

**U.S. Department of Education**

Washington, D.C. 20202-5335



**APPLICATION FOR GRANTS  
UNDER THE**

**Statewide, Longitudinal Data Systems**

**CFDA # 84.372A**

**PR/Award # R372A120027**

**Grants.gov Tracking#: GRANT11026339**

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		
* 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"/>
* 3. Date Received: <input type="text" value="12/15/2011"/>	4. Applicant Identifier: <input type="text"/>	
5a. Federal Entity Identifier: <input type="text"/>	5b. Federal Award Identifier: <input type="text" value="84.372"/>	
<b>State Use Only:</b>		
6. Date Received by State: <input type="text"/>	7. State Application Identifier: <input type="text"/>	
<b>8. APPLICANT INFORMATION:</b>		
* a. Legal Name: <input type="text" value="Indiana Department of Education"/>		
* b. Employer/Taxpayer Identification Number (EIN/TIN): <input type="text" value="356000158"/>	* c. Organizational DUNS: <input type="text" value="8247992090000"/>	
<b>d. Address:</b>		
* Street1: <input type="text" value="Room 229 State House"/>	Street2: <input type="text" value="151 W Ohio Street"/>	
* City: <input type="text" value="Anderson"/>	County/Parish: <input type="text"/>	
* State: <input type="text" value="IN: Indiana"/>	Province: <input type="text"/>	
* Country: <input type="text" value="USA: UNITED STATES"/>	* Zip / Postal Code: <input type="text" value="46204-1905"/>	
<b>e. Organizational Unit:</b>		
Department Name: <input type="text" value="Innovation and Improvment"/>	Division Name: <input type="text" value="School Accountability"/>	
<b>f. Name and contact information of person to be contacted on matters involving this application:</b>		
Prefix: <input type="text"/>	* First Name: <input type="text" value="Jon"/>	
Middle Name: <input type="text"/>	* Last Name: <input type="text" value="Gubera"/>	
Suffix: <input type="text"/>	Title: <input type="text" value="Chief Accountability Officer"/>	
Organizational Affiliation: <input type="text"/>		
* Telephone Number: <input type="text" value="317-234-6849"/>	Fax Number: <input type="text" value="317-233-6326"/>	
* Email: <input type="text" value="jgubera@doe.in.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:**

Indiana's Education and Workforce Data System;a federated data system automating data linking and providing on-demand data access.

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

\* b. Applicant

\* c. State

\* d. Local

\* e. Other

\* f. Program Income

\* g. TOTAL

**\* 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.

* SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL  Jon Gubera	* TITLE  Chief Accountability Officer
* APPLICANT ORGANIZATION  Indiana Department of Education	* DATE SUBMITTED  12/15/2011

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

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## 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.

<b>* APPLICANT'S ORGANIZATION</b>	
<input style="width: 80%; border: none; border-bottom: 1px solid black;" type="text" value="Indiana Department of Education"/>	
<b>* PRINTED NAME AND TITLE OF AUTHORIZED REPRESENTATIVE</b>	
Prefix: <input style="width: 50px; border: none; border-bottom: 1px solid black;" type="text"/>	* First Name: <input style="width: 150px; border: none; border-bottom: 1px solid black;" type="text" value="Jon"/> Middle Name: <input style="width: 100px; border: none; border-bottom: 1px solid black;" type="text"/>
* Last Name: <input style="width: 200px; border: none; border-bottom: 1px solid black;" type="text" value="Gubera"/>	Suffix: <input style="width: 50px; border: none; border-bottom: 1px solid black;" type="text"/>
* Title: <input style="width: 250px; border: none; border-bottom: 1px solid black;" type="text" value="Chief Accountability Officer"/>	
* SIGNATURE: <input style="width: 250px; border: none; border-bottom: 1px solid black;" type="text" value="Jon Gubera"/>	* DATE: <input style="width: 100px; border: none; border-bottom: 1px solid black;" 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.]

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## 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:

## **Project Abstract: Indiana Education and Workforce Data System**

Indiana is requesting funding for the development of a federated data system that will enable automated linkages between K-12, higher education and workforce data (RFA Priority Three). This system will advance Indiana's P-20 data system from its 1.0 version where manual linkages and time intensive protocols make data access a lengthy and arduous process to a next generation 2.0 system that leverages agency data for seamless data access and reporting without requiring the data to be physically loaded in a central repository. Working with other key agencies, the Indiana Department of Education will establish a governance council and a well-defined research agenda to guide the development and expansion of the proposed system.

Indiana has made steady progress on the development of its statewide longitudinal data system (SLDS) since initiating a unique student identifier in 2002. Work on this system was accelerated by a SLDS grant in 2007 and now Indiana has met the basic criteria for data systems outlined in the America COMPETES Act.

Key features of the existing system include role-based access to longitudinal performance data for K-12 students through the *Learning Connection* which boasts 60,000 registered users, and the development of the Indiana Workforce and Education Intelligence System that represents Indiana's first attempt to link K-12, Higher Education and Workforce data.

Indiana's reform legislation "*Putting Students First*" is propelling dramatic changes in Indiana's K-12 schools in an effort to improve outcomes for Indiana students. These student centered reforms and policies are powered by data. However, there still some agency and technology boundaries within the P-20 data continuum that make developing a complete profile of Indiana learners more challenging than it should be. For this reason, Indiana's Education Roundtable moved to fund a feasibility study for the development of a federated data system so that researchers, policy makers, state agencies and the public can have access to information about the results and trends of Indiana's education system. This study underscores Indiana's commitment to moving forward with the data system proposed in this grant application. Working with partners such as the Commission for Higher Education and the Department of Workforce Development, the Indiana Department of Education is seeking funding under RFA Priority Three for the development of Indiana's Education and Workforce Data System, a federated data system.

## Project Narrative File(s)

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\* Mandatory Project Narrative File Filename:

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

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## A. NEED FOR THE PROJECT

*“The path to real reform begins with the truth – and we must keep facing the truth and finding the answers until every classroom has a great teacher, and every child has an education that prepares him for college, for work, and for life.”*

– U.S. Secretary of Education Arne Duncan

Like all Americans, Hoosiers are responding to the call for dramatic improvement in educational outcomes. This year, Indiana took the biggest step in state history to advance education reform by passing the “*Putting Students First*” agenda. This comprehensive legislative package, which focused on teacher quality and flexibility coupled with a marked expansion in educational options for students and families, represented a sea change to the state’s education landscape.

This sea change has propelled the expansion of the state’s Statewide Longitudinal Data System (SLDS). Data-driven accountability, built upon clear measures of student growth over time and direct student-teacher performance linkages, is a key tenet undergirding Indiana’s reform efforts. As the state continues to advance the bold education reforms within “*Putting Students First*” – reforms that align completely with the principle that better decisions require better information – Indiana is committed to ensuring that the state’s aggressive reform agenda is fueled by data and framed by evidence.

In doing so, the Indiana Department of Education (IDOE) recognizes that the achievement and preparation of Hoosier students does not occur solely within the confines of K-12 education. While the previous efforts focused primarily on addressing key components of the K-12 data system, IDOE and its partner agencies must now commit attention to a system that enables all stakeholders to gain insight into trends and patterns only observable when data from each part of the education continuum are seamlessly connected. To advance this objective, IDOE is requesting funds to support the development of a federated data system that will enhance key elements specified in the America COMPETES Act and targeted by *Priority Three* of the Request for Applications (RFA). Preliminary work on this system has already begun through a feasibility study that is outlined below.

The remainder of this section reviews the current status of Indiana’s SLDS, explains why post-secondary connections should be the next step, and concludes with a description of risks associated with leaving this work unfinished.

### **Status of Indiana’s Statewide Longitudinal Data System**

Indiana meets **(M)** the criteria for each of the twelve basic SLDS elements as outlined in the America COMPETES act as shown in the table below. However, there is still much room for improvement and for further leveraging these basic elements to support research, transparency, and policy development. This proposal will dramatically expand and improve the capacity of Indiana’s P-20 data system as it relates to elements 4, 11 and 12 of the America COMPETES act.

<b>Table 1. America COMPETES Elements</b>
With respect to preschool through grade 12 education and postsecondary education:
1. A unique statewide student identifier that does not permit a student to be individually identified by users of the system (except as allowed by Federal and State law); <b>(M)</b>
2. Student-level enrollment, demographic, and program participation information; <b>(M)</b>

3. Student-level information about the points at which students exit, transfer in, transfer out, drop out, or complete P-16 education programs; (M)
4. The capacity to communicate with higher education data systems; and (M)
5. A State data audit system assessing data quality, validity, and reliability. (M)
With respect to preschool through grade 12 education:
6. Yearly test records of individual students with respect to assessments under section 1111(b) of the Elementary and Secondary Education Act of 1965; (M)
7. Information on students not tested, by grade and subject; (M)
8. A teacher identifier system with the ability to match teachers to students; (M)
9. Student-level transcript information, including information on courses completed and grades earned; and (M)
10. Student-level college readiness test scores. (M)
With respect to postsecondary education:
11. Data that provide information regarding the extent to which students transition successfully from secondary school to postsecondary education, including whether students enroll in remedial coursework; and (M)
12. Data that provide other information determined necessary to address alignment and adequate preparation for success in postsecondary education. (M)

Over the past nine years, with state support and federal funding, Indiana has made deliberate and steady progress on its SLDS. Beginning with the development of Indiana’s unique student identifier in 2002, the Student Test Number (STN) marked a key milestone in Indiana’s journey toward having an actual SLDS. The system, built to help Local Education Agencies (LEAs) and IDOE manage the assignment and inventory of the STNs, became the key data input system for Indiana’s SLDS. This system, the Application Center (App Center), is also the home for the School Personnel Number (SPN) application which manages the assignment and inventory of SPNs—unique identifiers for school personnel in general and Indiana educators in particular. The App Center is the point of origin for student and educator identifiers which serve as the foundation for all longitudinal efforts and for establishing data linkages between teachers and students.

In addition to originating student and educator identifiers, Indiana’s App Center is the system LEAs use to submit data to the IDOE through various annual collection cycles. LEAs load data at specified periods of the year, according to published file specifications and data layouts. As part of the data upload process, the App Center automates a variety of data quality checks and validations, including cross-field and cross-collection validations, according to each collection’s specific requirements. The App Center then rejects individual records (or entire files) not meeting requirements and provides users with error messages and instructions for correction. Additionally, the App Center produces post-collection summary and exception reports for data managers, building principals and district superintendents. Data collected through the App Center are then loaded into the IDOE data warehouse. End users are provided with access to these data through two main web portals: *Compass* which provides aggregated data profiles for each school and comparisons of school performance to state averages, and the *Learning Connection* which provides role based access to student-level data to school leaders, teachers, parents and students.

The IDOE currently maintains a large repository of longitudinal data, including the following elements collected through the App Center:

- Student demographics including Limited English Proficiency (LEP) and homeless status;
- Program participation (such as Title I, special education, alternative education);
- Performance on various assessments, including ISTEP+ (state standardized assessment), LAS Links (LEP), ISTAR (Indiana’s alternate assessment), End of Course Assessments (ECAs), ACT, SAT, AP, and PSAT;
- Students not tested and reasons for not testing;
- Dropout and mobility;
- Graduation and post-secondary plans; and
- Educator and administrator variables.

The 2007 SLDS grant award was instrumental to the development and expansion of Indiana’s SLDS. Indiana’s *Learning Connection*, created through the grant, established an important capacity for Indiana — providing student-level data to authorized educators at the classroom level. As mentioned above, *Learning Connection* provides role-based access to longitudinal student data. School and district administrators can see individual data on all the students they serve, teachers can see data for all students in their classes, parents can see the performance data for their children and students can see their own performance history.

In addition to implementing the *Learning Connection*, IDOE used the 2007 SLDS grant funds to accomplish the following:

- Implemented the unique educator identifier or School Personnel Number (SPN) and linked students to teachers;
- Constructed a data warehouse along with an OLAP database to facilitate data reporting;
- Increased data quality and reduced data redundancy.
- Developed and implemented a data governance system (data stewards, data sharing agreements, and data request processes/protocols); and
- Began linking data between K-12, higher education, and the workforce—the IWIS system described in more detail below.

In summary, Indiana’s current SLDS is comprised of five related systems:

<b>System Name</b>	<b>Function</b>	<b>Users</b>
Application Center	Collect Data from LEAs	Data Managers and School Administrators
Data Warehouse	Storage of data collected through the Application Center	All systems that consume data from the data warehouse. (e.g., Compass and Learning Connection: See Below)
Compass	Display aggregate data from the Data Warehouse	General public and those interested in aggregate data
Learning Connection	Display student level data	Educators, parents, students
Indiana Workforce and Education Intelligence System (IWIS)	Houses some linked P-20 data	State agencies and researchers



As indicated above, Indiana's current SLDS is a critical component of the state's reform efforts. Moreover, "*Putting Students First*" has generated incredible momentum towards leveraging the power of data to proactively drive continuous improvement. New accountability measures have elevated the importance of data in conversations about how to improve educational outcomes for students. For example, the *Learning Connection* provides a teacher with detailed academic profiles based on Indiana's growth model for each student in his or her class. Using information stored in IDOE's data warehouse, *Learning Connection* displays this performance history only to authorized teachers, administrators, parents and students. Based on reforms contained in "*Putting Students First*," student growth data is now required as a significant component of teacher evaluations. All of these factors increase educators' use of *Learning Connection*, which now has 60,000 registered users (See Appendix A).

Data that can be turned into information and then transformed into knowledge, action and foster real change should be the goal of any SLDS. With the recent passage of significant K-12 education reform, Indiana must expand the availability and usability of its data to include other aspects of Indiana's education system to better understand what must be done to improve P-20 student outcomes.

### **Next Step for Indiana's SLDS is Linkage to Higher Education and Workforce Data**

While Indiana's efforts to date have yielded significant results, additional work is required to accelerate change and demonstrate all the capabilities of a fully functional SLDS. Two basic elements of a SLDS, as defined by the America COMPETES act, fall under the post secondary education heading. While Indiana has technically met these criteria through its data linkage projects with Ivy Tech, high school feedback reports generated by the Indiana Commission for Higher Education (CHE), and the Indiana Workforce and Education Intelligence System (IWIS) data warehouse project, more work remains to be done in more effectively and efficiently linking data and making it more accessible, more easily obtainable, and less burdensome to use (Elements 11 and 12). This proposal will also necessarily expand Indiana's capacity to communicate with higher education (Element 4) and workforce data systems.

Based on these criteria and preliminary efforts the state has already launched in this area, Indiana proposes the development of a federated data system that leverages existing infrastructure, security, and privacy protections but automates data linkages, mitigates security risks associated with longitudinal linked data, and provides on-demand access to linked data to authorized users. Further, Indiana plans to leverage the federated data system that will be created through this grant, as well as the systems it currently has in place (e.g., *Learning Connection*, *Compass*, etc.) to create a variety of reports that can be used to inform education policy.

Over the past three years, Indiana undertook two important projects to explore the challenges of linking IDOE data to higher education and workforce development data; they are described below.

### **Higher Education Data Linkage pilot**

IDOE partnered with Ivy Tech Community College of Indiana (Indiana's statewide community college system, representing approximately 38% of statewide public higher education enrollment) to successfully link Ivy Tech data with IDOE's Student Test Number (STN) data; IDOE was able to successfully match more than 65% of Ivy Tech students to IDOE STN data. Approximately 35% of students could not be matched due to:

- Students' ages (*i.e., the students graduated from high school prior to the implementation of IDOE's STN system*);
- Maiden names (*IDOE's system maintains a student's maiden name while Ivy Tech files maintain a person's married name*);
- Students graduating from high schools outside of Indiana; or
- Multiple possible matches (*common names*).

Through the IDOE data sharing agreement, Ivy Tech is better able to track students as they move across Ivy Tech campuses, without requiring the use of Social Security numbers. Further, by obtaining data from Ivy Tech, the IDOE was able to examine college-going patterns for students who attend Ivy Tech, as well as characteristics of students who need remediation. As a result of the successful project with Ivy Tech, other public institutions and CHE have expressed interest in expanding the use of K-12's STN to encompass all public institutions in Indiana, with the possibility of also expanding to private institutions.

While the Ivy Tech project was successful in bridging some data gaps between K-12 and higher education, it proved to be more valuable in helping to figure out the challenges of linking those data. Summarily, the results pointed out the need for a system that could overcome the linking challenges.

### **Indiana Workforce and Education Intelligence System (IWIS)**

For the past three years, IDOE has worked in conjunction with CHE, the Indiana Department of Workforce Development (DWD), and the Indiana Business Research Center (IBRC) to create the Indiana Workforce and Education Intelligence System (IWIS). IWIS is a data warehouse that stores linked K-12, higher education, and workforce data. Prior to July 2011, IWIS housed only linked workforce and higher education data, due to the lack of a common identifier between workforce/higher education data and K-12 data. However, based on the pilot work with Ivy Tech, IDOE tested the same weighted matching algorithm to link K-12 data with IWIS's workforce and higher education data in an effort to achieve true K-20 data reports. IDOE matched approximately 75% of its 2006 graduating cohort to IWIS data; approximately 70% of its 2007 graduating cohort; and approximately 63% of its 2008 graduating cohort. Currently, IBRC is developing reports to display the percentage of graduates attending higher education, percentage of graduates currently in the workforce, and associated salary information.

The important work conducted by IBRC, DWD, IDOE, and CHE for the IWIS project has laid the groundwork for the next phase—the development of a federated data system. Indiana sees the development of a federated data system as the “next level” of IWIS. While the IWIS project has had many benefits, such as the creation of protocols for handling data sharing agreements and data requests; early exploration of how to link data without having common identifiers; the creation of a data warehouse storing linked data; and several white papers and research reports (e.g., average wages by degree type across the state; job placement by degree type across the state), IWIS suffers from some limitations.

First, data linkages for the IWIS data warehouse have required a number of hours of manual work on the part of both IDOE and IBRC, and exchanging data between agencies follows a manual process as outlined below:

1. one agency extracts data from its system;
2. the data are linked;

3. the linked file is submitted via FTP to IBRC;
4. and IBRC then loads the data into the IWIS warehouse

As such, the exchange of data itself is very time consuming especially since the steps above are required each time new data is added from any agency (and this is simply to get data into the warehouse—additional manual processes, enumerated below, are followed to extract the linked data for research purposes).

Secondly, there is no commonly-defined process across agencies for how to link data. While this is not necessarily problematic as is (given that only three agencies are currently participating in IWIS), it would likely create more significant issues as more agencies joined in data linkages.

Thirdly, while IWIS is a secure system, simply by nature of being a warehouse environment where many years of identifiable, linked data are physically housed, there are certainly concerns about what might happen if the system were compromised.

Additionally, IWIS has suffered from difficulties in making data accessible to stakeholders. Much like the data exchange process, accessing data from IWIS is a manual process. In order for agency stakeholders to obtain data to load into their own warehouses, the agencies must

1. Contact IBRC and request the information;
2. Wait for a human response;
3. Wait for the database administrator to harvest the data being requested;
4. Have the data loaded onto an FTP by the DBA; and
5. Harvest the data from the FTP site.

The whole process can take anywhere from two weeks to three months, depending on the volume and type of request.

### **Challenges Remain**

Identifying the limitations of IWIS is certainly not intended to diminish the important groundwork that it laid in moving forward with a federated data system. As noted, the invaluable work of IBRC and the partner agencies (IDOE, DWD, and CHE) with the IWIS project was instrumental in bringing three major agencies together; creating mechanisms for data sharing and data linkages; starting down the path of figuring out how to overcome not having common identifiers; and facilitating some high level reporting. Additionally, the Ivy Tech project, while it only affected one institution in the state, was valuable in helping to figure out the challenges of linking data. More importantly, these pilots illustrated the challenges that still exist and brought to light the need for a system that could overcome the linking and access challenges that presented themselves as part of both the IWIS project and the Ivy Tech STN project.

The amount of time needed to link data; the manual work required to both link and exchange data; and difficulty in accessing linked data housed in IWIS hinders Indiana's ability to reach the full potential of its SLDS in terms of making data readily available ("on demand"), as well as facilitating access to linked data for state agencies and other stakeholders. Indiana's SLDS currently faces the following limitations:

- Indiana's agencies lack a common set of data elements and data standards to allow for system interoperability and true comparability data on the same individual across source systems.

- Indiana’s current approach to matching data is personnel intensive thus creating delays for researchers and policy makers in using the data.
- Accessing linked data is cumbersome and time consuming and requires significant staff time, thus limiting the ways in which the linked data can be effectively used.
- Having large amounts of identifiable, longitudinal (P-20) data physically housed in a single warehouse can create security and privacy concerns.
- While the current governance model that provides structure to the data arrangement among IDOE, DWD, and CHE guides the ongoing collaboration between these entities, there are no formal structures for extending the agreement to include other agencies and there is no research agenda to shape the further development of the system.

### **Risk of Inaction—How Indiana Students Lose Without a P-20 System**

“*Putting Students First*” is the organizing idea for the legislative reforms enacted and currently being implemented by IDOE. In contrast, the longitudinal data systems that underlie the educational continuum in Indiana are not yet organized in a way that fully realizes the potential power of the data. Indiana’s current P-20 system makes the production of fully developed student learning profiles not only inconvenient, but it also precludes the optimal use of data as an integral part of raising student achievement and closing achievement gaps. Moreover, partially developed portraits are no longer acceptable. If Indiana’s SLDS is not designed to automate and further facilitate data linkages, data access, and data reporting, the state risks:

- *Suffering the status quo of poor preparation for post-secondary education and low post-secondary and college attainment that has typified Indiana over the years.*  
According to the National Governor’s Association, only 33% of adults ages 25-64 in Indiana have a postsecondary degree (Associate’s or higher). With this attainment rate, Indiana significantly lags behind the national percentage of 38%. Further, according to the Indiana Commission for Higher Education, approximately one fifth of recent Indiana high school graduates who go on to postsecondary education require remediation. Policy makers and researchers need access to the data sets, reports, dashboards, and analytical tools available through the proposed system to inform taxpayers and policy makers in a timely and user-friendly manner about key P-20 educational trends.
- *Fragmenting efforts to understand student outcomes across the P-20 spectrum.*  
A cross-cutting view of student learning is required—one that is organized around students and not cut short when students move from one system to another on the continuum.
- *Limiting support for consumers of the education services provided by Indiana institutions.*  
The transparency of the proposed system will provide education consumers with new tools for evaluating and selecting educational options.

### **B. PROJECT DELIVERABLES RELATED TO SYSTEM REQUIREMENTS AND IMPLEMENTATION**

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#### **Overall Project Outcome: Develop and implement a federated data system**

*At its highest level, Indiana’s proposed project will have a key outcome: the development of a federated data system.*

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This federated data system (also referred to here as the Indiana Education and Workforce Data System) will connect multiple state agency data sources, including existing K-12, higher education, and workforce systems. Each of these data systems are maintained independently by

their respective state agency, run on different platforms, and meet different state agency needs and reporting requirements. These systems have evolved over time in response to various agency needs—needs which are not necessarily obviated by a P-20 system. Rather than focusing on physical solutions that combine agency systems into superstructures, it is more appropriate and strategic to focus P-20 data system development efforts on the data outputs of such systems rather than attempting to re-engineer all of the business rules that have shaped these systems in the first place. In other words, the reality that agencies have different systems is not the problem that needs to be solved in order to have a robust P-20 data system. Rather, the obstacle to overcome involves combining the data outputs of these disparate systems. To coordinate diverse data sources within a multi-agency environment with continually evolving data needs, Indiana proposes adopting a federated data system approach to successfully implement a robust P-20 data system.

A federated data system interacts with multiple participating agencies' data sources on the back end, while presenting itself as a unified system (through a single point of access) on the front end. The system allows end users (agency stakeholders, legislators, educators, researchers, and the public) to query data that lives in various systems (with the appropriate permissions and controls in place) and allows participating agencies to leverage the system as a resource to build upon existing reporting structures to create aggregated longitudinal data reports. Further, the system would make important data available on demand to K-12 school districts and institutions of higher education, potentially reducing the amount of IT labor needed to create reports and track longitudinal student information. Such a system would be integrated and interactive and support data querying that could be used to inform policymaking, program evaluation, and research. (See Appendix A: Indiana Education and Workforce Data System Conceptual Diagram.)

In order to meet Indiana's needs and the RFA's *Priority Three* requirement, the state has identified five major deliverables that will enable development and implementation of a federated data system:

1. Conduct feasibility study
2. Convene a Governing Council
3. Define data management and controls
4. Design and build a federated data linking system
5. Design report delivery systems/reports

To address the *Priority Three* requirements, the proposed federated data system will enhance and facilitate data linkages across all levels of the P-20 spectrum—especially higher education and the workforce. As the lead agency in the proposed effort, IDOE has redoubled its efforts to focus on preparing all students for College and Career readiness. IDOE's vision is that the academic and career preparation of all Indiana students will be the best in the United States and on par with the most competitive countries in the world. IDOE recently included College and Career readiness in its statewide school and district accountability system which was approved by the Indiana State Board of Education in November, 2011. Access to data that provides timely insights regarding where to improve upon these efforts and focus additional reform efforts as well as data that can be used to measure the effectiveness of existing reforms and policies has never been more important. IDOE's partners in this effort, CHE and DWD have a similarly pressing need to understand the full spectrum of educational and career attainment. These needs

for accurate and timely data have outstripped Indiana's current SLDS system. The system proposed here will address the deficiencies of the current system and create a foundation for further expansion of SLDS to include the data sources of other agencies.

To ensure that the project remains on target and produces the desired results, Indiana will contract with an independent evaluator to evaluate its progress in meeting its deliverables and objectives. The evaluator will be responsible for reviewing the project plan with the Steering Team; identifying outcome metrics for each deliverable; and conducting both progress and outcome evaluations of the project. The evaluator will conduct stakeholder interviews and surveys to ensure that the system and ensuing reports will meet the needs of stakeholders and will be responsible for measuring Indiana's progress toward meeting its outcome metrics, as well as helping the Steering Team identify and make any adjustments necessary if it is identified that the project is not on target to meet outcomes. Indiana's evaluator will be a reputable evaluation agency with experience in statewide and multi-state evaluations of various educational projects. Preferably, the evaluator will have experience evaluating SLDS projects and shall be a nationally recognized evaluation organization. IDOE will follow the requirements of the Indiana Department of Administration and all IDOE requirements for vendor selection.

#### **Deliverable 1: Conduct feasibility study (in progress)**

*Indiana has already initiated core planning and analysis for development of a federated data system that will augment the existing SLDS.*

Indiana is fully committed to developing a federated data system to support data-driven policy making in the Hoosier state. Work is already underway help Indiana reach this goal. To examine the feasibility of implementing a federated data system, Indiana's Education Roundtable (a statutorily created bipartisan committee chaired by the Governor and the State Superintendent and comprised of key leaders from K-12, higher education, business, industry, labor, parents, community, and the Indiana General Assembly), awarded a \$40,000 planning grant to the Kualii Foundation on November 29, 2011. The Kualii Foundation has unique intergovernmental data system expertise, having worked with numerous institutions of higher education around the world to create student management, financial, and human resources data systems. As part of the planning grant, Kualii will do the following:

- Interview stakeholders at potential participating agencies such as IDOE, CHE, DWD, State Student Assistance Commission of Indiana (SSACI), Indiana State Department of Health (ISDH), Indiana Family and Social Services Administration (FSSA) and the Indiana Office of Technology (IOT) to determine agency needs, interests, and implementation barriers regarding a federated data system.
- Identify required agency or other resources (human resources, IT capabilities) required for system development and implementation.
- Examine federated data system work in other states.
- Explore potential federated data system governance mechanisms across participating agencies.
- Explore the federated data system's impact on reducing IT labor effort associated with data reporting and longitudinal tracking at K-12 school districts and higher education institutions.
- Estimate timelines, as well as one-time and recurring costs, for system implementation.
- Define a sustainability plan for the system beyond initial implementation.

- Enumerate the main benefits and risks of the proposed federated data system approach, comparing and contrasting the risks/benefits of other potential longitudinal data system solutions (e.g., a shared data warehouse among agencies).
- Identify preliminary end-user functionality and needs by interviewing a set of potential third-party users (e.g., Indiana Fiscal Policy Institute; Indiana Chamber of Commerce; Indiana Legislative Services Agency; K-12, higher education, and adult education teachers and administrators; and researchers).

The work done by the Kuali Foundation under this planning grant will help Indiana ensure it is fully prepared and has the appropriate mechanisms in place to successfully implement and sustain a federated data system. Kuali’s findings will help Indiana understand core end-user needs. These needs will drive and inform the development of the federated data system’s web-based portals and tools that users will utilize in accessing data. Additionally, Kuali’s study will identify potentially unforeseen obstacles in building a federated data system by uncovering lessons learned from the successes and failures of similar efforts in other states. Indiana anticipates the project plan articulated in Section D will be a living document and may be adjusted based on the key findings from Kuali’s work. The fact that Indiana’s Education Roundtable, a diverse body of stakeholders from K-12, postsecondary education, and the workforce, have supported a planning grant for this type of feasibility study demonstrates that Indiana has a strong level of support for the implementation of a federated data system.

**Deliverable 2: Convene a Governing Council**

*To ensure the long-term success of Indiana’s SLDS, Indiana must design and implement governance structures appropriate for guiding and overseeing a federated data system environment.*

At a minimum, the Indiana Education and Workforce data system being proposed would offer linked data from three agencies: IDOE, CHE, and DWD. Ideally, the system would also offer linked data from the Family and Social Services Administration (FSSA); State Student Assistance Commission of Indiana (SSACI); and Indiana State Department of Health (ISDH) as an expansion on the project proposed here. The federated data system will require a strong governance process across participating agencies to ensure the robustness of the system, data security and confidentiality, system utility and sustainability. It is imperative that each agency has some influence over the research agenda that will focus the development of the system.

To this end, Indiana will convene a Governing Council comprised of participating state agencies and other key stakeholders (See Table 2).

<b>Table 2. Governing Council Members</b>	
<b>Agency/Organization</b>	<b>Representative</b>
Office of the Governor	Governor Mitch Daniels
Indiana Department of Education	Tony Bennett, Superintendent of Public Instruction
Commission for Higher Education	Teresa Lubbers, Commissioner
Department of Workforce Development	Mark Everson, Commissioner
Indiana’s Education Roundtable	Dan Clark, Executive Director
Indiana Chamber of Commerce	Derek Redelman, Vice President of Education and Workforce Development Policy

Members of the Governing Council will have a deep and vested interest in the educational outcomes of Indiana's students as well as the state's overall economic development. The Governing Council will set the course for Indiana's Workforce and Education Data System by setting a research agenda to be accomplished through new levels of data access and linking made possible through the system, establishing agency support at the executive level, and empowering the Steering Team to drive the various phases of the project. Members of the Governing Council will have the authority to commit agency/organization resources to complement the direct support through the grant and to sustain the federated system once the initial funding cycle is complete.

In addition to coalescing support for the research agenda and development and expansion of the federated data system that provides the data necessary to accomplish the research agenda, the Governing Council will also address the following:

- Document governance structure and protocols for membership on the council
- Seek new members of the federation consistent with capacity and research agenda
- Review policies regarding data confidentiality, access, and use.

The Governing Council is *not* a Steering Team for the proposed project. Rather, this high level group will focus on creating the conditions for long-term success of the federated data system and identifying a statewide research agenda for P-20 issues. The Governing Council will consult with Indiana's SLDS evaluator and the Steering Team to bring forth the statewide research agenda around important P-20 topics. A project team and Steering Team will be responsible for the day-to-day efforts and outcomes that together will complete this phase of the project. The relationship between the Governing Council, steering team and project team are outlined in diagrams included in Appendix A.

Five tasks contribute to this deliverable.

### *2.1 Recruit the Governing Council members*

- Identify appropriate representation from participating agencies and other key stakeholders;
- Confirm commitment from potential Governing Council members.

### *2.2 Develop the Governing Council charter*

- Construct a founding document for the new decision-making body;
- Define the Governing Council, purpose, scope and authority (e.g., data sharing, confidentiality, ownership, access);
- Formalize initial membership of the Governing Council and member/officer roles and responsibilities;
- Set standard meeting schedule;
- Establish the by-laws (e.g., consensus, quorum), including procedures for amending the charter and for adding/removing council members.

### *2.3 Develop vision and research agenda*

- Articulate an overarching vision for a federated data system and, by association, Indiana's SLDS direction;
- Set long term SLDS strategic goals;



- Specify initial research and policy objectives, priorities, and milestones;
- Establish quantifiable performance measures associated with goals and objectives.

#### *2.4 Develop governance model and policies*

- Clearly define participating agency and other stakeholder roles and responsibilities, and decision-making policies and processes;
- Establish tools (e.g., business case, balanced scorecard, technology qualifications report) to support decision-making and evaluation;
- Develop criteria, processes, and policies for elevating issues to the Governing Council;
- Create and implement stakeholder communications plan.

#### *2.5 Create/enhance data sharing agreements*

- Define data sharing standards;
- Approve SLDS-related data sharing agreements.

### **Deliverable 3: Define data management and controls**

*Prior to building the federated data system itself, Indiana will establish common standards and controls to ensure data quality, accuracy, interoperability and security.*

Because IDOE, CHE, and DWD house different existing data systems, it is crucial to develop a comprehensive dictionary which will document all of the data element definitions, metadata requirements, and technical requirements necessary to create the federated data system. Many datasets are similar but are not consistent across agencies (i.e., they do not mean the same thing). As such, the development of a data dictionary will ensure that all common and unique definitions for data elements are captured. Capturing these similarities and differences will provide a conceptual map defining how users may retrieve data, driving the system's ability to retrieve, recode and organize data.

The federated data system will contain a highly secure registry which links agency-specific individual identification numbers to enable longitudinal P-20 educational research and analysis. IDOE will finalize this system's design as part of this project, but it will most likely leverage industry standard master data management approaches, such as deterministic and probabilistic matching, for entity resolution. This approach will ensure a very high level of data indexing and linking integrity.

Three tasks contribute to this deliverable.

#### *3.1 Develop data dictionary and mapping table*

- Identify existing data sources and data sets across all participating agencies (including needed, but missing data sets);
- Determine data sets to be shared in support of the council's strategic goals and policy objectives;
- Define common data exchange standards and semantics for data to be shared, aligning with emerging standards when appropriate;
- Create a mapping table which links common dimensions across participating agencies' data sources as well as to relevant data standards.

### *3.2 Develop security measures and implementation plan*

- Define access control and system security standards and policies based on the Governing Council guidelines and applicable state and federal privacy laws;
- Document methodology and approach to data storage (if applicable) and metadata management;
- Define steps required to implement and test security policies during federated data system development;
- Develop and implement data security training plan.

### *3.3 Develop and implement data quality and audit plan*

- Evaluate quality and accuracy of existing data sets to be shared;
- Reconcile major data quality and/or accuracy issues with existing data sets;
- Develop and implement data life cycle quality controls;
- Define regular audit processes, policies, and timing.

## **Deliverable 4: Design and build a federated data linking system**

*The core of a federated system, made possible by the governance structures and data management and controls, is the software that creates the linking engine to query data across agency systems.*

A functional federated data system acts as a metadata repository for the various data elements that are available from participating agencies. Each participating agency is responsible for exposing its data to the Indiana Education and Workforce Data System through web services. The system fills data queries by extracting data on demand from the multiple data sources. Data sets requested from the system are constructed by querying participating agencies' data sources via web services.

Of paramount importance for a longitudinal data system is data security and participant confidentiality, as well as the ability to accurately link participant data. The Indiana Education and Workforce Data System would alleviate issues associated with the lack of a common identifier (e.g., K-12 uses STN; workforces use SSN; early childhood programs have early childhood IDs, etc.) in record-level data across agencies by creating a data linking system. The data linking system also eliminates the need for any individual agency or entity to manually link data sets and eliminates any need for sharing files that may contain confidential or protected information. Data linking is accomplished by creating a hash of identifier attributes that are common across participating agencies. When the Indiana Education and Workforce Data system requests data from an agency data source, it provides a salt. The agency's system then uses this salt along with a pre-defined hashing algorithm to return de-identified data to the federated system. Through this data linking, no identifiable data are ever returned to the Indiana Education and Workforce data system. Thus, the system permits data to be linked and shared with stakeholders (whether at the record level or in the form of aggregated reports) in order to facilitate longitudinal research, but it does not allow personal identification of any of the individuals used in the data set. As such, it is fully FERPA-, HIPAA-, and all other privacy-related legislation-compliant. Access to de-identified record-level data is further managed through user authentication and authorization schemes.

