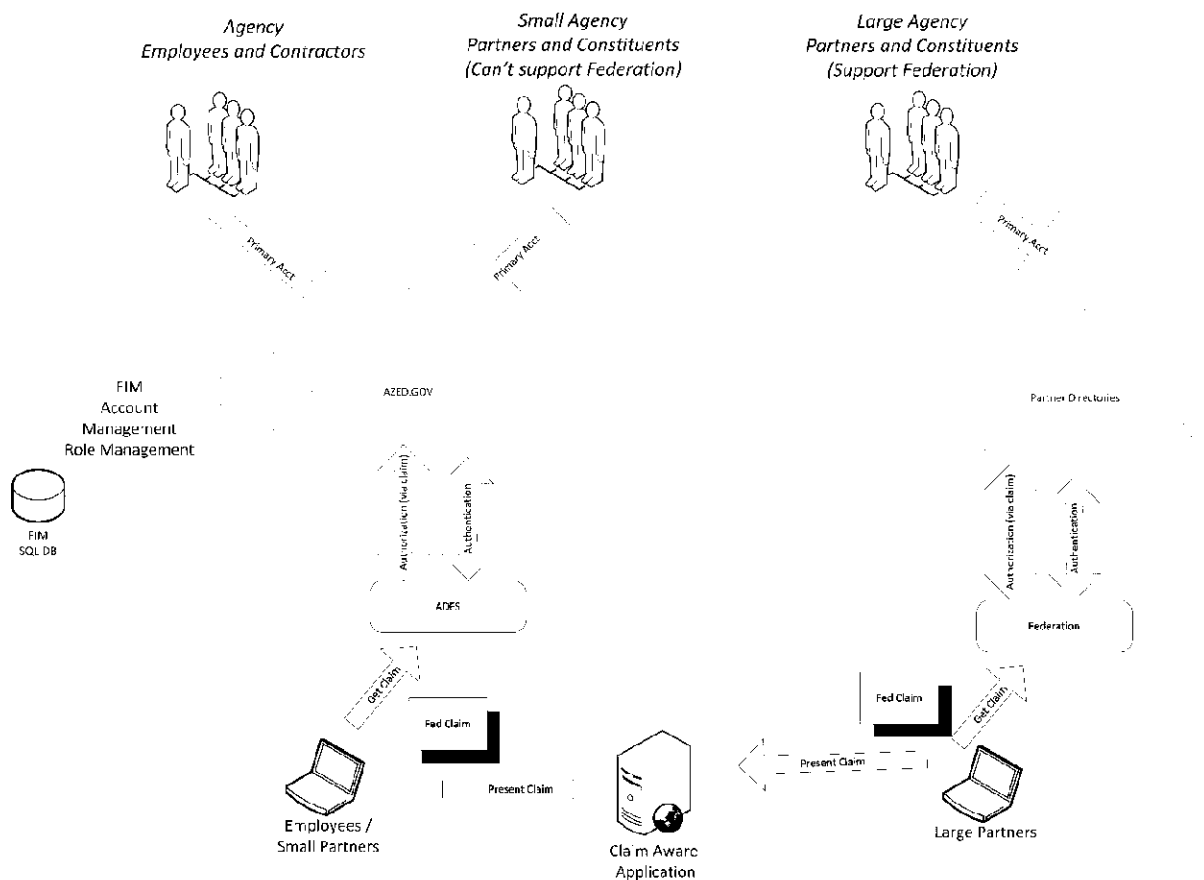


Figure 1: ADE Federation Proposed Architecture

The long-term vision for ADE identity and access management shows a single directory for agency employees, contractors, and independent partners. These accounts and application roles are managed through a single Forefront Identity Management (FIM) 2010 instance. All applications are Active Directory Federated Services (ADFS) integrated allowing them to leverage the accounts and roles published from the azed.gov forest.

Also, ADFS will allow large partners and constituent organizations to federate their directories with the agency application farm. This federation will enable these users to authenticate (and possibly be authorized) into the published ADE applications. This will dramatically reduce the cost and complexity of account and role administration within the agency.

Dashboards

Usability and collaboration is an important part of the dashboard development and support ADE. A blog site will be created and available enabling teachers, administrators, and ADE staff to have candid exchange, inquiries, and sharing about ADE initiatives including the SLDS deliverables outlined in this proposal through the existing ADE SharePoint system.

The SLDS dashboards will provide parents, teachers, administrators, policy makers, and the public access to the state’s data warehouse in a user-friendly visual format. These dashboards will be designed to visualize the three types of information (student data, teacher data, and

school/district data) already found in the AEDW. In addition to developing the dashboards, more efficient external data request approval processes will be established to work with the research community. Tools can also be developed to work with researchers to pull data as both standard and custom reports.

| Stake Holders | Student Visualizations | School Visualizations | Teacher Visualizations |
|----------------------|------------------------------------|------------------------------|---|
| Students | Yes, His/Her Own data ONLY | Yes | NO |
| Parents | Yes, His/Her Own Child data ONLY | Yes | TBD |
| Teachers | Yes, His/Her Students Data ONLY | Yes | Yes, His/Her own Data ONLY |
| School/Districts | Yes, District/School Students ONLY | Yes | Yes, District/School Teachers Data ONLY |
| Policy Makers | TBD | Yes | TBD |
| Public | TBD | Yes | NO |
| ADE Program Areas | Yes | Yes | Yes |

Student Visualizations

Users will be able to access, via the ADE website, these comprehensive data in a visually-pleasing, user-friendly format. By clicking the type of information he/she is interested in, a visual display of the above described student information will be available by school, district, region, and statewide. These data will be able to be tracked over time and users will be able to get a complete picture of both the current state and changes over time. Parents using these dashboards will be able to see important information about their child's school and have the ability to make informed educational choices.

School Visualizations

Analysis for identification of all entities participating in public education and all data sources related to funding has been completed. It exposed the necessity to develop a new master data model that will accommodate new organizations providing public education, such as various consortiums and multiple rollups of entities. School Performance data is not currently available in the AEDW. ADE will begin to incorporate school descriptors like geographic, educational and organizational data. The data on school district and charter schools annual budgets and expenditure data and state and federal grants must also be collected and incorporated into the AEDW. Currently various ADE units produce various annual indicators, publishing each on the website in a separate spreadsheet format. To be effective all indicators per school need to be displayed together with a longitudinal perspective.

This component of SLDS is a critical piece for parents, teachers, and policy makers. Having data collected and displayed in an easy, understandable format is critical to ensure sound educational choices and decisions. Parents will know the strengths and weaknesses of a particular school and/or district and be better able to match that information to the strengths and weaknesses of their children. Administrators will know how their school measures up to others in a district,

region and statewide, quickly emphasizing areas for improvement. Policy makers will have this important data to consider when deliberating on educational-related policies.

Once completed, users will be able to visualize student data at the school, district, county and state level. Users will easily see data on the school calendar and basic school demographics. School district and charter schools annual budgets and expenditure data will be readily available as well as state and federal grant allocations (including the allocations of federal titles money). Performance indicators like AYP, AZLEARNS and school improvement information will be displayed in a visually-interesting, easy-to-use manor. The aggregated data on district graduation and dropout rate will also be included in the dashboards.

Teacher Visualizations

The teacher-focused dashboards will allow teachers to view his/her class data. In a single view, teachers will know important information about classroom students, personal performance reviews, special needs, and program participation. This real-time data is essential to providing teachers the tools for individualized instruction. Teachers can more efficiently and effectively prepare lesson plans, develop curricula, measure student progress, and identify the specific educational needs of students in his/her classroom. Teachers will also be able to view a unique personal profile, including past evaluations and other performance metrics.

Completing the AEDW

Several of the components required for this dashboard are not currently available in the data warehouse. ADE collects some of this data in other formats, so this data would need to be migrated to the AEDW. The SLDS project will provide visualization tools and dashboards in support of identified key indicators at identified levels. In order to accomplish this task, ADE will continue to incorporate common elements and standards into the AEDW and incorporate teacher data, course, and class data into AEDW for use in classroom-level instruction analyses. Longitudinal data on teacher demographics, certifications, education, and experience are currently available in ADE source systems. This effort will include the steps identified in the following sections.

Extend the current data warehouse to contain K12 data elements required to establish student-teacher connections and related K12 data elements that can illuminate and/or influence student outcomes. Arizona districts and schools are free to choose student management systems (SMS), set up courses and define what constitute classes for scheduling and funding purposes. The state is currently participating in pilot programs with partner districts to develop standards for data transfers between LEAs and ADE. At present, the state cannot mandate that SMS vendors provide their district customers with the means to comply with these standards.

Create an automatic means to provide Arizona's unique teacher identifier to LEAs. Unique teacher identifiers are maintained in ADE's statewide educator database. LEA's can extract their teacher identifiers through the state's Highly Qualified Teacher application for import into their SMSs. The completed project ideally can detect teachers in a LEAs SMS and human resources systems with missing state identifiers and provide those identifiers from the state system without human intervention.

Establish a set of state level common course codes. Earlier this year, ADE contracted with ESP Solutions Group to pilot a mapping of local course codes from a single LEA to the School Codes for the Exchange of Data (SCED) school code classification system. The process established during this pilot is to be extended to a larger set of partner districts and ultimately to all LEAs throughout the state. These codes will be made available to LEAs that choose to incorporate them. The district systems and a cross-reference process will be made available to those LEAs unable to do so.

Finalize data file specifications for student-teacher connection files. In partnership with Arizona State University, ADE defined an initial set of four file specifications for the transfer of student-teacher connection data elements: a course file, a class file, a staff assignment file, and a student roster file. We also provided data dictionaries and file creation instructional materials. Six districts provided files based upon these specifications with varying degrees of completeness and success. In partnership with the Maricopa County Educational Service Agency (MCESA) and their partner districts, these specifications and associated materials are being refined to ensure that correct and complete data can be made available to the state for inclusion in its data warehouse.

Training and Support

SLDS Implementation

ADE will employ a structured process to develop a training and support system. The first objective of the plan is to conduct a needs assessment. ADE will identify and define stakeholder/user training requirements and use guidelines through tools like surveys, focus groups, and in-depth key stakeholder interviews. Business use cases designed to capture each stakeholder group's unique and diverse data needs. The resulting information will be used to design guidelines, training, and systems of support aligned to stakeholder needs. ADE staff have identified the following stakeholders necessary for a successful program:

- ADE Information Technology Division
- Students
- Parents
- Teachers
- School and district administrators
- County and state administrators
- Policy makers
- General public

ADE will also develop guidelines for SLDS that align with to stakeholder requirements and data use needs. Training materials (multiplatform/multimodal/synchronous and asynchronous) and programs will be created to respond to stakeholder needs requirements. Training will be provided to support both procedural use and on the review, examination and interpretation of available data through the SLDS. This training program supports stakeholders' efforts to enhance student learning and growth and addressing research questions regarding program effectiveness. Program artifacts will include:

- Documentation: Guidelines, Manuals
- Stand-alone modules/webinars

- Face-to-face modules
- Train-the-trainer materials

ADE will also deploy a sustainable system to support the ongoing training and technical assistance needs of users of the SLDS. To that end, ADE will use the new Regional Training Centers and County ESAs and create an ongoing system of support. This multi-modal will consist of websites of resources, in house help-desk, ADE implementation/use coaches, and collaboration with ADE program staff to infuse training within existing outreach and support. A SharePoint Portal will be used to introduce for discussion boards/social networking to build community of support.

The next activity is to partner with the pilot LEAs already fully connected to the SLDS. LEAs that have completed course mapping and the student-teacher-data link will be uniquely positioned to help ADE evaluate the developed products and training methodologies and make process revisions based on evaluation results. Finally, ADE will launch these training modules for statewide implementation and review.

6. c. Timeline for Project Deliverables

The timeline section describes the activities and responsibilities of ADE IT, ADE functional team, LEAs, and various review committees. The ADE IT team is comprised of ADE staff, professional services providers, consultants, applicable vendors. The various deliverables are detailed in software development and project management in section 6. d.

| Sr. No | Activities/Tasks | Responsibility | Start | End |
|-----------|--|-----------------------------------|-----------|-------------|
| 1. | Blueprint and planning | | | |
| 1.1. | Project kick-off meeting | ADE IT, LEAs, ADE Functional team | June 2012 | June 2012 |
| 1.2. | Project charter | ADE IT | June 2012 | June 2012 |
| 1.3. | Identify all stake holders for the project | ADE IT | June 2012 | June 2012 |
| 1.4. | Create high level business requirements document | ADE IT, LEAs, ADE Functional team | June 2012 | July 2012 |
| 1.5. | Technical requirements specification | ADE IT | June 2012 | July 2012 |
| 1.6. | Top-level Development Plan | ADE IT | June 2012 | June 2012 |
| 1.7. | Testing Plan | ADE IT | June 2012 | July 2012 |
| 1.8. | Configuration management plan | ADE IT | June 2012 | June 2012 |
| 1.9. | Migration Plans | ADE IT | June 2012 | July 2012 |
| 1.10. | User Interface Design specification document | ADE IT, LEA, ADE functional team | June 2012 | August 2012 |
| 1.11. | Risk Mitigation plan | ADE IT, LEA, ADE functional team | June 2012 | June 2012 |

| Sr. No | Activities/Tasks | Responsibility | Start | End |
|---------------|---|---|-------------------|----------------|
| 1.12. | Product backlog | ADE IT, LEA, ADE functional team | July 2012 | August 2012 |
| 1.13. | UI prototype | ADE IT, LEA, ADE functional team | June 2012 | August 2012 |
| 1.14. | Usability testing on mock-up screens | ADE IT, LEA, ADE functional team | August 2012 | August 2012 |
| 1.15. | Budgets and resource allocation | ADE IT, LEA, ADE functional team | June 2012 | June 2012 |
| 1.16. | Setup of code and document repository | ADE IT, | June 2012 | June 2012 |
| 1.17. | Setup of guidelines and standards | ADE IT | June 2012 | June 2012 |
| 1.18. | Identify additional pilot districts apart from 5 Maricopa county school districts | ADE Functional team | August 2012 | August 2012 |
| 1.19. | Acceptance test scenarios | ADE IT and ADE functional team | July 2012 | August 2012 |
| 1.20. | Update from IMS team | ADE IT | July 2012 | July 2012 |
| 1.21. | Update from 5 school districts about student-teacher link | ADE functional team, LEAs, ADE IT | August 2012 | August 2012 |
| 1.22. | Develop architectural impacts to existing AEDW | ADE IT | August 2012 | August 2012 |
| 1.23. | Identify training needs | ADE IT, LEAs, ADE functional team | August 2012 | August 2012 |
| 2. | <ul style="list-style-type: none"> • Development, Testing and Deployment (Phase 1) • Dashboard - School/District Visualizations <ul style="list-style-type: none"> ▪ Demographics ▪ Schedule/Calendar ▪ Enrollments ▪ Graduation Rate ▪ Dropout Rate ▪ School Performance • Identity management system Training | | | |
| 2.1. | Sprint Backlogs | ADE IT, ADE functional team | September 2012 | March 2013 |
| 2.2. | Functional specifications document | LEA, ADE IT, ADE Functional team | September 2012 | March 2013 |

| Sr. No | Activities/Tasks | Responsibility | Start | End |
|---------------|--|---|-------------------|---------------|
| 2.3. | Functional test cases | LEA, ADE IT, ADE Functional team | September 2012 | March 2013 |
| 2.4. | Technical design document <ul style="list-style-type: none"> • Create data model • Design warehouse views • Develop reports design • Create source-to-target mappings | ADE IT | September 2012 | March 2013 |
| 2.5. | HTML screens | LEA, ADE IT, ADE Functional team | September 2012 | March 2013 |
| 2.6. | Coding <ul style="list-style-type: none"> • Create data tables • Create code for loading data • Load data to development/staging • Build Cubes • Create reports | ADE IT | September 2012 | March 2013 |
| 2.7. | Unit testing | ADE IT | September 2012 | March 2013 |
| 2.8. | User guides | LEA, ADE IT, ADE Functional team | September 2012 | March 2013 |
| 2.9. | Online training | LEA, ADE IT, ADE Functional team | September 2012 | March 2013 |
| 2.10. | Deployment guide | ADE IT | September 2012 | March 2013 |
| 2.11. | Test data from LEAs | ADE IT, LEAs | September 2012 | March 2013 |
| 2.12. | Build automation and script | ADE IT | September 2012 | March 2013 |
| 2.13. | Deployment and testing | ADE IT | September 2012 | March 2013 |
| 3. | Roll-out – Phase 1 | | | |
| 3.1. | Roll-out Plan | ADE IT, LEAs, ADE Functional Team | April 2013 | April 2013 |
| 3.2. | Cutover plan | ADE IT, LEAs, ADE Functional Team | April 2013 | April 2013 |
| 3.3. | Data Preparation and Migration | ADE IT, LEAs | April 2013 | April 2013 |

| Sr. No | Activities/Tasks | Responsibility | Start | End |
|---------------|---|-----------------------------------|---------------|---------------|
| 3.4. | Bug Tracking Mechanism – System Test/Acceptance test | ADE IT, LEAs, ADE Functional Team | April 2013 | May 2013 |
| 3.5. | Training and user guides | ADE IT, LEAs, ADE Functional Team | April 2013 | May 2013 |
| 3.6. | Deploy Code to Production for 5 pilot school districts | ADE IT, LEAs, ADE Functional Team | June 2013 | June 2013 |
| 3.7. | Load data to production. | ADE IT | June 2013 | June 2013 |
| 3.8. | Validate data | ADE IT, LEAs, ADE Functional Team | June 2013 | June 2013 |
| 3.9. | Deploy Cube to Production | ADE IT | June 2013 | June 2013 |
| 3.10. | Process Cube | ADE IT | June 2013 | June 2013 |
| 3.11. | Validate Cube | ADE IT, LEAs, ADE Functional Team | June 2013 | June 2013 |
| 3.12. | Deploy Reports to Production | ADE IT | June 2013 | June 2013 |
| 3.13. | Validate Reports | ADE IT, LEAs, ADE Functional Team | June 2013 | June 2013 |
| 3.14. | Release data products | ADE IT, LEAs, ADE Functional Team | June 2013 | June 2013 |
| 3.15. | Prepare Data for additional 5 school districts – Pilot II | ADE IT, LEAs, ADE Functional Team | August 2013 | October 2013 |
| 3.16. | Training of users | ADE IT, LEAs, ADE Functional Team | August 2013 | October 2013 |
| 3.17. | Acceptance Test/System Test | ADE IT, LEAs, ADE Functional Team | October 2013 | November 2013 |
| 3.18. | Load data to production - Pilot II | ADE IT | November 2013 | November 2013 |
| 3.19. | Validate data | ADE IT, LEAs, ADE Functional Team | November 2013 | November 2013 |
| 3.20. | Deploy Cube to Production | ADE IT | November 2013 | November 2013 |
| 3.21. | Process Cube | ADE IT | November 2013 | November 2013 |

| Sr. No | Activities/Tasks | Responsibility | Start | End |
|---------------|---|---|------------------|------------------|
| 3.22. | Validate Cube | ADE IT, LEAs, ADE Functional Team | November 2013 | November 2013 |
| 3.23. | Deploy Reports to Production | ADE IT | November 2013 | November 2013 |
| 3.24. | Validate Reports | ADE IT, LEAs, ADE Functional Team | November 2013 | November 2013 |
| 3.25. | Release data products | ADE IT, LEAs, ADE Functional Team | November 2013 | November 2013 |
| 4. | Maintenance and Support – Phase 1 | | | |
| 4.1. | Maintenance Plan | ADE IT, LEAs, ADE Functional Team | June 2013 | June 2013 |
| 4.2. | Support Plan | ADE IT, LEAs, ADE Functional Team | June 2013 | June 2013 |
| 4.3. | Tickets tracking system | ADE IT, LEAs, ADE Functional Team | June 2013 | June 2015 |
| 4.4. | Review of tickets and feedback to development team | ADE IT, LEAs, ADE Functional Team | June 2013 | June 2015 |
| 4.5. | Provide Maintenance and Support | ADE IT | June 2013 | June 2015 |
| 4.6. | Provide Maintenance and Support – Pilot II | ADE IT | November 2013 | June 2015 |
| 5. | <ul style="list-style-type: none"> • Development, Testing and Deployment (Phase 2) • Student Visualizations <ul style="list-style-type: none"> ▪ Demographics ▪ Program & Needs ▪ Attendance ▪ Assessments ▪ Student Transcripts ▪ Student Growth ▪ College Readiness <p>Training</p> | | | |
| 5.1. | Sprint Backlogs | ADE IT, ADE functional team | November 2013 | March 2014 |
| 5.2. | Functional Specifications document | LEA, ADE IT, ADE Functional team | November 2013 | March 2014 |
| 5.3. | Functional test cases | LEA, ADE IT, ADE Functional team | November 2013 | March 2014 |

| Sr. No | Activities/Tasks | Responsibility | Start | End |
|---------------|--|-----------------------------------|---------------|------------|
| 5.4. | Technical Design document <ul style="list-style-type: none"> • Create data model • Design warehouse views • Develop reports design • Create source-to-target mappings | ADE IT | November 2013 | March 2014 |
| 5.5. | HTML screens | LEA, ADE IT, ADE Functional team | November 2013 | March 2014 |
| 5.6. | Coding <ul style="list-style-type: none"> • Create data tables • Create code for loading data • Load data to development/staging • Build Cubes • Create reports | ADE IT | November 2013 | March 2014 |
| 5.7. | Unit Testing | ADE IT | November 2013 | March 2014 |
| 5.8. | User Guides | LEA, ADE IT, ADE Functional team | November 2013 | March 2014 |
| 5.9. | Online training | LEA, ADE IT, ADE Functional team | November 2013 | March 2014 |
| 5.10. | Deployment guide | ADE IT | November 2013 | March 2014 |
| 5.11. | Test Data from LEAs | ADE IT, LEAs | November 2013 | March 2014 |
| 5.12. | Build Automation and Script | ADE IT | November 2013 | March 2014 |
| 5.13. | Deployment and Testing | ADE IT | November 2013 | March 2014 |
| 6. | Roll-out – Phase 2 | | | |
| 6.1. | Roll-out Plan | ADE IT, LEAs, ADE Functional Team | April 2014 | April 2014 |
| 6.2. | Cutover plan | ADE IT, LEAs, ADE Functional Team | April 2014 | April 2014 |
| 6.3. | Data Preparation and Migration | ADE IT, LEAs | April 2014 | April 2014 |
| 6.4. | Bug Tracking Mechanism – System Test/Acceptance test | ADE IT, LEAs, ADE Functional Team | April 2014 | May 2014 |

| Sr. No | Activities/Tasks | Responsibility | Start | End |
|---------------|--|---|-----------------|-------------------|
| 6.5. | Training and user guides | ADE IT, LEAs, ADE Functional Team | April 2014 | May 2014 |
| 6.6. | Deploy Code to Production for 5 pilot school districts | ADE IT, LEAs, ADE Functional Team | June 2014 | June 2014 |
| 6.7. | Load data to production. | ADE IT | June 2014 | June 2014 |
| 6.8. | Validate data | ADE IT, LEAs, ADE Functional Team | June 2014 | June 2014 |
| 6.9. | Deploy Cube to Production | ADE IT | June 2014 | June 2014 |
| 6.10. | Process Cube | ADE IT | June 2014 | June 2014 |
| 6.11. | Validate Cube | ADE IT, LEAs, ADE Functional Team | June 2014 | June 2014 |
| 6.12. | Deploy Reports to Production | ADE IT | June 2014 | June 2014 |
| 6.13. | Validate Reports | ADE IT, LEAs, ADE Functional Team | June 2014 | June 2014 |
| 6.14. | Release data products | ADE IT, LEAs, ADE Functional Team | June 2014 | June 2014 |
| 6.15. | Prepare Data for additional 5 school districts – Pilot II | ADE IT, LEAs, ADE Functional Team | July 2014 | September 2014 |
| 6.16. | Training of users | ADE IT, LEAs, ADE Functional Team | July 2014 | September 2014 |
| 6.17. | Acceptance Test/System Test | ADE IT, LEAs, ADE Functional Team | August 2014 | October 2014 |
| 6.18. | Load data to production - Pilot II | ADE IT | October 2014 | October 2014 |
| 6.19. | Validate data | ADE IT, LEAs, ADE Functional Team | October 2014 | October 2014 |
| 6.20. | Deploy Cube to Production | ADE IT | October 2014 | October 2014 |
| 6.21. | Process Cube | ADE IT | October 2014 | October 2014 |
| 6.22. | Validate Cube | ADE IT, LEAs, ADE Functional Team | October 2014 | October 2014 |
| 6.23. | Deploy Reports to Production | ADE IT | October 2014 | October 2014 |

| Sr. No | Activities/Tasks | Responsibility | Start | End |
|---------------|---|---|-----------------|------------------|
| 6.24. | Validate Reports | ADE IT, LEAs, ADE Functional Team | October 2014 | October 2014 |
| 6.25. | Release data products | ADE IT, LEAs, ADE Functional Team | October 2014 | October 2014 |
| 7. | Maintenance and Support – Phase 2 | | | |
| 7.1. | Update Maintenance Plan | ADE IT, LEAs, ADE Functional Team | July 2014 | July 2014 |
| 7.2. | Update Support plan | ADE IT, LEAs, ADE Functional Team | July 2014 | July 2014 |
| 7.3. | Tickets tracking system | ADE IT, LEAs, ADE Functional Team | July 2014 | June 2015 |
| 7.4. | Review of tickets and feedback to development team | ADE IT, LEAs, ADE Functional Team | July 2014 | June 2015 |
| 7.5. | Provide Maintenance and Support | ADE IT | October 2014 | June 2015 |
| 8. | <ul style="list-style-type: none"> • Development, Testing and Deployment (Phase 3) • Teacher Visualizations <ul style="list-style-type: none"> ▪ Teacher Assessments ▪ Student- Teacher connection for courses taken Training | | | |
| 8.1. | Sprint Backlogs | ADE IT, ADE functional team | October 2014 | December 2014 |
| 8.2. | Functional Specifications document | LEA, ADE IT, ADE Functional team | October 2014 | December 2014 |
| 8.3. | Functional test cases | LEA, ADE IT, ADE Functional team | October 2014 | December 2014 |
| 8.4. | Technical Design document <ul style="list-style-type: none"> • Create data model • Design warehouse views • Develop reports design • Create source-to-target mappings | ADE IT | October 2014 | December 2014 |
| 8.5. | HTML screens | LEA, ADE IT, ADE Functional team | October 2014 | December 2014 |

| Sr. No | Activities/Tasks | Responsibility | Start | End |
|---------------|--|-----------------------------------|---------------|---------------|
| 8.6. | Coding <ul style="list-style-type: none"> • Create data tables • Create code for loading data • Load data to development/staging • Build Cubes • Create reports | ADE IT | October 2014 | December 2014 |
| 8.7. | Unit Testing | ADE IT | October 2014 | December 2014 |
| 8.8. | User Guides | LEA, ADE IT, ADE Functional team | October 2014 | December 2014 |
| 8.9. | Online training | LEA, ADE IT, ADE Functional team | October 2014 | December 2014 |
| 8.10. | Deployment guide | ADE IT | October 2014 | December 2014 |
| 8.11. | Test Data from LEAs | ADE IT, LEAs | October 2014 | December 2014 |
| 8.12. | Build Automation and Script | ADE IT | October 2014 | December 2014 |
| 8.13. | Deployment and Testing | ADE IT | October 2014 | December 2014 |
| 9. | Roll-out – Phase 3 | | | |
| 9.1. | Roll-out Plan | ADE IT, LEAs, ADE Functional Team | January 2015 | January 2015 |
| 9.2. | Cutover plan | ADE IT, LEAs, ADE Functional Team | January 2015 | January 2015 |
| 9.3. | Data Preparation and Migration | ADE IT, LEAs | January 2015 | January 2015 |
| 9.4. | Bug Tracking Mechanism – System Test/Acceptance test | ADE IT, LEAs, ADE Functional Team | January 2015 | February 2015 |
| 9.5. | Training and user guides | ADE IT, LEAs, ADE Functional Team | January 2015 | February 2015 |
| 9.6. | Deploy Code to Production for 5 pilot school districts | ADE IT, LEAs, ADE Functional Team | February 2015 | February 2015 |
| 9.7. | Load data to production. | ADE IT | February 2015 | February 2015 |

| Sr. No | Activities/Tasks | Responsibility | Start | End |
|---------------|--|---|------------------|------------------|
| 9.8. | Validate data | ADE IT, LEAs, ADE Functional Team | February 2015 | February 2015 |
| 9.9. | Deploy Cube to Production | ADE IT | February 2015 | February 2015 |
| 9.10. | Process Cube | ADE IT | February 2015 | February 2015 |
| 9.11. | Validate Cube | ADE IT, LEAs, ADE Functional Team | February 2015 | February 2015 |
| 9.12. | Deploy Reports to Production | ADE IT | February 2015 | February 2015 |
| 9.13. | Validate Reports | ADE IT, LEAs, ADE Functional Team | February 2015 | February 2015 |
| 9.14. | Release data products | ADE IT, LEAs, ADE Functional Team | February 2015 | February 2015 |
| 9.15. | Prepare Data for additional 5 school districts – Pilot II | ADE IT, LEAs, ADE Functional Team | March 2015 | April 2015 |
| 9.16. | Training of users | ADE IT, LEAs, ADE Functional Team | March 2015 | April 2015 |
| 9.17. | Acceptance Test/System Test | ADE IT, LEAs, ADE Functional Team | March 2015 | April 2015 |
| 9.18. | Load data to production - Pilot II | ADE IT | March 2015 | April 2015 |
| 9.19. | Validate data | ADE IT, LEAs, ADE Functional Team | March 2015 | April 2015 |
| 9.20. | Deploy Cube to Production | ADE IT | March 2015 | April 2015 |
| 9.21. | Process Cube | ADE IT | March 2015 | April 2015 |
| 9.22. | Validate Cube | ADE IT, LEAs, ADE Functional Team | March 2015 | April 2015 |
| 9.23. | Deploy Reports to Production | ADE IT | March 2015 | April 2015 |
| 9.24. | Validate Reports | ADE IT, LEAs, ADE Functional Team | March 2015 | April 2015 |

| Sr. No | Activities/Tasks | Responsibility | Start | End |
|---------------|--|---|---------------|---------------|
| 9.25. | Release data products | ADE IT, LEAs, ADE Functional Team | March 2015 | April 2015 |
| 10. | Maintenance and Support – Phase 3 | | | |
| 10.1. | Update Maintenance Plan | ADE IT, LEAs, ADE Functional Team | March 2015 | March 2015 |
| 10.2. | Update Support Plan | ADE IT, LEAs, ADE Functional Team | March 2015 | March 2015 |
| 10.3. | Tickets tracking system | ADE IT, LEAs, ADE Functional Team | March 2015 | June 2015 |
| 10.4. | Review of tickets and feedback to development team | ADE IT, LEAs, ADE Functional Team | March 2015 | June 2015 |
| 10.5. | Provide Maintenance and Support | ADE IT | April 2015 | June 2015 |
| 11. | Project Governance | | | |
| 11.1. | PMO Status Reporting | ADE IT | June 2012 | June 2015 |
| 11.2. | Program Steering committee meetings and reporting | ADE IT, LEAs, ADE functional team | June 2012 | June 2015 |
| 11.3. | Data Governance Commission(meeting, reporting) | Governance commission, ADE IT, ADE Functional team | June 2012 | June 2015 |
| 11.4. | Ad-hoc committee(meeting, reporting) | Ad-Hoc committee, ADE IT, ADE Functional team | June 2012 | June 2015 |
| 11.5. | Status updated to US Department of Education | ADE IT, ADE Functional team | June 2012 | June 2015 |

6. d. Project Management and Governance Plan

Software Development and Program Management Approach

ADE will follow a two-phased approach to this program. The first phase will serve to gather high level details on the requirements from the proposed system and components, create a blueprint of all the system components in the ecosystem in which the proposed system and components reside, and their mutual interaction. Subsequently, ADE will adopt an agile approach towards development of the product.

- Setup and planning
- High level requirements
- High level architecture
- High level development plans
- Product and Sprint backlog
- Development using SCRUM methodology
- Testing using V-Model for testing
- Deployment and systems architecture
- Release management
- Roll-out to pilot LEAs
- Data migration and Cut-over
- Training
- Maintenance Plan
- SLAs
- Support Level 1, 2 and 3
- Plan for implementing it across the state

Figure 2: Software Development Cycle

Phase 1 – Blueprint/Planning Phase

Methodology: The requirements gathering phase will involve a detailed study of the system and all the associated integration needs. It will also address the larger business requirement of the changing context (e.g. new programs being introduced by ADE), updates, reporting needs, etc. Before the conclusion of the first phase, requirements will be prioritized at a broad level, providing a road map for development, and detailed priorities will be worked out for the initial two or three development sprints.

Deliverables: The following will be the key deliverables of Phase 1:

| Item | Content / Details | ADE IT’s Responsibility | ADE Functional Team and LEA’s Responsibility |
|--|---|---|--|
| Business Requirements Specification | The complete scope of the system will be identified as a combination of use cases, functional specifications and non-functional specifications. Key risks, dependencies and assumptions will be documented as well. | Draft document, Work with functional leaders at agency to incorporate review changes, Work with Functional teams to identify priorities | Review, Ensure completeness, Ensure correctness, Assign Priorities, Sign Off |

| Item | Content / Details | ADE IT's Responsibility | ADE Functional Team and LEA's Responsibility |
|---|---|---|---|
| Project Charter | Development approach for the project along with roles and responsibility of various teams, deliverables, quality, communication and risk management plans, high level scope | Create a draft project charter, review the document and work with functional teams for sign-off | Review and sign-off |
| Technical Requirements Specification | <p>The complete technical scope of the system including:</p> <ol style="list-style-type: none"> 1) additional technologies to be used 2) related systems to interact with 3) risks, dependencies, assumptions 4) additional infrastructure needs and constraints 5) High Level Design 6) Any architecture considerations/ changes 7) Data model, if applicable 8) Integration approach 9) migration needs and approach, if required 10) Refine Coding and design guidelines if needed | Work with Functional Team to procure all information required, document them, make changes based on review comments | Review document in a timely manner for completeness, correctness and quality. |

| Item | Content / Details | ADE IT's Responsibility | ADE Functional Team and LEA's Responsibility |
|--------------------------------------|--|---|--|
| Top-level Development Plan | <p>Major requirement chunks and milestones associated with them.</p> <p>Detailed Development Plan for the first 2 sprints</p> <p>Sign off acceptance criteria for development in broad strokes as well as for the sprints which have been detailed out</p> | <p>Create top level development plan, milestones per sprint</p> | <p>Ensure access to resources to get the required information in a timely and complete manner, Review document, Sign Off</p> |
| Testing Plan | <p>Test plan for broad-level requirements</p> <p>Test plan in detail for the first 2 sprints</p> <p>User acceptance testing methodology including UAT Scenarios</p> <p>System Test Scenarios, Performance / Load Testing and Memory Profiling</p> | | <p>Ensure access to resources to get the required information in a timely and complete manner, Review document, Sign Off</p> |
| Configuration Management Plan | <p>Software configuration management, build management, tools, release plans, automation of build etc</p> | <p>Code and hardware configuration management, decide on automation tools for creating a build, develop release management plan and contribute to enterprise release management</p> | <p>Work with ADE IT to decide on releases of the products</p> |

| Item | Content / Details | ADE IT's Responsibility | ADE Functional Team and LEA's Responsibility |
|---------------------------------------|---|---|---|
| Migration Plan | Detailed migration plan with roles and responsibilities of individual and various stakeholders, data quality control agreements, data access mechanism for LEAs and ADE, changeover plan, migration test plan | Create the document, make review changes | Ensure access to resources to get the required information in a timely and complete manner, Review document, Sign Off |
| Project and Communication Plan | Project plan – top level Communication protocol between various teams, including regular as well as contingency communication. Bug tracking system access as well as access to Wiki, SharePoint sites for regular communication with all the stakeholders | Create the document, make review changes | Ensure access to resources to get the required information in a timely and complete manner, Review document, Sign Off |
| Design Specification Document | Visual and User Experience design requirement and solution specification Branding specification Personalization options | Create document, make review changes (up to 2 rounds of design iteration will be considered at the proposed cost) | Ensure access to resources to get the required information in a timely and complete manner, Review document, Sign Off Provide design crops and images as necessary (e.g. logo, branding guidelines etc.) |
| Risk Mitigation Plan | Identify and mitigate all the risks for the program and actively manage the risks | Create risk mitigation plan along with probability of risk | Review and contribute to risk mitigation plan |

Phase 2 – Development, Testing, and Deployment

Methodology: The second phase will be conducted based on the agile development methodology. This is an incremental development approach where sprints are defined for a period of two to four weeks, with clear developmental priorities and goals for that period. The scope and priorities will be defined by the ADE development team and functional team. ADE has been using modified SCRUM methodology for development for the last few months. This program will use the same agile development methodology for development once the blueprint/planning phase is complete.

Deliverables: The following are deliverable as part of Phase 2:

| Item | Detail | ADE IT's Responsibility | ADE Functional Team and LEA's Responsibility |
|---|---|---|---|
| Sprint backlog for each sprint (Each sprint's plan will be finalized before the start of that sprint at the very least and ideally at least one sprint ahead.) | Development plan, including detailed requirements, priority for each requirement and test plan for each sprint. Every sprint plan is to have clear sign off criteria laid out | To make the sprint plan available for review for project management team and functional team | To ensure that the sprint plan captures ADE's vision and priorities in the product. Determine the set of test cases that constitute the acceptance criteria. |
| Functional Specifications Document | The complete scope of the functionality of module will be identified as a combination of use cases, functional specifications and non-functional specifications. | Draft document, Work with functional leaders at agency to incorporate review changes, Work with Functional teams to identify priorities | Review, Ensure completeness, Ensure correctness, Assign Priorities, Sign Off |
| Bug Tracking Mechanism | Identify, track, prioritize and fix bugs in the system | Proactively fix bugs as found and actively fix bugs identified based on mutually agreed upon timelines and priorities | Identify, log, track and prioritize bugs in the application in a timely manner. Ensure that fixes have removed the bug and close reports on fixed bugs |

| Item | Detail | ADE IT's Responsibility | ADE Functional Team and LEA's Responsibility |
|--|--|--|--|
| Detailed Technical Design | Fully resolved technical architecture, web service / API definitions, database model, top level class diagram, if applicable | Create document, make review changes, approvals from technology lead | Ensure access to resources to get the required information in a timely and complete manner, Review document |
| Detailed Test Cases and Test Plan | Functional and unit test cases | Create document, make review changes | Ensure access to resources to get the required information in a timely and complete manner, Review document, Sign Off |
| Developed Code | Application code, configuration files, database scripts, build scripts, XML schemas, integration services | Develop the application | Review at every sprint, evaluate against agreed upon test cases for the agreed upon scope. If the test cases pass, the evaluation criteria for that sprint are considered to have been met and the acceptance certificate will be due from at that point for that sprint. Review, Provide Acceptance Certificate in a timely manner for each sprint. |
| Deployment Notes | Identify deployment details and any final deployment requirements and mechanisms | Create document, make review changes | Ensure access to resources to get the required information in a timely and complete manner, Review document, Sign Off |

| Item | Detail | ADE IT's Responsibility | ADE Functional Team and LEA's Responsibility |
|--------------------------------------|--|--|---|
| Help, User guide and Training | Develop online help, user and administrator guides, online training videos for the users | Create online and print user guides, administrator guides and online training videos | Review and approve user guides, online training manuals and help in videos. |

Phase 3 - Rollout

Methodology: The third phase will be to rollout the deliverables to pilot school districts. ADE has identified five sample school districts from Maricopa County. ADE will rollout the deliverables in phases to the pilot school districts. For example ADE will rollout few dashboards at a time along with help/training guides. This is an incremental rollout approach where sprints are defined for a period of two to four weeks, with clear developmental priorities and goals for that period. The release plan will be defined along with functional team and LEAs

Deliverables: The following are deliverable as part of Phase 3:

| Item | Detail | ADE IT's Responsibility | ADE Functional Team and LEA's Responsibility |
|---|---|--|--|
| Roll-out Plan | Plan all the roll-out activities such as releases, training, smoke-test, cut-over plan, availability etc. | Develop release plan and training plan along with LEAs, cut-over plan. | Work with ADE IT to decide on roll-out with users and training |
| Cutover plan | Develop cut-over plan for actual cut-over and implementation of the system | Draft document, Work with functional leaders at agency to incorporate review changes | Review, Ensure completeness, Ensure correctness, Assign Priorities, Sign Off |
| Bug Tracking Mechanism – System Test/Acceptance test | Identify, track, prioritize and fix bugs in the system | Proactively fix bugs as found and actively fix bugs identified by based on mutually agreed upon timelines and priorities | Identify, log, track and prioritize bugs in the application in a timely manner. Ensure that fixes have removed the bug and close reports on fixed bugs |

| Item | Detail | ADE IT's Responsibility | ADE Functional Team and LEA's Responsibility |
|---------------------------------------|--|--|--|
| Training and user guides | Create user guides, administration guides and online training for users | Develop context sensitive user guides, online training for users | Work with ADE IT to develop and review user guides and online training |
| Data Preparation and Migration | Create data preparation and migration plan from LEAs to ADE environments | Develop data migration scripts and dry run of the scripts | Work with ADE IT to review data migration plan |

Phase 4 - Maintenance and Support

Methodology: The fourth phase will be to support and maintain the product for the pilot LEAs. ADE has identified 5 school districts from Maricopa County. ADE will be responsible for providing Level 1, 2, and 3 support to the pilot school district and work with LEAs to roll out this product to other school districts in future after the pilot is stabilized.

Deliverables: The following are deliverable as part of Phase 4:

| Item | Detail | ADE IT's Responsibility | ADE Functional Team and LEA's Responsibility |
|-------------------------|---|--|--|
| Maintenance Plan | Plan all the maintenance activities required for the product | Develop maintenance plan with LEAs and functional teams to maintain the application, backup/restore, disaster recovery for the application/product | Work with ADE IT to decide on maintenance plan |
| Support plan | Develop product support plan for level 1, 2 and 3 support, decide on SLAs | Develop SLAs and level 1, 2 and 3 support plan | Work with ADE IT to provide product support requirements |

| Item | Detail | ADE IT's Responsibility | ADE Functional Team and LEA's Responsibility |
|--------------------------------|------------------------------------|--|---|
| Tickets tracking system | Use tickets tracking system at ADE | Develop standard change catalog and link it to tickets tracking system | Identify and provide details to users about tickets tracking system |

ADE uses SCRUM Methodology and V-Model Testing. See Appendix A

Program Governance

ADE IT and functional teams provide various status and progress reports on regular basis to different stakeholders who monitor and govern state of the program and implementation on regular basis. This helps to handle any risks, contingencies, management of issues, review of budgets, review of technology, communication plans, and quality of work on regular basis.

Project Management Office (PMO) status reporting

ADE has setup a program management office that monitors the progress of all the projects along with various metrics to check the health of the projects and programs. The detailed report and deliverables are provided to PMO office on bi-weekly basis by program teams. Program director, program manager, and project managers are responsible for reviewing the status of the projects with PMO office on bi-weekly basis.

ADE IT

The ADE IT team has project and program management, a business analyst, a technology architect, software engineers, and QA engineering professionals. ADE IT also utilizes professional services contractors and various software vendors. Additionally, the division also has support and infrastructure services resources.

ADE Functional team

ADE functional team comprises of various departments under Arizona Department of Education like school finance, assessment, certification, adult education program, etc. The representatives of these departments will help this project under the direction of the superintendent, CIO, and COO of the department will set the part of functional team.

LEAs

LEAs are participating in this project for piloting the solution. There are five sample school districts from Maricopa County that will be participating in the pilot. ADE will identify additional five school districts from other regions of Arizona to be part of this program as a part of Phase II.

Technology Review Committee (TRC)

It is necessary to evaluate technology architecture, data models, hardware/software, and capacity needs of application/products that ADE is developing. It will be responsibility of TRC to closely review the technology aspect of the project. Technology architects and leads will present the

technology side of the product on monthly basis to TRC. Following roles will participate on technology review team:

- ADE Deputy CIO
- Director of Technology of pilot school district
- IT Executive from a private company in Arizona
- ADE Technology Architect

Program Steering Committee

A steering committee will be formed during the setup phase of the project. The steering committee will be accountable for ensuring program progress. The committee will meet monthly over the duration of the program. Following stakeholders will be part of the steering committee

- Mark Masterson, ADE CIO
- Pamela Smith, ADE Executive Director of Special Projects
- Linda Jewell, ADE Deputy CIO
- Dr. Don Covey, Superintendent Maricopa County Educational Services Agency
- Director of Technology, School District

Data Governance Commission (DGC)

The DGC was established to coordinate with ADE to create and implement the Arizona Education Learning and Accountability System (AELAS). DGC shall identify and evaluate the needs of public educational institutions, provide recommendations and establish guidelines relating to ELAS technology and its application. The Commission is a statutorily created commission established to identify, examine, and evaluate the needs of public educational institutions; provide recommendations on proposals for technology spending in the education arena; analyze and recommend policies for various aspects of data management; and, establish guidelines for future technology implementation. The Commission is a 13-member body that represent various aspects of expertise in the areas of administration, information technology, and business.

Ad Hoc Committee on Education Data Systems

Speaker of the House Andy Tobin created the Ad Hoc Committee on Education Data Systems, co-chaired by Representatives Heather Carter and Kate Brophy McGee. The Ad Hoc Committee's main focus is to raise public awareness on the value of a P-20 longitudinal education data system. The committee was created because the key to meaningful education reform is to set academic goals that lead to systematic change. This change is not achievable without accurate and reliable data.

The Ad Hoc Committee acts as public forum for discussion on the design, construction, and implementation of state education data systems. Key individuals who have day-to-day operational involvement in the efforts currently underway to build our state education data system have been appointed to the Committee:

- Rebecca Gau, Director, Governor's Office of Education Innovation
- Mark Masterson, CIO, ADE
- Jaime Molera, President, State Board of Education
- J. Elliott Hibbs, Chair, Data Governance Commission

- Jeff Billings, Director of Technology, Paradise Valley Unified School District

Regular status updates to the US Department of Education

ADE will provide regular status updates to the US Department of Education and the grant review team on regular basis by providing status reports, face-to-face meetings and conference calls/remote online meetings.

All of the above committees and teams will provide strong program governance to the project and help for a successful delivery of the product to pilot school districts.

6. e. Staffing

Appendix C contains the resumes of the management team members listed in the following table. The table below identifies each team member's position. These individuals are selected based on the range of experience they bring to the team as indicated by their current positions. They were also the primary authors of this application.

Their first order of business will be the hiring of a fulltime program manager followed by a fulltime business analyst / project coordinator. With the addition of these two individuals to the management team, work will begin. The table below lists the members of this team.

| Project Management Team | |
|--------------------------------|---|
| Name | Position / Role |
| Mark Masterson | Chief Information Officer |
| Pamela Smith | Executive Director of Strategic Initiatives |
| Linda Jewell | Program Director |
| Alexandra Jones | Enterprise Data Architect |
| Amit Soman | Information Architect |
| Satya Indukuri | Sr. Software Developer |
| Surya Vipparthy | Business Information Specialist |
| TBD | Program Manager |
| TBD | Business Analyst / Project Coordinator |

Roles, Responsibilities, and Time Commitments

All deliverables will be managed by ADE staff and, where possible, staffed with ADE FTE's. Grant-funded FTEs and individual contractors will be used for staff augmentation as needed.

| Position | Description |
|--|---|
| CIO (FTE 0.05) | The CIO provides overall project guidance for IT Department within ADE. |
| Program Director (FTE 0.1) | The program director provides project strategies developing new data system concepts. |
| Program Manager (FTE 1.0) | The program manager provides direct project planning and management including QA coordination and oversees grant execution and reporting. |
| Project Coordinator (FTE 0.5) | The project coordinator will provide coordination among the various team members maintaining focus on deliverables and meeting the timeline. |
| Developers (FTE 2.0) | Software developers will develop the programming code supporting the project deliverables including stakeholder dashboards. |
| IMS – Developer (FTE 2.0) | The IMS developers will implement the IMS solution. If a commercial product is used then the IMS developer will customize the product for use in the ADE environment and support the rollover of existing IMS systems into the new system. |
| QA (FTE 1.5) | The Quality Assurance team will support the project by verifying that the deliverables work according to the needs of the various stakeholders. For IMS this will include verification of system security and proper access of users to the correct information. For dashboards QA will verify that the information provided in the dashboards are correct and appropriate to the stakeholders with a given access. |
| Business Analyst / Project Coordinator (FTE 1.0) | The role of the business analyst / project coordinator is the use analysis, statistical, and Business Information tools to identify data useful to stakeholders and make that information available to dashboards. |
| User Interface Designer (FTE1.0) | The user interface designer primary task will be to design and implement dashboards making available to stakeholders an easy to use visually appealing user interface. |
| Training / User Guide (FTE 1.0) | The task of completing training and user guide materials will be performed by a technical writer. The materials may be print based (PDF), compiled help, or web based. |
| LEAs – Tech Support (FTE 1.0) | As stakeholders dashboards needs are identified it may be necessary for the LEAs to export more information to ADE. LEA tech support will be needed to support system change to download data to ADE. |
| ADE Functional Teams (FTE 0.25 to 0.5) | The ADE functional teams will provide support for various phases of the project. During implementation of the new IMS system a functional team may be responsible for transferring users from legacy IMS system into the new system. To facilitate changes to the data received from LEAs to support the new dashboards functional teams may assist with changes to SMS systems. To support the new dashboards functional teams may support data acquisition from the AEDW to the dashboards. |

Other Attachment File(s)

* Mandatory Other Attachment Filename:

To add more "Other Attachment" attachments, please use the attachment buttons below.

Appendix A – Optional Attachments

Proposed Technology Architecture

The architecture for the data warehouse is described in terms of four inter-related components:

- 1) Application layer
- 2) Data layer
- 3) Security layer
- 4) Support (processes and organization)

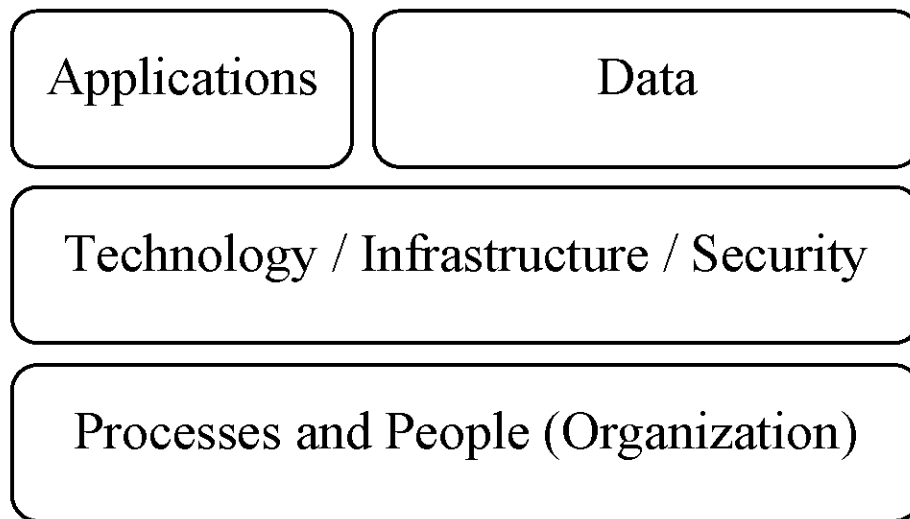


Figure 1: Data Warehouse Components

Application Layer

The application layer provides reports such as dashboards, tools for querying, planning, and forecasting. Dashboards communicate information with easy-to-understand graphics such as scorecards and meters, and charts. Typically dashboards are used to report on established performance indicators, measured at predefined intervals. Dashboards make it easy for end users to quickly assess current state and progress against goals. Also application layer can provide explorer tools for selecting data, drilling down or summarizing data, and combining data across subject area. Data warehouse views which organize the information into simpler structures which are easily understood and navigated by particular kinds of users.

Data Layer

The data layer contains information about history and plans. These are referred to as *facts*, as they usually consist of discrete facts or measurements. Facts or measurements occurred in terms a context is referred as *dimensions*. The warehouse is a collection of tables and views consumed

by end users, directly or through the applications tools described above. The data in the warehouse has been processed for consistency and alignment with standard data descriptions and value sets. Facts have been aligned with the standard dimensions. Data layer contains a staging environment is a set of databases and files used by the ETL process to prepare data for publication in the warehouse as it flows from the operational systems which collect it originally. Metadata is a repository of business rules and its data definitions. Cubes are specialized views of a set of facts and dimensions. They take a form very similar to spreadsheets, in the sense that they are composed of cells visualized along a set of axes.

Security Layer

The goal of the security layer is to provide fine-grained control over access to data, administered according to the policies of appropriate data custodians. This includes managing access at the individual data element level. Current data access requirements mean that sometimes the warehouse has to control access to information within a particular context, such as information about students who have taken certain classes or studied with particular instructors. Restrictions on small sample sizes imply that for some uses, data access is restricted to answer sets large enough not implicitly identify individual persons. Meeting all these requirements is done by a set of facilities, some automated in the data bases and some in the reporting portal.

Current Architecture

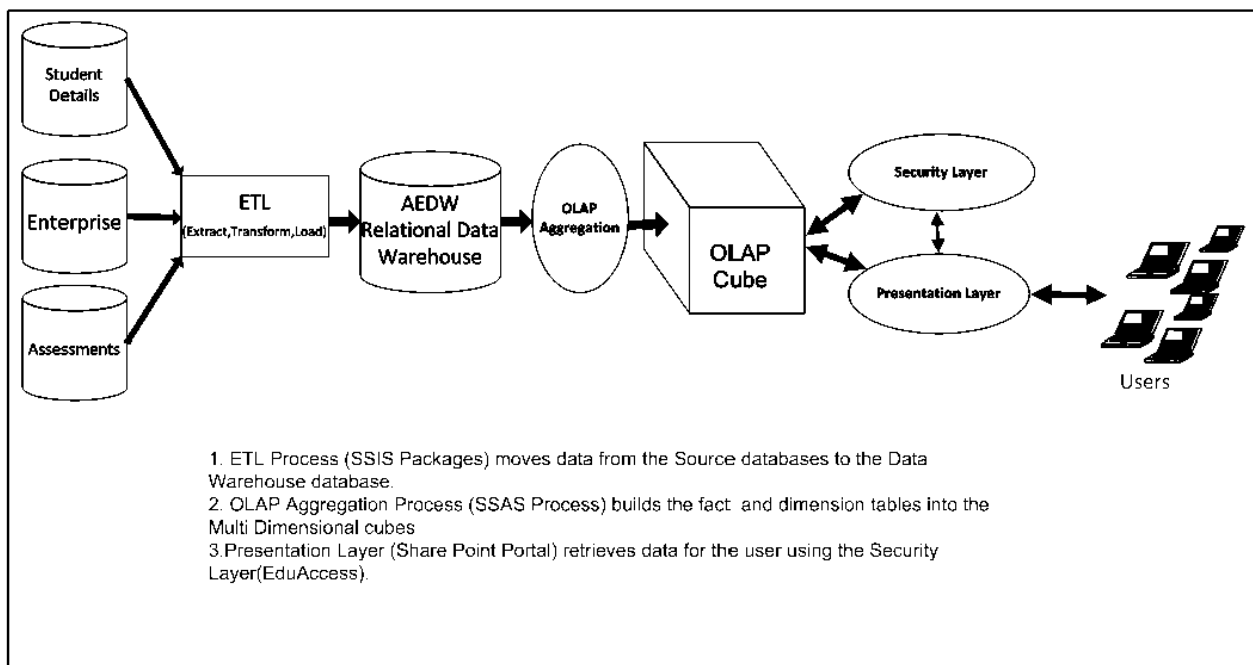


Figure 2: Current Architecture

Source System: A periodic snapshot of the student details, enterprise, and assessments data is analyzed and extracted into data warehouse.

ETL Process: This process extracts, transforms, and loads the source data into data warehouse using **SQL Server Integration Services 2008**.

AEDW Relational Data Warehouse: AEDW relational data warehouse contains source data transformed into facts and dimensional data using **SQL Server 2008**.

OLAP Aggregation Process: This process creates data warehouse views and converts fact and dimensions into multidimensional cubes using **SQL Server Analysis Services 2008**.

OLAP Cubes: ADE currently provides two MOLAP cubes with 49 measures. These cubes are updated periodically using **SQL Server Analysis Services 2008**.

Presentation Layer: SharePoint is used as presentation layer for analysis and reporting. This layer provides users with reports and other analytical tools to analyze the data. A data dictionary, user guide, and other documents are provided for support and feedback from users

Security Layer: EduAccess is a custom **Identity Management** system which manages users and their accounts, permissions, authentication for access, and usage of reports and other tools.

Proposed Architecture

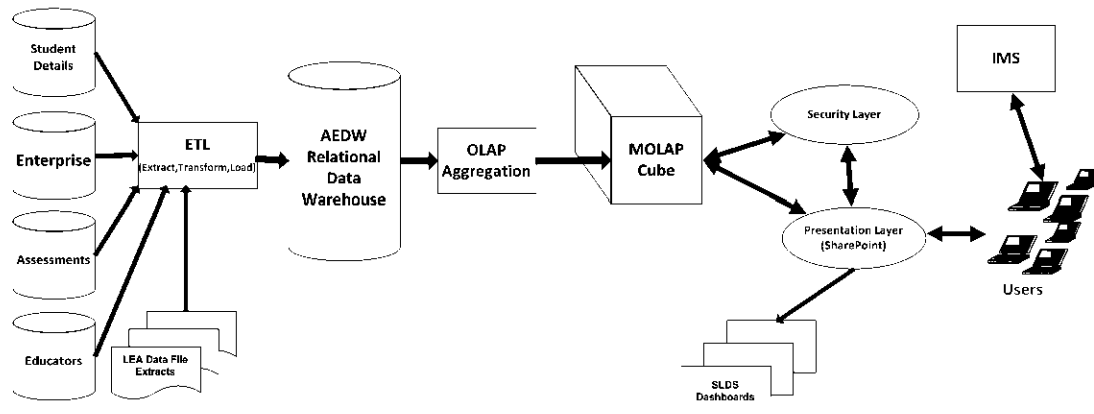


Figure 3: Proposed Architecture

The following components will be included in the data warehouse to compliment components already available in the data warehouse:

LEA Data Collection Process: A new data collection process will be developed using common data extracts for the 10 pilot LEAs. The data collection process periodically extracts teacher, school, and student data from the LEAs collection database to a staging environment. Validation

reports are then generated for district review and certification. Once certified, the data will be transformed into information required for state and federal reporting using **SQL Server Integration Services 2008, SQL Server Reporting Services 2008, and SQL Server Analysis Services 2008**.

Educators Source System: Educators data will be extracted, transformed, and loaded into existing data warehouse data using **SQL Server Integration Services 2008**. Once completed, transformed data will be analyzed and aggregated with currently available student, school and teacher data for state and federal reporting using **SQL Server Reporting Services 2008 and SQL Server Analysis Services 2008**.

Dashboards: Dashboards and user-friendly analytical tools will be developed for stakeholders (such as students, parent, teacher, school, district, policy makers, researchers, ADE program areas, and public) using **Server Reporting Services 2008 and SQL Server Project Crescent Tools**. User-friendly reports will be developed and made available to stakeholders via the **SharePoint** web portal.

Security Layer and IMS: This layer will provide identity management and authentication through single sign on mechanism. It will provide self-service features such as password reset, user account changes, provisioning, de-provisioning, and group management through a web-based portal. Standards based web and Security Technologies/Protocols such as SAML, SSL, HTTPS, and certificates will be utilized to make this layer interoperable and flexible. Federation with other entities will also be explored in discussions with districts that have the capabilities.

SCRUM Methodology

ADE Information Technology (IT) uses modified SCRUM methodology for development of applications and products. SCRUM, an agile development methodology, helps ADE IT to build the product incrementally and also implement or rollout the product in smaller increments to LEAs.

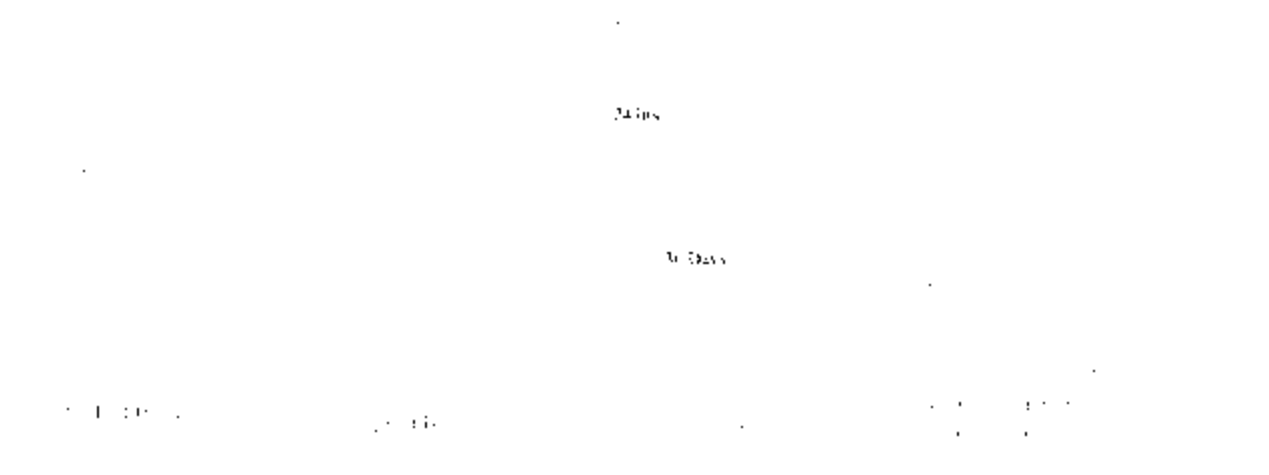


Figure 4: SCRUM Process Framework

SCRUM delivers value in four distinct areas of a project:

- Managing changing requirements
- Increasing productivity
- Ensuring quality standards are met
- Developing and delivering a product increment more often

The following are some general practices of SCRUM:

- Functional team of ADE become a part of the development team
- The product backlogs and the sprint backlogs will be shared across and tasks will be prioritized in close collaboration with functional team and LEAs.
- SCRUM has frequent, intermediate deliveries with working functionality, like all other forms of agile software processes. This enables the functional team to get working software earlier and enables the project to change its requirements according to changing needs.
- Frequent risk and mitigation plans are developed by the ADE IT team itself—risk mitigation, monitoring and management (risk analysis) occur at every stage and with commitment.
- Transparency in planning and module development identifies who is accountable for what and by when.
- Frequent stakeholder meetings are held to monitor progress, displaying balanced dashboard updates (delivery, customer, employee, process, and stakeholders).
- There should be an advance warning mechanism, i.e., visibility to potential slippage or deviation ahead of time.
- Problems are not overlooked, and no member of the team is penalized for recognizing or describing any unforeseen problem.

V-Model Testing

ADE IT uses V-Model for testing to make sure maximum requirements coverage happens for quality assurances (QA) in order to release a defect-free product to various users of ADE. Various metrics are tracked to continuously improve the quality of the product.

Defect density for each project/work stream will be published on a monthly basis and a root-cause analysis conducted, resulting in corrective measures of processes, checklists, and test cases. Various tests that will be followed by ADE IT will be:

- Functional testing
- System/Integration testing
- Acceptance testing
- Test automation
- Regression testing
- Performance testing
- Break fix testing
- UAT planning and execution
- User interface testing
- Usability testing
- Accessibility testing

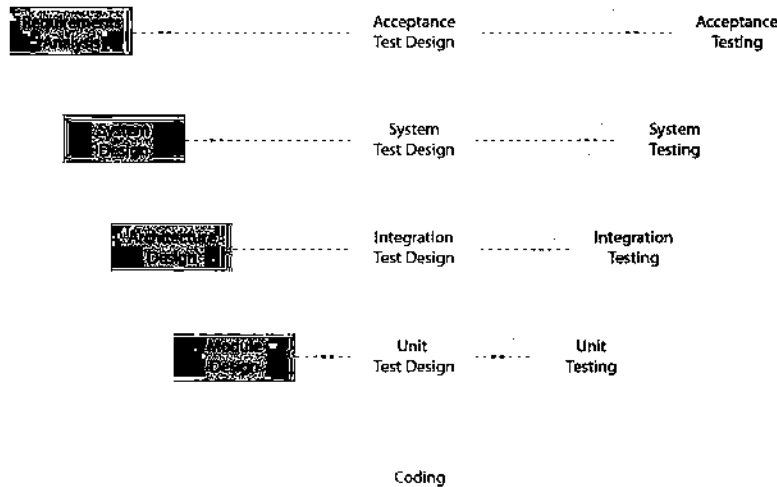


Figure 5: V-Model

The V-Model provides the following benefits to the software engineering and QA process:

- Greater transparency in test process and reporting
- Strong emphasis on Metric collection and analysis
- Reduced testing effort in performing technical acceptance testing
- Reduction in cost of quality

SLDS Grant – SLDS Requirements Template

| Governance and Policy Requirements | Requirement Met (Yes or No) | Current State | Development Need / Deliverables |
|--|--------------------------------|---|--|
| <p>Need and Uses</p> <p>In addition to providing information that helps to improve student achievement and reduce achievement gaps among students, a successful data system should address several of the State’s other key educational policy questions. The system should provide data and data-use tools that can be used in education decision-making at multiple levels, from policy to classroom instruction.</p> | <p>No</p> | <p>Student enrollment, state-level student assessment, program participation data available for state-level and school-level analysis.</p> | <p>Incorporate teacher data, course and class data into AEDW for use in classroom-level instruction analyses. Provide visualization tools and dashboards in support of identified key indicators at identified levels.</p> |
| <p>Governance</p> <p>A successful data system rests upon a governance structure involving both State and local stakeholders in the system’s design and implementation. Particularly when expanding the data capacity in existing K-12 systems to include other educational data, an SLDS must identify the entities responsible for the operation of the statewide data system and should include a common understanding of data ownership, data management, and data confidentiality and access, as well as the means to resolve differences among partners.</p> | <p>Yes</p> | <p>The Data Governance Commission (DGC) is a statutorily created commission established to identify, examine and evaluate the needs of public educational institutions, provide recommendations on proposals for technology spending in the education arena; analyze and recommend policies for various aspects of data management; and, establish guidelines for future technology implementation. The DGC is established within the ADE to further its goal of responsible technological innovation in the educational community.</p> | <p>ADE will continue to work with the DGC to develop guidelines and data standards of AZ-SLDS.</p> |