RFSP: Illinois Longitudinal Data System Data Warehouse (ILDS) Contractor

Part I: Narrative Description

January 5, 2011 4:00 PM CST

Submitted to:
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State Purchasing Office
Fiscal and Performance Division
Illinois State Board of Education
100 North First Street
Springfield, Illinois 62777

Proposal Submitted on behalf of:
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Proposed Subcontractors:
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Authorization to submit:

William J. Moskosz
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RFSP: Illinois Longitudinal Data System Data Warehouse (ILDS) Contractor

Part I: Narrative Description

January 5, 2011 4:00 PM CST

Submitted to:
Sherri Sullivan
State Purchasing Office:
Fiscal and Procurement Division
Illinois State Board of Education
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NCS Pearson, Inc
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Authorization to submit:

William S. Mosakowski
President & CEO, Public Consulting Group, Inc.

[Signature]
January 4, 2011

Attn: Sherri Sullivan, State Purchasing Officer
Fiscal and Procurement Division W-380
Illinois State Board of Education
100 North First Street
Springfield, Illinois 62777-0001

RE: RFP: Illinois Longitudinal Data System Data Warehouse (ILDS) Contractor

Dear Ms. Sullivan:

Public Consulting Group, Inc. (PCG) is pleased to submit our proposal for the Request for Sealed Proposals (RFP): Illinois Longitudinal Data System Data Warehouse (ILDS) Contractor. Our submission meets all requirements and addresses each of the specifications outlined in the RFP. Most importantly, our proposal is designed to create a centralized location and data management process that you can trust.

PCG is proud of the partnership we have had with the Illinois State Board of Education (ISBE) on the ILDS Data Architecture Project as well as our extensive experience with Illinois School Districts over the past 14 years. We look forward to continuing to expand our partnership with ISBE as the contractor for the ILDS.

We believe that we are uniquely qualified to fulfill the needs of ISBE in your efforts to build the ILDS for the following reasons:

- **PCG understands ISBE, its systems and needs.** PCG has spent the last seven months working in partnership with ISBE to document every data source with over 50,000 individual data fields, building a comprehensive data dictionary based on national standards. Today, PCG is confident that we know your data better than any other organization or vendor.
• **PCG provides extensive local service coupled with national SLEDS expertise.** PCG's partnership with ISBE has been continuous and productive. We look forward to bringing this same approach to the ILDS data warehouse effort. PCG is proposing a complete solution built on our experience working with dozens of other states. We know the pitfalls of state longitudinal data systems. **We are leading CCSSO's State Core Model.** We have a proven track record working with states to both fulfill their state and federal reporting needs and provide district- and school-based personnel with decision support tools.

• **PCG is fully committed to meeting the requirements of this RFP and the needs of ISBE.** Many companies can build a data warehouse that meets the minimum requirements of the RFSP. **Only PCG is prepared to provide the data quality assurance ISBE needs to have full confidence in your data.**

• **PCG has composed a world-class team with an unrivaled track record of success with state education data warehouse implementations.** Working in close partnership with Choice Solutions and Pearson, PCG is proud to bring the strongest possible team to the ILDS project. We know that successful data warehouses are more than just sound technologies. **PCG and our partners have a public, proven history of success in data warehouse implementations.**

• **PCG is a strong, growing and financially stable company.** In these tough economic times, PCG has continued to grow and reinvest in our education service offerings. PCG is a vendor with strong financial capacity and would be a highly qualified choice to meet this project's goals and fully implement the required scope of work.

Thank you for the opportunity to participate in the ILDS RFSP process. We believe that we offer the best solution and value to meet the scope of services outlined in the RFSP. If you have questions or you would like to discuss potential next steps, please don't hesitate to contact Greg Nadeau at (617) 717-1111.

Sincerely,

William S. Mosakowski
President & CEO
Public Consulting Group, Inc.
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I.3 Executive Summary

Introduction

Public Consulting Group, Inc. (PCG) is pleased to provide ISBE with our proposal to deliver a Data Warehouse Solution, tightly coupled with the recently completed ILDS Data Warehouse Architecture. In order to best fulfill ISBE’s objectives, we have assembled two partners to comprise what we believe is an unbeatable team:

- **Choice Solutions** is the premier state education agency data warehouse, portal, and reporting engineering company in the nation. Choice’s portal has been deployed statewide in 11 states. Its new warehouse and reporting solution was recently deployed in two states and is now in the process of deploying with two more states. Choice brings unparalleled engineering capacity and experience to rapidly and effectively deploy a solution based on the State Core Model.

- **Pearson Data Solutions** is the innovative business unit that was created with the integration of Edustructures into Pearson. Edustructures is the leading SIF company by any standard. Pearson is the world’s biggest education company. Their expertise and support will ensure that ISBE’s Data Warehouse connects seamlessly into the emerging e-learning marketplace.

This new three-company partnership brings familiar components into a new solution based on CCSSO’s State Core Model, part of the Common Education Data Standards (CEDS) initiative. Our proposal provides a new, lower-risk, lower-cost approach to P-20 state longitudinal data systems (SLDS). PCG is the lead developer of CCSSO’s State Core Model. Choice’s lead architect co-directs the CEDS initiative.

If selected, PCG will expand its Program Management Office (PMO) and create a Collaborative Data Model Environment (CDME) to work closely with ISBE technical teams to carefully document every possible piece of metadata and business logic. This documentation will be used to generate a series of testable plans we group under the heading PCG Data Quality Assurance. Through these plans, ISBE will know exactly what it is receiving from our work, how to administer it, and, most importantly, the exact context for data published by ISBE in reports.

Based on PCG’s specifications, Choice will engineer ETL plans to load or provide views of data into a single, fully documented, staging area. From there, a second set of ETLs will transform data into an Illinois customized instance of the State Core ODS, a normalized schema developed out of over 10,000 hours of work during the last year and a half. This loading process will simultaneously record changes in the State Core EAV logs. A third set of ETLs will create the State Core RDS, a single logical snapshot view, as of a particular day, of the primary entities with attributes organized by category. Choice will engineer a fourth, and final layer of the transformation into a series of datamarts, each optimized to support a particular report set.
One such datamart will be Choice's edFusion datamart. edFusion is a security portal and reporting platform created specifically to manage highly secure state education agency data. Choice has been building and deploying portal based security solutions for more state education agencies and for longer than any other vendor in the marketplace. A demonstration of Choice's capabilities will show how much out-of-the-box functionality and extensibility is built into the edFusion platform.
An additional, specialized datamart will be created to publish data to the State Core SIF Agent, a new class of SIF agent which Pearson will design as part of this project. Pearson Data Solutions will work under ISBE and PCG direction to design an architecture for interoperability that will enable ISBE to publish class roster, student profile, and staff profile objects to authorized servers.

Our Understanding of ISBE’s Needs:

In responses to this RFSP, ISBE is looking for the best possible proposal for four primary system components:

1. Metadata Management. Integration of the metadata workbook developed as part of the data architecture initiative.

2. Data Warehouse. Development, testing, and implementation of ETL routines to populate the staging data stores, ODS with EAV, and RDS with EDEN Data Mart data.
3. **Security Portal.** Deployment of a portal providing role-based access to the data warehouse information in an intuitive, user-friendly interface.

4. **Legacy Reports.** Development, testing, and implementation of a set of legacy reports to utilize the data warehouse as the primary data source.

To document the delivery of these components, ISBE has detailed 21 deliverables:

1. Weekly and monthly status reporting
2. Project Management Plan
3. ILDS Data Warehouse Requirements
4. ILDS Data Warehouse System Design
5. ILDS Data Warehouse Detailed Design
6. ILDS Data Warehouse Unit Test Plan
7. ILDS Data Warehouse Software and Components Unit Test Results
8. ILDS Data Warehouse System Test Plan
9. ILDS Data Warehouse System Test Scripts
10. ILDS Data Warehouse System Test Results
11. ILDS Data Warehouse Acceptance Test Plan
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13. ILDS Data Warehouse Acceptance Test Results
14. ILDS Data Warehouse Operations Training Materials
15. ILDS Data Warehouse Operations Training Results
16. ILDS Data Warehouse Implementation Plan
17. ILDS Data Warehouse Pilot Implementation and Recommendations
18. ILDS Data Warehouse User Training and Support Materials
19. ILDS Data Warehouse Implementation Memo
20. Initial ILDS Data Warehouse User Training and Support Memo
21. ILDS Data Warehouse Ongoing Support Completion Memo

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**Our Proposal Provides**

**Our Team:**

Our team builds on the same core team that is currently completing the data warehouse architecture.

**Project Management Team**

- Project Director – Greg Nadeau*
- Project Coordinator – Mike Sage*

**Business Analysis**

January 5, 2011
Executive Summary

As prime contractor, PCG will be 100% accountable for every detail of the project's success. If selected, PCG will continue to run daily project management meetings with ISBE staff and will be directly involved with every aspect of the project. These meetings will be expanded to provide a Program Management Office to help coordinate all ISBE data-related projects.

To provide ISBE with the best possible solution, PCG has selected Choice Solutions and Pearson Data Solutions as our partners.

Our Approach

Project Management
PCG believes successful projects are built on impeccable project management. Our methodology is based on our experience, integrating the best of Project Management Body of Knowledge (PMBoK) into a streamlined process optimized for state education agencies.

We write everything down. When meeting with our clients, we frequently project documents or run WebEx sessions. As we did in the Data Warehouse Architecture project for ISBE, we would work daily to continue to build a workbook of metadata, people’s contacts, tasks, and issues.

We don’t assign homework. We understand how busy SEA staff are. Managing ISBE staff time is the single most important thing we can do to ensure project success. If we need something from someone on ISBE’s staff, we schedule a meeting with enough time to accomplish what we need during that meeting.

We manage the sub-contractors so ISBE does not have to. We have worked with both Choice and Pearson many times before. We know how to manage them to ensure success.

January 5, 2011
Each week, we will provide a written report of the progress made that week. Each month, we will provide a set of slides summarizing the status and identifying as early as possible any change in schedule or unresolved issues.

**Business Analysis and Architecture**

Good design starts with thorough documentation. PCG, Choice, and Pearson staff will work together to build a body of business analysis documentation to support the full ISBE enterprise.

This work will build directly off the Requirements, Systems Design, and Detailed Design documentation built as part of the Data Warehouse Architecture project and will follow similar project management procedures.

The weekly status report will be submitted in Microsoft Excel and will include:

- **Project Log containing:**
  - Weekly accomplishments
  - Completed tasks
  - Activities and tasks in progress
  - Previous planned activities and tasks not accomplished, the reason for not accomplishing them, anticipated timeline and plan for bringing them back on schedule

- **Risk Management Log, containing:**
  - Risks and costs associated with planned activities and costs not accomplished
  - Issues and anticipated problems
  - Recommendations for issue and problem resolution

- **Deliverable Status Log, containing:**
  - Anticipated deliverable due dates
  - Deliverable completion status

PCG’s project management approach involves holding daily working sessions with the ILDS project manager, using WebEx to include the larger project team. This approach allows PCG and ISBE to be aware, as they happen, of any issues that may arise that impact the project.

Business analysis and architecture reviews will occur during the daily working meetings. These reviews will focus on maintenance of the data architecture workbooks, and will engage the ISBE data stewards in documentation and review of data architecture updates.
Data Quality Assurance

PCG specializes in data quality assurance. We provide special education compliance software and Medicaid reimbursement services to more school districts than any other company. Over the last ten years, we have helped secure over $2B in Medicaid reimbursements.

Our approach to quality assurance begins with a decomposition of the system into testable components:

- Data Sources and ETL to Staging
- ETL to ODS and EAV
- ETL to RDS and DataMarts
- Reports and Cubes

These components are validated using SQL and manual testing procedures. Once one or different testable components passes validation (Unit and Integration Testing), they are cross checked to assure integrity of the data (System Testing).

The testing procedure used is to describe positive and negative scenarios where a user is (or is not) able to get access or upload (in case of files) different sources including File Validations or Data Source Connection Strings. Usually, this validation is performed as part of the ETL’s testing procedure.

ETL Testing. The testing process of validating ETLs consists mainly of assuring that Source and Destination data inside the data warehouse matches according to technical or business specifications.

The tasks involved are:

1. Understand the ETL Data Source subset where data will be extracted from
2. Document all transformation rules that need to take place in the ETL
3. Create Positive and Negative data test scenarios to validate data elements and the Transformation Rules.
   - Data Elements
     - Positive Scenarios: Acceptable values per data element or group of data elements including in-boundary conditions.
     - Negative Scenarios: Out of boundaries, Nulls (if apply), or values that should not enter the data warehouse.
   - Transformation Rule
     - Positive Scenarios: Acceptable data source values are transformed into the correct ones in the data warehouse.
     - Negative Scenarios: Unacceptable or unknown values are treated correspondingly (Accepted or Rejected) to the rule defined.
4. Count totals for all different data conditions (Positive and Negative scenarios)
5. Execute and monitor the performance of ETLs
6. Validate testing scenarios
7. Validate all totals

This activity requires manual testing using SQL and is achieved by managing the data at the source level and predicting its expected result. The validation of Business Rules is mainly treated as the case of validating Transformation Rules. The Positive Scenario is defined and then Negative Scenarios are derived from it in order to make sure all values are treated (Accepted or Rejected) in the data warehouse.

Report Testing. Reports and cubes are validated on the following aspects:

- Metadata: Appropriate Name, Description, Language, Spelling, Order.
- Dimensions: All dimensions are displayed, Dimension metadata validation, Hierarchies, Hierarchies’ metadata validation, Members, Members’ metadata validation.
- Measures: For each measure the metadata is validated as well as the calculated value displayed and the value format.
- Cross Dimension Checking: In this test, the tester picks different combination of dimensions, populates measures and validates its corresponding calculated values. Assuming that all possible combinations of dimensions are impossible to achieve (Time Restriction), the tester will focus first on the common business scenarios and then investigate unusual combinations.
- Security: Based on the different security roles implemented, the tester will access the cubes with the same role to make sure that role only has access to what is defined for that particular role.
- Layout: Anything related to the format of the report, e.g., Structure, Language, Spelling, Colors, Font type, Font Size, Paragraph, etc.
- Data Content: Anything related to Titles, Headers, Parameters, Graphics, Tables, Totals, Grand Totals, Data Values.
- Functionalities: Anything related to Drill-thru scenarios, Printing (Printing, Preview) and Export Functionalities to different formats.

Performance/Load Testing. Many times performance and load tests are treated as a single topic. However, there is a slight difference between them. A Performance Test is the activity that will answer the question of how responsive the system is in time manners (time sensitive requirements) in relation to usual workloads. On the other hand, the Load Test is the activity of evaluating the target of the test exceeding the maximum workloads and behaving acceptably. Both measure and evaluate response time, transaction rates and other time sensitive requirements in conjunction with resource utilization.
Performance tests focus the attention on how many requests per hour the system can handle when managing a normal specific business scenario (i.e., regular workload of the application). For example: We want the response time to be less than 2 seconds when running reports. On the other hand, the load test will indicate if the system is capable of managing requests under a specific load request.

**Engineering**

By focusing so extensively on project management, business analysis, architecture, and data quality assurance, PCG will enable our partner, Choice Solutions, to engineer system components as efficiently as possible, with minimal risk.

The primary component of the system is the ETL plans needed to load data into stating, operational data store with EAV logging files, snapshot reporting data store views as of particular dates, and datamarts optimized to support sets of reports.

Much of the critical work needed to accomplish these tasks efficiently has already been completed in the Data Architecture project:

- Requirements and System Design have been documented
- Stakeholders have been identified and interviewed
- Source systems have been documented in detail
- Fixed position maps have been built specifying the source and target locations for each element

The next step in the process will be to build a development environment to stage the data and thoroughly profile each repository. In this process, actual data ranges, types and lengths are discovered. The goal of the staging environment is to centralize and document an unchanged view of the source repositories. This environment will be used as the foundation to test future data.

In most cases, the next phase of the project would be to build a normalized data structure. However, in this case, ISBE can benefit from the work that has recently been completed related to the State Core Model. The State Core Model documents a comprehensive logical model for early childhood, K-12, secondary, and workforce data. By leveraging this work, ISBE can both substantially reduce the costs and risks of implementation and increase the comparability between ISBE data and other agencies within and outside Illinois.

Once the data model has been designed and ETL plans built, the next step in the process is to resolve and map non-conforming values. If student gender is listed as Z rather than Male or Female, a decision needs to be made whether to:

1. Research and correct the data from the source
2. Create a value a new option for gender called "Z"
3. Map "Z" to a value to a new value such as "No Data Available"
4. Remove the record

Through this process of validation and transformation, conforming data can be safely loaded through each stage of the data warehousing process.

Choice's edFusion Portal and Reporting framework provide mature tools to control access to the resulting data. A full description of these technologies is included in Section 1.8.

As part of the core proposal, Pearson Data Solutions will provide the following services:

- Develop the IL state SIF profile based on data made available via the proposed State Core RDS (State Core Model)
  - Includes both student record (historical) data and current student roster data
  - Includes detailed object usage and behavior information for explanation to SIS and other vendors
  - Design based on the current SIF 2.4 data model
  - Assumes PCG will deliver a data dictionary for all related data elements including those specific to IL, and provide timely answers to follow up questions
  - PDS will use its expertise to round out the data dictionary to include those data elements that should be part of any student record and student roster offering
  - Profile will need to be approved and distributed by PCG and/or ISBE
  - Work with SIS and other vendors to clarify questions regarding profile

- Develop and document a cloud-based architecture in which to deploy a statewide enterprise SIF infrastructure based on the State Core Model
  - Architecture design will fully describe the system requirements, security model, scalability, provisioning, and deployment strategies
  - Design will focus on SIF zone provisioning and data partitioning

- Develop and document architecture for SEA to SEA student record exchange using State Core Model
  - Architecture design will fully describe the system requirements, integration points, security model, scalability, provisioning, and deployment strategies,
  - Design will also explore multi state governance issues.

In addition to the services provided in the core proposal, Pearson Data Solutions will make available as an optional expansion the following services:

- Develop State Core SIF agent and license to ISBE for 1 year
- License restricted SIFWorks Zone Integration Server (ZIS) to ISBE for 1 year
Conclusions
PCG’s submission meets all requirements outlined in the RFSP and, most importantly, it is designed to create a centralized location and management process that you can trust.

PCG knows your data better than any other organization or vendor does. PCG has spent the last seven months working in partnership with ISBE to document every data source with over 50,000 individual data fields, building a comprehensive data dictionary based on national standards.

PCG is proposing a complete solution built on our experience working with dozens of other states. We are leading CCSSO’s State Core Model. We know the pitfalls of state longitudinal data systems. We have a proven track record working with states to both fulfill their state and federal reporting needs and provide district-and school-based personnel with decision support tools.

PCG has composed a world-class team, in partnership with Choice Solutions and Pearson Data Solutions, with an unrivaled track record of success with state education data warehouse implementations. We know that successful data warehouses are more than just sound technologies. PCG and our partners have a public, proven history of success in data warehouse implementations.
1.5 Required Qualifications and Customer References

This section details our qualifications and customer references. Organization Background, Bidder Experience, and Customer References are included for PCG and for our subcontractor, Choice Solutions, who is receiving over 25% of the proposed cost.

Description of the Bidder’s Organizations (1.5.a)

Public Consulting Group

About Public Consulting Group

Established in Massachusetts in 1986, Public Consulting Group, Inc. (PCG) is a management consulting firm offering strategic planning and implementation, operations improvement, policy development, financial management, systems development, rate setting, revenue maximization, and other management advisory services to government and private health and human services providers. As a privately held company, PCG has the flexibility to properly serve our public sector clients with the highest level of customer service. More than 95% of PCG’s clients are public sector agencies or agency providers such as school districts, county offices of education, state departments of education, state and county departments of mental health, developmental disabilities, Medicaid, social services, public welfare, county governments and multicounty entities, cities, and municipalities.

PCG is comprised of four divisions: Education, Health and Human Services, Technology Consulting, and Consumer Direction of Care. This structure allows PCG to address a broad range of public sector needs. It also allows the firm to assemble multidisciplinary teams when required, taking advantage of the specialized expertise and experience of each practice area to address the multidimensional objectives of public sector agencies. The firm currently employs over 800 full-time staff in 31 office locations. We have the financial stability, resource depth, and strategic expertise to ensure the quality and applicability of our services to ISBE.

About PCG Education

In 1992, PCG began providing education consulting services and products to Boston Public Schools to modernize school-based Medicaid billing and to provide an easy and innovative approach for clinicians to document services. In the last 18 years, PCG Education has developed considerable expertise and has achieved numerous successes working with school districts, state departments of education, and Medicaid agencies since our initial work with Boston Public Schools. Our areas of expertise include:

- Education Analytics and Data Capacity Services
- Special Education Program Evaluation and Audit Services
- Special Education and At-Risk Student Data Management
- Response to Intervention (RTI), Positive Behavior Supports (PBS) and Education Plans
  Solutions
- Professional Development and Coaching on district and school-level use of data
- Literacy and Learning
- Strategic Planning and School Improvement
- School-Based Medicaid Reimbursement Services
- Operations Improvement and Financial Consulting Services

Working with school districts and state departments of education ranging in size from 500 to 1.5 million
students, PCG Education has the knowledge and expertise to provide a full spectrum of data-based
services informed by research and the practical experience of our staff. PCG Education currently has
over 800 contracts in 32 states plus Puerto Rico, the US Virgin Islands, Ontario, Quebec, Alberta,
Saskatchewan, and British Columbia, Canada. In addition, PCG Education currently serves twelve state
departments of education (Arizona, Colorado, Illinois, Kansas, Kentucky, Louisiana, Massachusetts,
Michigan, New Hampshire, New Jersey, Tennessee, and Wisconsin) and 13 of the top 25 largest school
districts in the nation.

Figure 5.1 PCG Education Contract Locations
As a result of vast experience in the marketplace and a highly knowledgeable staff, PCG Education has a near perfect client retention rate—this is largely due to understanding clients’ needs, efficiently fulfilling our contractual obligations, and continually exceeding client expectations. PCG Education’s track record demonstrates the ability to improve outcomes for clients resulting in long-term relationships, contract extensions, and re-awards.

**Education Consulting Services and Products**

PCG’s Education Services unit offers full service consulting integrated with innovative and scalable technology solutions to address the changing needs of the K–12 education community. Our expertise spans across various education administrative and instructional functions and our objective is to provide districts with the resources they need to accomplish their goals utilizing only one vendor.

PCG Education provides evaluation, professional development, literacy, data management, and data use professional development services to education agencies at national, state, and local levels. The firm has played a leadership role in education reform initiatives and conducted numerous studies of state and federally funded education reform projects. We have offered products and services that help districts and schools achieve equity for all students, accountability for results, and continuous improvement. Our staff makes use of a wide range of tools and approaches, including internally developed models, resources, and software to build systemic capacity through the application of research-based knowledge, sustained professional development, cutting-edge technology, and collaborative partnerships.
Figure 5.2 PCG Education’s Range of Educational Expertise

This figure shows how our expertise in various content areas such as data-driven decision making, school improvement, adolescent literacy, and 21st century skills can be combined with our core competencies in strategic planning, data integration, analysis and evaluation, action planning, professional development, and coaching. We apply this combination of content expertise and core competency to clients at the national level, such as the U.S. Department of Education, foundations, and national educational organizations; to clients at the state level, such as state departments of education and regional educational organizations; and to district and school clients. We work directly with decision makers and educators to help them make the most effective use of their data and the resources available to them to improve student outcomes.

Educational Data Management

PCG assists school districts in managing data systems to provide timely and accurate information to administrators and educators. We help states meet the high standards for accountability introduced in the No Child Left Behind (NCLB) Act and offer solutions for the following:

- Data warehouse solutions
- Collection, management, and disaggregation of data
- Data analysis, reporting, and data mining
• Development of Personalized Education Plans (PEPs) for students who have been identified as “falling behind”
• Developing and maintaining school improvement plans
• Tracking and reporting on students’ progress
• Maintaining compliance with NCLB requirements
• Integrated Technology
  o Skopus: Fully supported suite of web-based data warehousing, data analysis, and reporting tools. By consolidating and storing the data school districts already collect in a central repository, the PCG solution helps create usable reports to evaluate current school improvement initiatives, meet federal and state reporting requirements, measure students’ progress over time, and assess instructional effectiveness.
  o EdPlan™: Web-based solution that helps school districts meet the data accountability requirements of No Child Left Behind. This school accountability solution tracks, measures, and reports on each school’s compliance including: development of a personalized education plan for any child who is falling behind, documenting services as they are delivered, and analyzing their effectiveness. Using this system reduces time and errors associated with filling out paper forms, and EdPlan™ provides immediate access to information by all parties involved in a child’s progress.
  o Skovision: Web-based school improvement planning solution. This system provides a fully integrated web-based means for schools and districts to set and align goals and monitor progress. Skovision can be connected electronically to Skopus allowing for electronic updates of progress against goals.
  o Program Evaluation: Program evaluation services provide district and school administrators with comprehensive information on the results of specific programs, services, and interventions; areas of strength; and where programs need to be improved.

Data Analysis and Instructional Data Use
PCG Education has a national reputation in data analysis and data-driven decision making, and has specific expertise in facilitating data use as a core component of school reform initiatives such as the Smaller Learning Communities grant program, the Carnegie-funded Schools for a New Society, and the NASSP Breaking Ranks Model. From 1995–2005, PCG had a 10 year partnership with the Northeast and Islands Regional Educational Laboratory at Brown University and conducted LAB-sponsored research on data use in Urban High Schools (Lachat & Smith, 2004). David Ronka, the lead manager at PCG for data use, is a member of the Data Wise Research Team at the Harvard Graduate School of Education and a contributing author to Data Wise in Action (Boudett & Steele, 2008), a book that showcases schools using the Data Wise improvement model. Collectively, PCG’s data use experts have experience in the following areas:
• Establishing and facilitating data teams (at the district and school levels)
• Collecting and collaboratively analyzing data
Part I: Narrative Description

Required Qualifications and Customer References

- Utilizing data warehouse and reporting technologies
- Preparing and developing school leaders
- Evaluating the effectiveness of improvement initiatives
- Providing teacher professional development
- School improvement planning
- Identifying areas of academic weakness
- Identifying root cause
- Action planning and progress monitoring

Special Education Consulting Services

PCG offers comprehensive services and customized technology solutions to special education departments and can assist with the following:

- Determining best practices for IEP development
- Assistance in planning successful IEP meetings
- Evaluations and audits
- Development of policy and procedures manuals
- Data management and sharing
- Federal and state compliance
- Project management
- Enhanced reporting
- Integrated technology with EasyIEP®
  - EasyIEP® is a web-based solution for the development of Individualized Education Plans (IEPs) and for the management of special education reporting. EasyIEP® provides administrators with a powerful management tool, extensive reporting capabilities, and instant access to student information securely via the Internet. Over 11 million IEPs have been written across the nation using our systems.

Literacy and Learning

PCG Education is a recognized leader in the area of adolescent literacy. As a partner of the Northeast and Islands Regional Educational Laboratory at Brown University (LAB), PCG was the content provider for the LAB’s Adolescent Literacy in the Content Areas Knowledge Loom Spotlight, a professional development website. In the past few years, PCG Education has provided literacy services to New Leaders for New Schools, the National Academy Foundation, the Ohio Resource Center, CCSSO, CALSA, ACTE, and the New England League of Middle Schools, among other national, state, and regional organizations. We have or are currently providing literacy services like those described in this proposal in Maine, Massachusetts, and New Hampshire. Our latest two publications, Meeting the Challenge of Adolescent Literacy (IRA, 2009) and Taking the Lead on Adolescent Literacy: Action Steps for Schoolwide Success (Corwin, 2010), coauthored with partners at the National Literacy Project, are being used by educators throughout the country. The Massachusetts Office of Literacy contracted with us this past
year to develop guidelines for district literacy action planning. We were integral to successful completion of district literacy action plans in 11 districts using the guidelines this past spring. Members of the PCG Education literacy team have been asked to speak at national and state conferences on a regular basis and have served in advisory or membership roles on a number of panels and committees, including those sponsored by the Alliance for Excellent Education, the National Association of Secondary School Principals, the Secondary Reading Interest Group of the International Reading Association, and the National Adolescent Literacy Council.

**Professional Development**

PCG Education’s approach to designing professional development programs is grounded in research-based methods that have proven highly effective in countless engagements. We use a range of adult learning strategies that are based on the National Staff Development Council (NSDC) Standards for Staff Development, including Context Standards, Process Standards, and Content Standards.

In designing professional learning experiences, PCG Education applies Wiggins & McTighe’s (1998) “backward design” principles that focus first on the desired outcomes. In the case of a data use project, the desired outcomes include not only knowledge and skills, but a positive orientation to using data to improve student performance. Creating a positive orientation to using data among education practitioners involves a combination of motivating learning, building the requisite knowledge and skills, and creating successful experiences that fuel further learning and application of knowledge.

To accomplish these goals, we engage learners through a “gradual release of responsibility” instructional model that transfers knowledge from the trainer to the learner. This model of instruction sets PCG Education professional development apart from other professional development providers, who often simply present the information without a process to ensure that the participants actually comprehend the information and have internalized it for independent use.

Additionally, PCG Education provides a unique approach to standard training by using a variety of research-based learning strategies to develop comprehension and interpretive and evaluative thinking drawn from PCG’s nationally recognized professional development work. Interactive techniques might include an Anticipation Reaction Guide used prior to learning to reveal participant assumptions or biases about data analysis; the use of Problematic Situations to bring the data “alive” in a school-related scenario; a Proposition-Support Outline exercise for participants to prove a conclusion or proposed decision based on the student performance data; or Jigsaw Discussions where small groups use different features of the data warehouse to complete an application exercise and present their findings to the other groups.

**Revenue Consulting Services**

PCG has developed a unique set of revenue generation, recovery, and cost avoidance consulting services tailored to school districts that are vital in today’s fiscal environment. Many districts are missing out on
additional funds that are available due to limited staff capacity to implement the complex procedures required for claiming them. PCG has been working with school districts for years to create and manage these programs effectively. We have recovered over $2.25 billion for our clients, more than any other vendor in the United States.

- **Medicaid Reimbursement Consulting Services**: PCG has extensive experience working with school districts to maximize Medicaid reimbursement for health-related services and administrative outreach activities. We offer districts flexible options for executing these programs by using traditional paper-based methods or the utilization of advanced technology solutions. PCG’s Medicaid billing and compliance experts can offer clients assistance with:
  - Identifying Medicaid eligible students
  - Developing and managing Fee-For-Service or Administrative Outreach Claiming programs
  - Preparation and submission of Medicaid claims
  - Ensuring state and federal compliance
  - Professional training and materials
  - Integrated Technology:
    - **EasyTRAC™**: Web and Palm™-based solution for the documentation of health-related services provided to special education students. Clinicians can easily document services provided—anytime, anywhere. Data entered using the Palm™ can also be synchronized from the unit into a central database for compliance and Medicaid billing.
    - **EasyAOC™**: The flexible EasyAOC™ process allows our clients to choose either the traditional week-long time study or a Random Moment Time Study methodology and the option to utilize paper-based time studies or to integrate time-saving technology. Each component of the administrative outreach claiming development cycle can be implemented electronically.

- **Other Revenue Consulting Services**: Through reviewing current operations and practices, PCG allows clients access to additional federal, state, and local funds in the areas of health services, adult education, early childhood education, and behavioral health.
  - Grants/Cash Management
  - Upper Payment Limits
  - Rate Setting
  - Tax Rebates
  - TANF/MOE
  - Food Stamps
  - Accounts Payable Reviews
  - Purchasing Strategies
  - **Cost Avoidance**: PCG was the first in the nation to implement this service.
Information Technology Consulting Services

PCG is known for its ability to recommend, develop, and manage successful solutions for the implementation of complex, new operations to solve our clients' information technology challenges. We work side by side with our clients to understand their IT needs and the educational processes that drive them. Our capabilities include:

- Project management
- Risk assessment and avoidance
- Quality assurance
- Information security
- Data integration and stabilization
- Business process management
- Custom web-based software solutions

PCG's proactive approach leverages best practices from school districts and state agencies across the country to ensure our clients are up-to-date on education processes and trends that govern short- and long-term decision making. Our integrated suite of products and services provides a holistic approach to managing the demands facing education. We believe our expertise is only as valuable as our ability to transfer "ownership" of decision-support tools and techniques to customers. To best understand the needs of our clients, PCG offers hands-on consultation and face-to-face interaction to the greatest extent possible. Our clients are viewed as partners in every consulting engagement. PCG believes the client's perspective is where every project engagement should begin and, therefore, we spend a great deal of time getting to know the client and the operating environment. Over the course of an engagement, document confidentiality, storage, and accessibility become imperative to the success of the project. PCG ensures that all clients receive these services. PCG keeps current information on FERPA, HIPAA, and other laws and regulations affecting client confidentiality.

PCG recognizes that most clients are looking for fresh approaches to difficult problems. PCG brings a wide body of national experience to every engagement, realizing innovation is only useful when it can meet the tough implementation requirements of the local public environment. PCG has a proven record of success in making the initial investments in time, capital, and other resources critical to high quality projects.

Corporate Structure:

PCG has approximately 800 total staff, divided into the following categories: First/Mid-Level Officials and Managers, Professionals and Support Personnel. The following graphic represents the organization of the management team of the company.
Figure 5.3 PCG Corporate Organization
Choice Solutions has developed one of the most successful state education data warehouses and portals in the US. The edFusion Solution is robust, scalable, and easy to use. We base the data Extract, Transform, and Load (ETL) and storage on our experience with state data systems and national standards for storage and data collection. Choice Solutions' ETL team manages all data movement between the U.S. Department of Education's (USED) EDFacts databases and the SchoolDataDirect databases. The solution provides a decision support system with analysis and reporting tools to support all stakeholders. The edFusion Portal acts as a central clearinghouse for both local and statewide applications, and can easily and affordably accommodate many additional applications. It is a foundation, built on proven enterprise architecture with sustainability, growth, reuse, and extensibility in mind. It is able to expand as technology, needs, and requirements change.

Choice's Executive Team are national leaders in educational data systems. Their Chief Architect is Lead of the Technical Board of SIF, the Project Manager of the Common Data Standards Project, and architected the National Education Data Model. Choice is a member of SIF, and a business partner to the Council of Chief State School Officers (CCSSO). Our solutions are powerfully based on standards and open, extensible enterprise architecture. One of the compliments that Choice most often receives is on their ability to meet and even predict the specific needs of our customers.

History
Choice Solutions' involvement with state and district software products and portals began in 1999 with the Massachusetts Department of Education's Student Information Management System and Directory Information Management System. Continued and evolved involvement in P-20 education on several State Education Agency (SEA) and Local Education Agency (LEA) initiatives throughout the US makes Choice Solutions uniquely situated to formulate long-term solutions meeting the technology needs of education institutions such as ISBE.

Experience gained from multiple implementations allows Choice Solutions to avoid many of the pitfalls that might befall a strictly technological solution or partner that does not understand the ongoing needs of P-20 institutions. The continued involvement of Choice Solutions with education-based initiatives—such as SIF, Sharable Content Object Reference Model (SCORM), and GEM—will help design ISBE's solutions for maximum scalability while also respecting difficult economic realities.

Choice Solutions has grown from a strictly technology consulting company to a leading provider of portal, directory, and longitudinal data systems to state educational agencies. It builds solutions and implementations upon advanced technology and uses its experience and relationship to build in long-term relevancy.
Choice Solutions has implemented various K-12 portal and data systems throughout the country for the past 10 years. Over that time, we have grown to see how important it is to put the data in the hands of those who can actually impact outcomes and instruction. When Choice Solutions began work on our edFusion product stack in 2005, the goal was to create a powerful and extensible solution to meet the needs of the SEA and LEA markets. Choice has created a solution that meets the great majority of ISBE’s needs, as well as provides the flexibility to add additional tools and functionality as needed.

Corporate Structure and Organization

Choice Solutions’ Organizational Structure
Choice Solutions team is focused on designing and implementing SEA based technology products and solutions. This team has worked in over a dozen SEA client engagements and has the capabilities to address all your organizational objectives.

Pearson Data Solutions

Pearson is an education company. With our roots in education, our team embraces Illinois’ very purpose in embarking on this project: We have insight into how educators wish to use the data. It is Pearson’s breadth of technical resources and educational content, spanning curriculum, instruction, professional development, assessments, accountability, and other critical areas, affecting students, teachers, and districts that sets us apart from other education vendors. Pearson delivers the tools that enable stakeholders to move beyond measurement to management by leveraging data for actionable and immediate change.
ISBE manages a valuable repository of data that needs to be made available to local education agencies (LEAs), program evaluators, and policymakers to support decisions in the classroom, as well as the analysis of student outcomes in Illinois. By enhancing school districts' abilities to make and support educational decisions, the ISBE can help improve educational outcomes for students. The mission-critical nature of this project requires a proven partner to work with ISBE and its education stakeholders to develop a data warehouse, and profile interoperability for data exchange between LEA and SEA systems and SEA to SEA. It is imperative for ISBE to choose a partner with a wealth of experience and a track record of success working with state education agencies.

**Illinois Experience**

With more than 100 Pearson employees based in Illinois, we are eager to continue our long-standing working relationship with ISBE and the Illinois school districts. ISBE and Illinois have experienced Pearson's commitment to education firsthand. Pearson currently supports the Illinois Standards Achievement Test (ISAT), Illinois Alternate Assessment (IAA), Illinois Measure of Annual Growth in English (IMAGE), Prairie State Achievement Examination (PSAE), and Illinois Goal Assessment Program (IGAP). Our primary purpose is to serve the ISBE and Illinois and help you better serve your education community. ISBE and Illinois can continue to benefit from access to anyone on our team who can help. We will continue to provide solutions that work, backed by the staff and senior management you have come to know and respect.

**Bidder’s History and Background (1.5.b)**

PCG is the prime contractor for this project. Choice Solutions is a subcontractor to PCG. Pearson is a subcontractor to PCG allocated less than 25% of the proposed budget.

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<td>Fax Number</td>
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<tr>
<td>Brief History and Background</td>
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</table>
Illinois State Board of Education  
ILDS Data Warehouse Contractor  
Part I: Narrative Description  

Required Qualifications and Customer References

| Services and Products Offered | PCG is comprised of four divisions: Education, Health and Human Services, Technology Consulting, and Consumer Direction of Care. This structure allows PCG to address a broad range of public sector needs. It also allows the firm to assemble multidisciplinary teams when required, taking advantage of the specialized expertise and experience of each practice area, to address the multi-dimensional objectives of public sector agencies. The firm currently employs over 800 full-time staff. We have the financial stability, resource depth, and strategic expertise to ensure the quality and applicability of our services to the Illinois State Board of Education (ISBE).

In 1992 PCG began providing education consulting services and products to Boston Public Schools to modernize Medicaid billing and to provide an easy and innovative approach for clinicians to document services. In the last 17 years, PCG’s Education Services division has developed considerable expertise and has achieved numerous successes working with school districts, state departments of education, and Medicaid agencies since our initial work with Boston Public Schools. Our areas of expertise include:

- Education Analytics / Decision Support
- Literacy and Learning
- School-Based Medicaid Reimbursement Services
- Special Education / At-Risk Student Data Management
- Strategic Planning and School Improvement

Working with school districts and state departments of education ranging in size from 500 to 1.5 million students, PCG Education is not simply a technology unit or an education consulting unit; rather it is a complete practice area that has the knowledge and expertise to provide ISBE with comprehensive analysis and research-based findings, grounded by practical experience. PCG Education currently has contracts in 31 states and 5 Canadian provinces. In addition, PCG currently serves 12 state departments of education and 14 of the top 25 largest school districts in the nation. |

| Number of Employees | Over 800 |
| Office Locations    | PCG currently has 31 office locations, including an office in Chicago, IL. PCG’s Corporate Headquarters is located in Boston, MA. Please see the map in section 1.5.a. |
| Type of Contractor  | Prime |

January 5, 2011  Page I.5-14
### Choice Solutions, Inc.

<table>
<thead>
<tr>
<th>Mailing Address</th>
<th>420 Lakeside Ave. Ste. 101</th>
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<tbody>
<tr>
<td></td>
<td>Marlborough, MA 01752</td>
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<tr>
<td>Contact Person and Title</td>
<td>Zachary Tussing</td>
</tr>
<tr>
<td></td>
<td>Vice President</td>
</tr>
<tr>
<td>Telephone Number</td>
<td>(508) 229-0044</td>
</tr>
<tr>
<td>Fax Number</td>
<td>(508) 229-0033</td>
</tr>
<tr>
<td>Brief History and Background</td>
<td>• Founded in 2000</td>
</tr>
<tr>
<td></td>
<td>• Microsoft Gold Partner</td>
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<tr>
<td></td>
<td>• Focused on P-20 Education</td>
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<tr>
<td>Services and Products Offered</td>
<td>Choice Solutions is a full service system integration and software development firm, focused on the needs of P-20 education clients. Over the past decade we have implemented SLDS solutions within 11 SEA clients as well as many LEAs as well. Currently we are the leading SLDS provider and are working in tandem with our clients and partners to extend our data management and decision support solutions to meet your every growing needs. We are working on several cutting edge initiatives with our states including Student-Teacher-Course Linking, National Education Data Model, State Core, Growth Model, Balanced Score Card, EDFacts reporting and are working to share that work with our clients through our community of practice.</td>
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<tr>
<td>Number of Employees</td>
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<tr>
<td>Office Locations</td>
<td>Marlborough, MA</td>
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<tr>
<td></td>
<td>Alpharetta, GA</td>
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<tr>
<td>Type of Contractor</td>
<td>Sub-contractor</td>
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### NCS Pearson, Inc.

<table>
<thead>
<tr>
<th>Mailing Address</th>
<th>9815 Monroe St., Ste 400</th>
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<tbody>
<tr>
<td></td>
<td>Sandy, UT 84070</td>
</tr>
<tr>
<td>Contact Person and Title</td>
<td>Barbara DelBove</td>
</tr>
<tr>
<td></td>
<td>Director, State Data Solutions</td>
</tr>
<tr>
<td>Telephone Number</td>
<td>(801) 858-0525</td>
</tr>
<tr>
<td>Fax Number</td>
<td>(801) 858-0073</td>
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Required Qualifications and Customer References

| Brief History and Background | Pearson has successfully deployed more state, LEA, and school SIF implementations than any other provider, assisting education agencies in meeting the data management and reporting demands of NCLB and state mandates. Pearson has installed and successfully supports clients ranging in size from small school districts to statewide implementations, including SEA projects in South Carolina, Virginia, Rhode Island, Wyoming, Ohio, Iowa, Pennsylvania. The Data Solutions group (formerly Edustructures) of Pearson within the Pearson Assessment & Information group is a business unit of NCS Pearson Inc., of Bloomington, MN (incorporated in 1961). NCS Pearson Inc. is 100 percent owned by PN Holdings Inc., which is 100 percent owned by its ultimate parent, Pearson plc (a publicly held UK company). Pearson acquired Edustructures in December 2007. Founded in 2001 by veterans of the educational software industry, Steve Curtis and Eric Petersen, Edustructures entered the market with a SIF-specific focus that has quickly taken the company to a leadership position for SIF-based solutions. Noting the emergence of XML-based web services technologies in the PK–12 market concurrent to the rising call for educational data standards, Curtis and Petersen anticipated and responded to the need for commercial-grade tools that integrate disparate education applications. Edustructures has developed scalable, robust, and cost-effective solutions and services that deliver secure data exchange for more states and districts than any other SIF solutions provider. |
| Services and Products Offered | Pearson Data Solutions’ comprehensive suite of SIF-based solutions addresses all forms of horizontal SIF integration (LEA-based SIF interoperability), SIF-based unique student ID management for SEAs, vertical reporting and longitudinal data collection, and SIF agent development. The Data Solutions group is the leading developer and marketer of enterprise-grade integration solutions and expert professional services based on SIF. Edustructures was the first company to successfully deliver a commercial Zone Integration Server (ZIS)—the heart of every SIF implementation—and is currently the only provider to offer a SIF 2 specification-supporting ZIS and Agent Development Kit (ADK*). Further, all Pearson’ products are SIF-compliant to the current specification and support previous versions of the specification; many leading vendors use Pearson technologies to achieve SIF compliance in their own products. |
| Number of Employees | Pearson Data Solutions employs 120 people. |
| Office Locations | Pearson Data Solutions within the Pearson Assessment & Information group is a business unit of NCS Pearson Inc., of Bloomington, MN (incorporated in 1962). |
PCG

Illinois State Board of Education
ILDS Data Warehouse Contractor

Part I: Narrative Description

Required Qualifications and Customer References

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<th>Type of Contractor</th>
<th>Subcontractor</th>
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Customer References (1.5.c)

This section provides customer references for PCG and Choice Solutions on comparable projects to the ILDS Data Warehouse.

Public Consulting Group

<table>
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<th>Illinois Cooperatives and Districts (ICAD)</th>
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<tr>
<td>Project Name</td>
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<tr>
<td>Project Scope</td>
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Project Narrative

Applicable Statistics:
- 160 Special Education Cooperatives and Districts
- Approximately 300,000 General Education students in the districts
- 42,000 Special Education students in the Districts
- 8,000 Staff members utilizing the EasyEP system

Scope of Work:

EasyEP™
- Implemented EasyEP™, a special education software program used to develop Individualized Education Plans for special needs children, in approximately 160 Special Education Cooperatives and Districts throughout Illinois.
- Implemented Behavior Plus module in several districts
- Implemented EasyEP™'s EasyFAX™ module in several cooperatives and districts
  - EasyFAX™ enables documents such as parent signature pages and outside agency documents to be sent via fax to EasyEP™ for permanent electronic storage

Fee-For-Service Program (FFS)

Implemented EasyTRAC™ component of the EasyEP™ system for documentation of school-based health services delivered to Special Education students. EasyTRAC™ system captures all data for the billing of those services for Medicaid Eligible students. PCG began billing the Fee-for-Service program for a subset of those districts. The system has implemented
error checks that will not allow the user to log a service unless all of the data required for billing and audit review has been entered.

**Key Achievements**
- Designed, built and implemented pilot IEP system with 3 months of contract execution
- Full implementation for districts within 7 months of contract execution
- Transitioned 8,000 staff to electronic IEP and service documentation system in less than 6 months
- Over 100 training sessions for end-users at district sites throughout the state
- Conducted more than 50 on-line training sessions for end-users as well

**Specific Deliverables**
- EasyEP Implementation
- EasyEP Training
- Fee-For-Service implementation and Training

**Start/End Date**
August 2007 - Present

**Web site for viewing**
Site requires login to access system.

**Reference**
Contact Name: Christi Flores, Director (ICAD Management Team Lead)
Business Address: Lemont High School District 210
800 Porter Street
Lemont, IL 60439
Telephone Number: (630) 243-3227
Fax Number: (630) 243-0310
E-mail Address: christf@lemont.k12.il.us

**Office of State Superintendent of Education, Washington, DC**
Project Name: Special Education Data System (SEDS)
Project Scope: SEDS houses and manages all data associated with the Special Education Process. PCG fully supports application design and configuration, legacy system data migration, development of hardware or software interfaces, installation and integration, training of end users and technical support personnel, and continuing maintenance.

**Applicable Statistics:**
- 60,000 student population
- 15,000+ Special education population
- 56% Medicaid eligible

In March 2008, PCG was charged with implementing a fully compliant IEP system for the newly formed Office of the State Superintendent of Education (OSSE) in three months. The OSSE student population, including all District of Columbia Public Schools and DC Charter Schools, consists of over 60,000 General Education students and more than 15,000 Special Education students.
students. The implementation team collaborated with key stakeholders and state team members to identify system needs. The collaboration resulted in the implementation of EasyIEP as the new Special Education Data System and the subsequent training of over 2,000 end users by the start of the 2008-2009 School Year. Now in the second year of the partnership with OSSE, PCG has redesigned the Eligibility process and customized other website elements to meet the changing policy needs of the District of Columbia.

| Specific Deliverables | • EasyIEP developed as OSSE Special Education Data System  
                        | • Training developed and implements for 2,000+ users |
|-----------------------|------------------------------------------------------|
| Start/End Date        | March 2008 - present                                 |
| Web site for viewing  | http://osse.dc.gov (EasyIEP site for OSSE requires login to access system) |

**Contact Name**
Amy Maisterra, Ed.D., Chief of Staff  
Department of Special Education

**Business Address**
Office of the State Superintendent of Education (OSSE)  
Government of the District of Columbia  
810 1st St. NE - 5th Floor  
Washington, DC 20002

**Telephone Number**
(202) 481-3757

**Fax Number**
(202) 741-0227

**E-mail Address**
amy.maisterra@dc.gov

**Tennessee Statistics:**
- Implementation of a Statewide Student Management System with a fully integrated Special Education Management System component
- Total Districts: 145
- Total Logins: 11,474,587
- Total Number of Hits: 324,158,973
- Total Number of Documents Created: 5,534,791
- Total Users: 41,629
- Total Special Ed Students: 142,645

**Project Narrative**
In January of 2004, PCG was awarded a 4.5 year contract to implement a combined student Information System and Special Education System to school districts across the State of Tennessee by the Department of Education. This was truly a ground breaking approach to providing full student data management at the district level that integrates completely...
with state data reporting and monitoring requirements.

State-of-the-art web based technology makes possible the unprecedented approach of hosting the operational Student Information System for all participating districts at centralized and secure hosting facility. This central repository of information is available to districts 24 by 7 from any internet accessible location. Teachers and administrators can access and update student information securely from the classroom or home. We anticipate providing parent access to selected information during the course of the project.

Tennessee school districts benefit from a professionally run and maintained Student Information Systems and Special Education System. The Department of Education is ensured of consistent and full data reporting from the districts to meet oversight and NCLB reporting requirements. Both benefit from the economies of scale and their ability to now focus on education rather than system maintenance and procurement, and fully mature state of the art systems.

PCG's Special Education Case Management System, EasyLEP™, forms the core web-based technology that provides users with a Special Education Case Management System for creating and tracking Individual Education Plans. Data is integrated seamlessly with the school information system software, Star_Base, by Century Consultants, Ltd. PCG provides project management, data conversion, training, and support services for the Special Education systems. Similarly, PCG provides overall project management, training, and support services to the school information system, Star_Base, rollout across the state.

EasyLEP™ also provides the core functionality to support add-on modules that are available to districts outside of the SSMS contract. These fully-integrated modules offer districts the ability to support regular education students and access to state-of-the-art technology. PCG is working closely with Memphis City Schools to provide EDplan services for 35,000 students currently with intervention plans and to support its new RTI initiative. PCG is also working with the State Department of Education on a proposed pilot project to shape EDplan to meet state RTI and Personal Learning Plan goals.

Key Achievements:
- New 5 year contract approved for 2008-2013
- PCG has mapped over 100 business best practices in order that Tennessee processes are applied consistently across the state for effective data management and reporting. Currently all school districts in the state are using EasyLEP™ to write IEPs and manage
the state and federal special education reporting requirements.

- The goals of the first phase of this implementation were successfully met when 36 school districts opened their doors in August, 2004 running their schools on the new system. This is an unprecedented rollout of a Statewide Student Information System.

**Key District Transitions:**
- Memphis City Schools
- Metro-Nashville City Schools
- Montgomery County Schools
- Knox County Schools
- Shelby County Schools
- Sumner County Schools

| Specific Deliverables | Combined student Information System and Special Education System for school districts across the State of Tennessee  
|                       | Data reporting from the districts to meet oversight and NCLB reporting requirements  
|                       | Provide training for Special Education System and Student Information System |

| Start/End Date        | January 2004 - Present |
| Web site for viewing  | https://ssms.state.tn.us/ |
| Reference             | Joseph Fisher, Assistant Commissioner |
| Business Address      | Tennessee State Department of Education  
|                       | Andrew Johnson Tower, 7th Floor  
|                       | 710 James Robertson Parkway  
|                       | Nashville, Tennessee 37243 |
| Telephone Number      | 615-741-2851 |
| Fax Number            | 615-532-9412 |
| E-mail Address        | Joe.Fisher@tn.gov |

**Choice Solutions**

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<td>Start/End Date</td>
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<tr>
<td>Additional Comments: The above link is an excellent resource to view the Snapshots and Data Tables component of our solution. This is all publicly available data.</td>
</tr>
</tbody>
</table>

**Reference**

<table>
<thead>
<tr>
<th>Contact Name</th>
<th>Marty Rose, Director</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Address</td>
<td>Connecticut Department of Education 165 Capitol Ave Hartford, CT 06145</td>
</tr>
<tr>
<td>Telephone Number</td>
<td>(860) 713-6879</td>
</tr>
<tr>
<td>Fax Number</td>
<td>(860) 713-7032</td>
</tr>
<tr>
<td>E-mail Address</td>
<td><a href="mailto:Marty.Rose@ct.gov">Marty.Rose@ct.gov</a></td>
</tr>
</tbody>
</table>

**Maine Department of Education**

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Maine Enterprise Data Warehouse and Decision Support System – Maine Department of Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Scope</td>
<td>Choice Solutions is implementing an enterprise education data warehouse and decision support solution, which is the foundation for Maine’s longitudinal data strategy. The solution includes a robust set of data extractions from approximately 30 source systems, over 1,000 SEA-specific reports, a complete zero-client ad hoc reporting solution as well as several state specific data marts for state/federal reporting, drop-out prevention, and growth model.</td>
</tr>
<tr>
<td>Project Narrative</td>
<td>2007 SLDS award winner to implement enterprise education data system and decision support system for both public and private views of data. Includes 29 source data systems aggregated into a single data warehouse and multiple data marts.</td>
</tr>
</tbody>
</table>
### Illinois State Board of Education

ILDS Data Warehouse Contractor

**Part I: Narrative Description**

### Required Qualifications and Customer References

| Specific Deliverables | • Architect, design, and deploy enterprise education data warehouse  
| • Design various users sites and views  
| • Implemented state and federal reporting data marts  
| • Establish RBAC enterprise directory for security and provisioning |

| Start/End Date | 2010 – present |
| Web site for viewing | The website is not public yet but should be within the next few weeks |

**Reference**

- **Contact Name**: Bill Hurwitch, Project Director
- **Business Address**: Maine Department of Education  
  23 State House Station  
  Augusta, ME 04333
- **Telephone Number**: (207) 624-6816
- **Fax Number**: (207) 624-6791
- **E-mail Address**: bill.hurwitch@maine.gov

### Wyoming Department of Education

- **Project Name**: Wyoming Department of Education (on-going)
- **Project Scope**: This project was also a project that came about from the Federal longitudinal data system (LDS) grants. One of the key projects was to implement an enterprise education portal and security solution information dissemination and application integration.
  
  **Size of Account**: 2 onsite, 4 offsite

- **Project Narrative**: Began as an enterprise portal and security project and has expanded to various data reporting and data management solutions.

- **Specific Deliverables**: Here is a short outline of the solutions Choice Solutions has or is currently implementing for the state of Wyoming:
  
  • Design, implement, and integrate an enterprise education portal  
  • Implement state registration system to manage unique student and staff IDs  
  • Design and develop reporting infrastructure using Microsoft BI  
  • Implement statewide education identity management solution supported by our Enterprise Directory Manager  
  • Develop community sites around assessment data

- **Start/End Date**: 2007 – present
- **Web site for viewing**: http://fusion.edu.wyoming.gov

**Additional Comments**: As part of the Wyoming team, Choice Solutions implemented a **statewide education identity management** solution.

**Reference**

- **Contact Name**: Meredith Bickell, Supervisor, Technical Services
- **Business Address**: Wyoming Department of Education  
  2300 Capitol Avenue  
  Hathaway Building, 2nd Floor  
  Cheyenne, WY 82002
### Project Experience (1.5.d)

The following tables provide information about project experience for PCG and Choice Solutions in the areas of project management, data warehouse, and education enterprise.

**Public Consulting Group**

<table>
<thead>
<tr>
<th>Requirement Area</th>
<th>Project Experience</th>
<th>Customer Name and Address</th>
<th>Contact Name and Phone Number</th>
<th>Project Start and End Dates</th>
<th>Project Description</th>
</tr>
</thead>
</table>
| Project Management | [X]                | Council of Chief State School Officers | Melissa Johnston 202-326-8697 | 2010 – present               | The State Core Model is a platform that enables comparability and interoperability between states, reduced Federal collection burdens, and increased research, analysis, and intervention capabilities. It is part of the Common Education Data Standards (CEDS) adoption work. The model:  
✓ Is based on NCES handbooks, NEDM v2.0, SIF v2.4, PESC, SHEEO State of State PS Data Systems report, and CDS v1.0  
✓ Covers early childhood (EC), elementary and secondary (K12), post-secondary (PS), and workforce (WF)  
✓ Establishes comparability between sectors and between states  
✓ Enables states to replace 625 Federal reporting file types with a single, record-level data snapshot pulled as few as four times a year  
✓ Supports DEWIS, PBIS, and RTI  
✓ Helps guide relationships, business rules, and entity factoring  
✓ Validates state maps to views of a common SLDS model  
✓ Accounts for:  
  ▪ Source files with different and/or non-existent start and end dates  
  ▪ Complex relationships between people, between organizations, and between people and organizations  
  ▪ People with multiple roles in multiple organizations |
| Data Warehouse   | [ ]                | Council of Chief State School Officers | Melissa Johnston 202-326-8697 | 2010 – present               |                     |
### New Jersey Department of Education

<table>
<thead>
<tr>
<th>Project Experience Requirement Area</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Project Name</td>
<td>New Jersey Standards Measurement and Resource for Teaching (NJ SMART)</td>
</tr>
<tr>
<td>Customer Name and Address</td>
<td>New Jersey Department of Education</td>
</tr>
<tr>
<td>Contact Name and Phone Number</td>
<td>Bari Erlichson, Ph.D, Director</td>
</tr>
<tr>
<td>Phone Number</td>
<td>(609) 341-3142</td>
</tr>
<tr>
<td>Project Start and End Dates</td>
<td>2005 – present</td>
</tr>
<tr>
<td>Project Description</td>
<td>PCG Education is implementing a statewide, student-level data warehouse in the state of New Jersey. The NJ SMART project includes annually loading statewide assessment data into a guided ad-hoc analytic tool, the collection and validation of over 90 student-level data fields, assignment of unique state identification numbers, and the implementation of local data marts to allow for the addition of supplemental student information to aid in data analysis. The collection of the data fields has provided the state of NJ the ability to sunset multiple state systems to reduce duplicative reporting on behalf of the districts. Additionally, a district report suite is offered to the state and school districts that links all data together for a longitudinal view of a student's education within NJ, which helps districts track mobility and performance on assessments over time.</td>
</tr>
<tr>
<td>Proposed ILDS Project Team Members who Participated</td>
<td>Greg Nadeau</td>
</tr>
<tr>
<td></td>
<td>Mike Sage</td>
</tr>
<tr>
<td></td>
<td>Anthea Medyn</td>
</tr>
<tr>
<td></td>
<td>Aaron Harte</td>
</tr>
<tr>
<td></td>
<td>Benjamin Robinson</td>
</tr>
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### Washington Office of Superintendent of Public Instruction

<table>
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<th>Project Experience Requirement Area</th>
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<td>Project Name</td>
<td>K-12 Research and Policy Questions and Data System Gap Analysis</td>
</tr>
<tr>
<td>Customer Name and Address</td>
<td>Washington Office of Superintendent of Public Instruction</td>
</tr>
<tr>
<td>Contact Name and Phone Number</td>
<td>Debbie Spaulding</td>
</tr>
<tr>
<td>Phone Number</td>
<td>(360) 725-6142</td>
</tr>
</tbody>
</table>
I. Project Description

PCG was awarded a contract by the State of Washington Office of Superintendent of Public Instruction (OSPI) to carry out several complementary analyses. First, in consultation with OSPI, PCG developed an in-person and internet based survey of statewide education stakeholders including State Legislators, the Governor’s Office, State Board of Education, superintendents, teachers, parents, and other statewide education advocacy groups to determine their priorities for research and policy questions to be addressed by the state longitudinal data system, CEDARS.

Next using the National Education Data Model as a guiding framework, PCG audited and documented OSPI’s data systems. The output of this audit will guide a data system gap analysis in order to determine Washington’s ability to answer the prioritized list of research and policy questions as well as their capacity to fulfill legislative requirements and position them for funding opportunities under ARRA. Finally, PCG conducted a statewide survey to help OSPI determine the extent to which stakeholders at the school-level can access the information through a technical capabilities analysis.

<table>
<thead>
<tr>
<th>Proposed ILDS Project Team Members who Participated</th>
<th>Greg Nadeau</th>
</tr>
</thead>
</table>

Choice Solutions:

<table>
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<tr>
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<td>Project Experience Requirement Area</td>
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<td>[X] Data Warehouse</td>
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<td>[X] Education Enterprise</td>
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<tr>
<td>Project Name</td>
<td>Connecticut Department of Education - Enterprise Portal and Data Warehouse</td>
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<td></td>
<td>165 Capitol Ave</td>
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<td>Hartford, CT 06145</td>
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<tr>
<td>Contact Name and Phone Number</td>
<td>Marty Rose, Director</td>
</tr>
<tr>
<td></td>
<td>(860) 713-6879</td>
</tr>
<tr>
<td>Project Start and End Dates</td>
<td>2007 – present</td>
</tr>
<tr>
<td>Project Description</td>
<td>Choice Solutions is engaged in multiple efforts with the state of Connecticut to design, develop, and deploy various enterprise education data systems. One of the core projects was the development of an enterprise wide portal and security infrastructure for all Connecticut applications and data collections.</td>
</tr>
</tbody>
</table>
Size Of Account: 2 onsite, 4-5 offsite

Duration: 12 months, ongoing

This project represents Phase 1 of the SLDS grants and has incorporated various data collection, reporting and data quality initiatives. Several key deliverables were the creation of a Public reporting site, and Pre-K student information system, and a public school data collection and information system.

<table>
<thead>
<tr>
<th>Proposed ILDS Project Team Members who Participated</th>
</tr>
</thead>
<tbody>
<tr>
<td>John Celso</td>
</tr>
<tr>
<td>Scott Gallant</td>
</tr>
<tr>
<td>Vasu Marla</td>
</tr>
<tr>
<td>Manos Stefanakos</td>
</tr>
<tr>
<td>Zachary Tussing</td>
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<table>
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<th>Maine Department of Education</th>
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<tbody>
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<td>Maine Department of Education</td>
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<td>23 State House Station</td>
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<tr>
<td>Augusta, ME 04333</td>
</tr>
<tr>
<td>Contact Name and Phone Number</td>
</tr>
<tr>
<td>Bill Hurwitch, Project Director</td>
</tr>
<tr>
<td>(207) 624-6816</td>
</tr>
<tr>
<td>Project Start and End Dates</td>
</tr>
<tr>
<td>2010 – present</td>
</tr>
<tr>
<td>Project Description</td>
</tr>
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<td>Choice Solutions is implementing an enterprise education data warehouse and decision support solution, which is the foundation for Maine's longitudinal data strategy. The solution includes a robust set of data extractions from approximately 30 source systems, over 1,000 SEA-specific reports, a complete zero-client ad hoc reporting solution as well as several state specific data marts for state/federal reporting, drop-out prevention, and growth model.</td>
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<table>
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</thead>
<tbody>
<tr>
<td>Anand Choppala</td>
</tr>
<tr>
<td>Scott Gallant</td>
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<tr>
<td>Vasu Marla</td>
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<tr>
<td>Manos Stefanakos</td>
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<tr>
<td>Project Experience Requirement Area</td>
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<tr>
<td>Project Name</td>
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<td>Customer Name and Address</td>
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<td>Project Start and End Dates</td>
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<td>Project Description</td>
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<tr>
<td></td>
</tr>
</tbody>
</table>

Contracts Held with ISBE During the Past Five Years (1.5.c)
PCG has held the following contracts with ISBE during the past five years:

- MY10803 – Illinois Longitudinal Data System, Data Architecture
1.6 Project Team Organization and Staffing Response

PCG proposes a project team with experience in project management, data warehouses, and education enterprise on both state and district level longitudinal data systems. The proposed team will work collaboratively with ISBE's designated staff to develop the ILDS data warehouse. PCG has teamed with Choice Solutions and Pearson Data Solutions to create a team of experts in creating a data warehouse.

PCG will provide project management and QA services, while Choice Solutions will build the data warehouse solution and Pearson will create a profile and architecture for interoperability. This team will work alongside ISBE's Project Manager and designated staff to develop a successful data warehouse solution.

Organizational Chart (1.6.a)
Figure 6.1 shows the Organizational Chart of proposed staff members. Description of the staff member's role, resumes, and the Project Team Experience Matrix follow.
Figure 6.1 ILDS Data Warehouse Organizational Chart

ISBE Project Sponsors

PCG Project Management Team
Greg Nadeau
Mike Sage

ISBE Project Management Team
Project Manager
Assistant Project Manager

Engineering Delivery
John Celso

Database Administration
Aaron Harte

Systems/Business Analyst
Anthea Medyn

QA Team
Phil Obbard
Diego Sztainberg

ISBE Data Specialists

ISBE Database Administrator

ISBE Data Stewards
Proposed Project Team

Included below are our proposed project team members represented on the Organizational Chart. Project Team Experience Matrices follow as do resumes for the below named individuals and additional proposed project team members.

Project Management Team

Greg Nadeau is a Manager in PCG’s Boston, Massachusetts office with overall responsibility for leading PCG’s Education Data Analytics services. Mr. Nadeau has over seventeen years of experience leading state longitudinal data systems, eight on the public side as Chief Information Officer of the Massachusetts Department of Education, and eight in the private sector, consulting with private companies, education organizations and states. Mr. Nadeau served on the Board of Directors of the School Interoperability Framework Association (SIFA) and as an expert consultant to the Council of Chief State School Officers (CCSSO). In 2001, Mr. Nadeau created and led the US Open e-Learning Consortium, a 14-state USED-funded project. The primary objective of the consortium was to harvest released high-stakes, assessment items to create a pool for low-stakes interim assessments. He currently leads CCSSO’s State Core Working Group.

Michael Sage, a Schools Specialist in Public Consulting Group’s (PCG) Chicago office, is experienced working with clients to develop and implement systems processes. His work includes acting as the project manager for the ILDS Data Warehouse architecture project. Mr. Sage managed the projects budget as well as took part in necessary tasks like identifying data sources, interviewing technical/business resources, and documenting data elements in a data dictionary. Before PCG, Mr. Sage worked at Chicago Public Schools as a Business Analyst for a database portal used by administration and staff to view test score data which had report capabilities used at the district and school level. Prior to that, he participated in implementing large-scale projects and infrastructure services for private trade show associations across the country and overseas.

Database Administrators

Aaron Harte is a Senior Database Architect at Public Consulting Group. Mr. Harte has 17 years of experience as an IT Professional and 10 years as a data warehousing architect. Mr. Harte has designed and delivered educational data systems to the State of New Jersey and State of Tennessee. Mr. Harte is a Microsoft IT professional and prior to starting his IT career he served 8 years in the Army as a special weapons technician and combat medic. He has implemented data warehousing solutions for the manufacturing, investment and healthcare industries prior to joining PCG, most recently designing the State Core Model in conjunction with CCSSO.
Benjamin Robinson has over twelve years of experience in database administration. On numerous projects, Mr. Robinson has successfully determined business processes and created logical models and physical implementations to support the business needs. He is well versed in the software development lifecycle (SDLC), thoroughly proficient in providing and implementing documentation, change control, normalized designs, best practices and the installation and configuration of servers and SQL Server instances. He is fully capable of creating all database objects and reporting, with a skilled command of SQL (T-SQL, PL/SQL) and extensive experience working with Microsoft’s SQL Server toolsets from 7.0 through 2008. Mr. Robinson has experience hardening SQL Server configurations, and advising and assisting developers with security aware development based on the rule of Minimum Rights. He is experienced with various hardware configurations (standalone, clustered, SAN) and installations. Mr. Robinson has developed an application to monitor instances, gather metrics to assist with utilization, capacity planning and change control. He is highly experienced in determining backup needs, implementing backup strategies and verifying recovery. He is equally competent with data imports and exports (DTS, SSIS, bcp) and is familiar with XML and SQL support of XML data sets.

Systems/Business Analysts:

Anthea Medyn is a Consultant at Public Consulting Group in Boston. She is working with the Illinois State Board of Education (ISBE) to develop a data architecture for the state’s longitudinal data system. This process involves interviewing ISBE staff, discovering and documenting sources, and mapping to the National Education Data Model. Ms. Medyn has worked with the National Education Data Model on a gap analysis to determine ability to answer prioritized research and policy questions and for the Council of Chief State School Officers in the development of the State Core Model. Prior to joining PCG, she worked as a Research Associate with the American Institutes for Research providing technical assistance to states and districts in the areas of special education and response to intervention.

Erik Glavich, a school specialist located in our Chicago office, works on projects for Minneapolis Public Schools, Saint Paul Public Schools, the Minnesota West Metro Consortium, and the School District of Philadelphia. Mr. Glavich manages web-based systems and acts as the liaison between the client and system and document level programmers for EasyI EP™ and Fee-for-Service Medicaid billing programs. He is also involved in PCG’s Advanced Reporting functionality within the EasyI EP™ and EdPlan™ platforms.

QA Team:

Phil Obbard is a Senior Consultant at PCG. Mr. Obbard focuses on strategic planning and education-oriented data analytics and warehousing for school districts. Recently, he has been working with districts across the US and Canada to implement data-based accountability initiatives associated with school
planning and data analytics. He was Executive Director of Wellspring Academy of California, the world’s first boarding school exclusively for overweight and obese adolescents and young adults, featured on *The Today Show*, TLC/Discovery Channel, CNN, *Macleans, The Globe & Mail*, the *New York Daily News*, and elsewhere from 2005-2008. Prior to Wellspring, Mr. Obbard spent several years developing web-based ERP applications and served as the Manager of Internet Technology for Slim-Fast Foods, a Unilever company, from 2001-2005. Mr. Obbard’s technical background includes extensive experience with Microsoft SQL Server, Internet applications, and ERP integration. Mr. Obbard holds a BA from Yale and an MBA from Boston University.

**Diego Sztainberg** is a Quality Assurance Manager located in our Montreal office. Mr. Sztainberg has more than 18 years of experience in system implementation in different industries. He achieved more than 7 years in software quality control and more than 6 years of managerial experience. In addition to the skills he acquired in his MBA, he participated in variety of system implementations in various positions such as programmer, analyst, tester, project manager, business consultant, and program manager that allow him to communicate effectively with people at different organizational levels. In the QA domain, he accomplished quality control objectives by implementing and improving the QA process as well as performing quality control activities such as test planning, test development, and test execution. He joined PCG in January 2008. He has also developed ties with the academic sector as an assistant lecturer at the University Level for five years. Finally, he was a member of the Argentine Academic Committee of the 3rd Internet and Intranet Web Congress and he lectured on e-payment model.

**Engineering Delivery**

**John Celso**, the Project Management Officer of Choice Solutions, Inc., has over 10 years’ experience as a Project Manager for statewide education projects. He has led onsite and offsite teams with four various data warehouse projects and multiple collection and reporting systems still in use today. Mr. Celso has focused his career on projects within state education agencies, beginning with seven years’ work for the Massachusetts Department of Education before moving to ESP Solutions Group and then to Choice. Because of this focus, he brings direct knowledge and experience on how best to conduct projects within this sector. He has been involved with statewide education projects in Massachusetts, Rhode Island, Pennsylvania, Connecticut, and Washington State. In 2010, he became the Project Management Officer for Choice Solutions, and will be overseeing work done throughout the country.

**Interoperability Plan**

**Doug Quinton** is the Manager of the Program Management in the Data Solutions unit of Pearson. Mr. Quinton provides technical expertise, architecture design and program management to state level
projects and larger district implementations. He directed the implementation of schools interoperability framework (SIF) in the first 40 school districts in the state of Virginia ahead of schedule although the original plan called for only 30 districts; phase 2 is now underway. Mr. Quinton also acted as Project Manager and lead in developing the first international version of the SIF 2.0 Data Model for the United Kingdom; data model is currently being piloted in a large school district in Birmingham, UK.

James Robertson is a Business Analyst in the Data Solutions unit of Pearson. Mr. Robertson designs and writes ETL processes for moving data between local data repositories, SIF zones, and state data warehouses, database schema development and performance profiling. He is responsible for requirements definition and tracking, correlating and mapping source data standards to SIF and other data models, and completing business process modeling and analysis. Mr. Robertson's work involves conducting database queries, database schema development, and performance profiling and implementing validity checks.

Project Team Experience Matrix (I.6.b)
The following pages contain the project team Experience Matrix for the Project Managers, Database Administrators, and Systems/Business Analysts.
FORM 1 – PROJECT TEAM EXPERIENCE MATRIX

ROLE: PROJECT MANAGER

Candidate's Name: Greg Nadeau

<table>
<thead>
<tr>
<th>Client Name Contact</th>
<th>Project Name</th>
<th>Dates</th>
<th>Duration</th>
<th>Experience Gained</th>
</tr>
</thead>
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<td>SC Department of Education</td>
<td>SUNS</td>
<td>2005 – 2006</td>
<td>2 years</td>
<td>1, 2, 4, 5</td>
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<tr>
<td>Tom Olson</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>803-734-8174</td>
<td></td>
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<td></td>
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<tr>
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<td>PIMS</td>
<td>2006</td>
<td>.8 Years</td>
<td>1, 2, 4, 5</td>
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<tr>
<td>Bob McGrath</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>717-783-6788</td>
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<tr>
<td>RI Department of Education</td>
<td>RIDE Data Warehouse</td>
<td>2007-2008</td>
<td>2 Years</td>
<td>1, 2, 3, 4, 5</td>
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<td>Ed Giroux</td>
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<tr>
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<tr>
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<td>Bill Hurwitch</td>
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<td>(360) 725-6142</td>
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<tr>
<td>Council of Chief State School Officers</td>
<td>State Core Model</td>
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<tr>
<td>Melissa Johnston</td>
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<td></td>
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<tr>
<td>202-326-8697</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Years of Experience in Role 15
FORM 1 – PROJECT TEAM EXPERIENCE MATRIX

ROLE: PROJECT MANAGER

Candidate's Name: Mike Saje

<table>
<thead>
<tr>
<th>Client Name Contact</th>
<th>Project Name</th>
<th>Dates</th>
<th>Duration</th>
<th>Experience Gained</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL State Board of Education</td>
<td>ILDS DW Architecture</td>
<td>8/2010 – 1/2011</td>
<td>6 months</td>
<td>1,3,4</td>
</tr>
<tr>
<td>Mike McKindles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(217) 782-0329</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Council of Chief State School Officers</td>
<td>State Core Model</td>
<td>8/2010 – 12/2010</td>
<td>5 months</td>
<td>1,3,4</td>
</tr>
<tr>
<td>Melissa Johnston</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>202-326-8697</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chicago Public Schools</td>
<td>Curriculum &amp; Instructional Management</td>
<td>3/2008-7/2009</td>
<td>1.5 yrs</td>
<td>1,2,3,4,5</td>
</tr>
<tr>
<td>John Connolly</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(708) 359-2735</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Years of Experience in Role</td>
<td></td>
<td></td>
<td></td>
<td>2.5 years</td>
</tr>
</tbody>
</table>
# Form 1 – Project Team Experience Matrix

**Role: Database Administrator**

**Candidate's Name:** Aaron Harte

<table>
<thead>
<tr>
<th>Client Name Contact</th>
<th>Project Name</th>
<th>Dates</th>
<th>Duration</th>
<th>Experience Gained</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Jersey</td>
<td>NJSmart</td>
<td>8/2008 – Present</td>
<td>2.4 years</td>
<td>1,2,3,4,5</td>
</tr>
<tr>
<td>Department of</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bari Erlichson</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(609) 341-3142</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Council of Chief</td>
<td>State Core Model</td>
<td>6/2010 – Present</td>
<td>3 months</td>
<td>1,2,4,5</td>
</tr>
<tr>
<td>State School</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Officers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melissa Johnston</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>202-326-8697</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illinois State Board</td>
<td>Illinois Longitudinal Data System, Data Architecture</td>
<td>6/2010 – Present</td>
<td>6 months</td>
<td>1,2</td>
</tr>
<tr>
<td>of Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mike McKindles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(217) 782-0329</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Total Years of Experience in Role</strong></td>
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<td></td>
<td></td>
<td>3.1 years</td>
</tr>
</tbody>
</table>
FORM 1 – PROJECT TEAM EXPERIENCE MATRIX

ROLE: DATABASE ADMINISTRATOR

Candidate's Name: Benjamin Robinson

<table>
<thead>
<tr>
<th>Client Name Contact</th>
<th>Project Name</th>
<th>Dates</th>
<th>Duration</th>
<th>Experience Gained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illinois State Board of Education</td>
<td>Illinois Longitudinal Data System, Data Architecture</td>
<td>6/2010 – Present</td>
<td>6 months</td>
<td>2</td>
</tr>
<tr>
<td>Alcohol and Drug Programs</td>
<td>Business Analysis and FSR for PRIME</td>
<td>10/2008 – 06/2009</td>
<td>1 year</td>
<td>1, 2, 3</td>
</tr>
<tr>
<td>California Housing Finance Agency</td>
<td>Fiscal Services Re-Platforming Project</td>
<td>02/2009 – Present</td>
<td>2 years</td>
<td>1, 2, 3, 4, 5</td>
</tr>
<tr>
<td>Department of Parks and Recreation</td>
<td>Database Administration</td>
<td>02/2003 – 11/2007</td>
<td>5 years</td>
<td>1, 2, 3, 4</td>
</tr>
<tr>
<td>California Department of Corrections and Rehabilitation</td>
<td>Programming Services for Parole Automated Systems</td>
<td>10/2007 – 06/2008</td>
<td>8 months</td>
<td>1, 2, 3, 4</td>
</tr>
</tbody>
</table>

Total Years of Experience in Role: 9 years
# FORM 1 – PROJECT TEAM EXPERIENCE MATRIX

**ROLE: SYSTEMS/BUSINESS ANALYST**

Candidate's Name: Anthea Medyn

<table>
<thead>
<tr>
<th>Client Name Contact</th>
<th>Project Name</th>
<th>Dates</th>
<th>Duration</th>
<th>Experience Gained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illinois State Board of Education Mike McKindles (217) 782-0329</td>
<td>Illinois Longitudinal Data System, Data Architecture</td>
<td>July 2010 – Present</td>
<td>6 months</td>
<td>1, 2, 3</td>
</tr>
<tr>
<td>Council of Chief State School Officers Melissa Johnston 202-326-8697</td>
<td>State Core Model</td>
<td>August 2010 – Present</td>
<td>5 months</td>
<td>1, 2, 3</td>
</tr>
<tr>
<td>Council of Chief State School Officers Chris Lohse 202-336-7052</td>
<td>National Education Data Model</td>
<td>June 2010 – August 2010</td>
<td>3 months</td>
<td>1, 2, 3</td>
</tr>
</tbody>
</table>

**Total Years of Experience in Role**: 7 months
## FORM 1 – PROJECT TEAM EXPERIENCE MATRIX

### ROLE: SYSTEMS/BUSINESS ANALYST

**Candidate’s Name:** Erik Glavich

<table>
<thead>
<tr>
<th>Client Name</th>
<th>Project Name</th>
<th>Dates</th>
<th>Duration</th>
<th>Experience Gained</th>
</tr>
</thead>
</table>
| School District of Philadelphia  
Jennifer Meller  
(215) 400-6055 | EasyIPTM                                  | September 2007 – Present | 3 year, 3 months  | 2, 3, 4          |
| Saint Paul Public Schools  
Janet Lowe  
(651) 767-8189 | EasyIPTM, Medicaid fee-for-service claiming | September 2007 – Present | 3 year, 3 months | 2, 3, 4          |
| Minneapolis Public Schools  
Kathryn Dole  
(612) 668-5414 | EasyIPTM, Medicaid fee-for-service claiming | September 2007 – Present | 3 year, 3 months | 2, 3, 4          |
| Minnesota West Metro Consortium  
Lois Lillie  
(763) 550-7171 | EasyIPTM, Medicaid fee-for-service claiming | September 2007 – Present | 3 year, 3 months | 2, 3, 4          |

**Total Years of Experience in Role:** 3 years, 3 months
Project Team Organization and Staffing Response

Project Team Resumes (1.6.c)

Resumes for the proposed project team members are on the following pages in the order below:

- Project Management Team: Greg Nadeau, Mike Sage
- Database Architect: Aaron Harte, Benjamin Robinson
- Systems/Business Analyst: Anthea Medyn, Erik Glavich
- QA Team: Phil Obbard, Diego Sztainberg
- Engineering Delivery Manager: John Celso
- Interoperability Plan: Doug Quinton, James Robertson
- QA Team: Yvonne Cheng, Pablo Hassid, Mauro Jaurez
GREG NADEAU  
Manager  
Public Consulting Group, Inc.

RELEVANT PROJECT EXPERIENCE

**Illinois State Board of Education**  
**Illinois Longitudinal Data System (ILDS)**  
**Data Architecture**  
- Provide daily strategic direction to ISBE regarding ILDS. Oversee the integration of all student-level data collection systems within ISBE; the linkage of early childhood and post-secondary data with existing K-12 ISBE student data; and the connection of student data with data from other parts of the ISBE education enterprise (e.g., staff data, special education, and school district finance).
- Developed an enterprise-wide data architecture; improved data quality by establishing practices for data stewards and enhanced data audit procedures.

**Council of Chief State School Officers**  
**State Core Model**  
- Project Director for CCSSO’s State Core Model. The State Core Model is a platform that enables comparability and interoperability between states, reduced Federal collection burdens, and increased research, analysis, and intervention capabilities.

**United States Department of Education and Council of Chief State School Officers**  
**National Education Data Model**  
- Team leader and system architect for CCSSO’s National Education Data Model (NEDM). NEDM is a U.S. Department of Education project to create a catalogue of data used in education and a description of the relationships among those data. Its mission is to create an open framework based on current standards for education data systems.

**New Jersey Department of Education**  
**NJ SMART**  
- Provide daily operational leadership and strategic direction to NJ DOE’s state longitudinal data system, NJ SMART. Particular areas of focus include project management and documentation maturity, data modeling, and district usage.

**Newark Public Schools**  
**Data Audit**  
- Conducted 18 interviews and synthesized findings in a narrative report and extensible workbook documenting Newark’s systems, assessments, people, and usage scenarios.
- The final report of this work is being used by Newark and a growing team of consultants to rationalize data flow and coordinate disparate initiatives.

PROFESSIONAL BACKGROUND

**ESP Solutions Group**  
**Chief Operating Officer (2008)**  
- Managed business development, product development, and daily delivery operations for a $4-5 million expert consulting and systems integration practice.

**ESP Services**  
**Vice President (2005-2007)**  
- Provided management and technology consulting to school districts including
Guilford County, NC; Quincy, MA; Lowell, MA; and Philadelphia, PA.

**e-Learning Systems Strategies, Inc.**
- Principal investigator leading 14 state-to-state assessment exchange pilots funded by the U.S. Department of Education. The project spurred efforts in standard-setting bodies, states, and the marketplace.

**Massachusetts Department of Education**
Special Assistant to the Commissioner (1993-1995)
- Primary author of the Massachusetts Department of Education’s Education Reform Implementation Plan and Five Year Master Plan.

**CCSSO Decision Support Architecture Consortium**

**US DEPARTMENT OF EDUCATION**
PBDMI
- Participated in site visits on behalf of USED to inventory and analyze each state’s data quality and status for the initiative that has become EDEN/EDFacts.

**Massachusetts Department of Education**
Associate Commissioner, Chief Technology Officer (1995-2001)
- Created and led the department’s 100+ person Education Technology group.
- Overall responsibility for statewide K-12 educational technology resources and initiatives including: agency IT environment and IMS operations, software and systems development, telecommunications and networking, and research and development.

- Created programs such as: MassEd.Net, Virtual Education Space, and Youth Tech Entrepreneurs.

**ADDITIONAL EXPERIENCE**

Massachusetts House of Representatives

**EDUCATION**

Harvard College
*Bachelor of Arts in Government*

**PUBLICATIONS**


“Why MySpace Matters to the K-12 Space” ESP Optimal Resource Guide 2006


“A Virtual Laptop for Every Kid, Speech Delivered to NCLG” NASBE, 2003
MICHAEL SAGE
Public Consulting Group, Inc.

PROFESSIONAL BACKGROUND

Illinois State Board of Education
Illinois Longitudinal Data System
Project Manager for data warehouse architecture to establish the technical resources necessary for ISBE to manage, link, and analyze education P-20 education data
- Identified data sources, interviewed technical/business resources, and documented data elements for data dictionary
- Trained data stewards on maintenance and updates of data dictionary
- Managed project budget

CCSSO
State Core Model
Model will enable comparability and interoperability between states, reduced Federal collection burdens, and increased research, analysis, and intervention capabilities.
- Contributed to gap analysis, data mapping, and business documentation of model.

Michigan Medicaid Claiming Program
Assist in centralized RMTS coding. Complete client follow up and verification on RMTS responses using EasyIEP.

Chicago Public Schools
Curriculum & Instructional Management
- Managed project of loading district-wide student test scores to database application
- Supported application on technical issues through troubleshooting and escalating problems plus recommending changes
- Proctored and monitored pilot online testing for elementary students which led to departmental meetings on strategy for web design of online assessment portal

CompuSystems, Inc.
Training Operations Manager
- Setup and monitored relational databases for private trade show associations across the country and occasionally worldwide

EDUCATION

The University of Iowa,
Iowa City, IA
Bachelor of Arts, History
Minor Business Administration; Psychology, 2000

SOFTWARE PROFICIENCY
- Microsoft Access, Excel, PowerPoint, Project, Visio, Word, SharePoint, SQL Server Management Studio
- EasyIEP
- SchoolNet
AARON D. HARTE
Senior Database Architect
Public Consulting Group, Inc.

RELEVANT PROJECT EXPERIENCE

New Jersey Department of Education
NJ SMART
The NJ SMART Portal is used by the state of NJ to collect, validate, store, analyze and present state-wide NJ educational data.
- Designed and implemented the physical data model for the data warehouse.
- Supported the development of the collection data store and security management.
- Designed and implemented an OLAP database to support analysis.
- Database performance analysis and tuning.

Tennessee Department of Education
Data warehouse / Adhoc Analysis Reporting System
The TN Adhoc system provides a state-wide, integrated data architecture which facilitates reporting and analysis of TN Special Education programs.
- Created a data dictionary and mapped source system data elements.
- Designed and implemented the physical data model for the reporting data store (RDS).

Memphis, Tennessee School District
EdPlan, Response to Intervention (RTI) Reporting Data Store
The RTI data store provides a repository of key attributes to provide a place to analyze data, design and distribute reports state-wide, integrated data architecture which facilitates reporting and analysis of TN Special Education programs.
- Created a data dictionary and mapped source system data elements.

Illinois State Board of Education
Illinois Longitudinal Data System
The design of data architecture for Illinois education system focusing on the application of national educational standards towards a goal of a P-20 data warehouse.
- Analyzed the educational system elements collected and mapped.
- Designed the logical/physical data model for the operational data store (ODS) and reporting data store (RDS).

Jobs for the Future (JFF)
Early College High School (ECHS) Initiative
The data collection system to allow the American Institutes for Research (AIR) to analyze ECHS enrollment, attendance, assessment, discipline and transcript data in support the Gates Foundation effort.
- Designed and implemented the physical data model for the staging, operational data store (ODS) and reporting data store (RDS).
- Designed and implemented the integration process to validate, transform and load data.
- Delivered a system which executed reports in less then 10 seconds.
- Delivered formatted extracts to AIR Systems

CCSSO
State Core Model
The model enables comparability and interoperability between states with the goals towards, reducing Federal collection burdens, and increased research, analysis, and intervention capabilities.
- Analyze the collection of data elements to produce logical/physical data models.
- Mapped the required educational report elements to a common state core.

PROFESSIONAL BACKGROUND

ProHealth Physicians, INC
- Leveraged enterprise information from multiple sources to design and implement an Operational Data Store and Data Warehouse using SQL 2000
- Delivered scheduled reports to business areas, reducing the month end reporting from 15 to 1 day using SQL Reporting services.
- Designed and implemented an OLAP solution to support the accounting, budgeting, and forecasting needs of the accounting group. This allowed a analysis of the business from 1997 to present.
- Designed and delivered 40 reports for across all areas of the business, eliminating the need for a dedicated reporting staff.
- These systems achieved over 99% uptime.
- Designed and implemented integration solutions to securely exchange information with outside organizations. Supporting prescribing and auto confirmation applications.
- Responsible for the implementation and support of all SQL based systems, including performance monitoring, disaster recovery strategies and updates.

Phoenix Life Insurance Company
- Analyzed business systems and data extracts to produce data models, and fixed target mapping documentation used to load the enterprise data warehouse.
- Designed and implemented a disaster recovery solution for the enterprise data warehouse.
- Designed and implemented an Adhoc reporting solution to support business analysis and report development. Empowering the business to access and analyze data without IT support.

Phoenix Investment Partners
Senior Systems Engineer/DBA (1999-2001)
- Performed hardware and software installations and provided high-level training, and technical support.
- Designed and implemented a SAN solution to house the data warehouse and other large OLTP systems.
- Consolidated critical business systems to a centralized location.
- Designed and implemented an encrypted SQL replication solution to deliver information to the corporate web site.
- Responsible for the support of all application development database resources and modeling, including performance tuning and disaster recovery design and support.

TECHNICAL SKILLS
- SQL Server 7.0/2000/2005/2008 Suite
- Microsoft Office Suite
- Windows 98/XP
- Data Modeling - Erwin, Visio
- Data Profiling - EVOKE Axio
- Messaging – BizTalk, Orion Rhapsody
- Database Management - Imceda
- Project Management - MS Project, Excel
- Storage Area Network Architecture
AREAS OF EXPERTISE

- Project Management
- Business Analysis
- Data Modeling
- Data Transformation
- Operational Data Stores
- Data Warehousing
- Performance Tuning
- Online Analytical Processing (OLAP)
- Data Mining
- Storage Area Network (SAN) Architecture
- Data Security Protocols (HIPAA, FERPA)
- Event Messaging Protocols
- (SIF, HL7, DICOM)
BENJAMIN ROBINSON
Senior Technical Lead
Public Consulting Group, Inc.

RELEVANT PROJECT EXPERIENCE

California Housing Finance Agency (CalHFA)
Database Architect, Fiscal Services Re-Platforming Project
Replace the legacy financial/accounting system with a SQL, .NET application that:
meets functional and non-functional requirements; provides the needed integration between and among the financial/accounting applications including the GL module, the Homeownership System and other systems/applications; utilizes data migrated from the current financial/accounting applications (excluding GL data); takes advantage of modern application programming features and processing efficiencies; and can be fully supported by CalHFA business and technical staff after successful completion of the vendor contract.
- Wrote the data conversion plan and Perl scripts in order to convert the legacy Queo data and data structures.
- Created the physical model, data dictionary and converted the legacy code base to SQL stored procedures in order to support reporting and the functionality of the .NET application.
- Created reports using SQL Server Report Server.

Alcohol and Drug Programs
Database Architect, Business Analysis and FSR for PRIME
ADP identified the need for a centralized repository to reduce redundancies in their enterprise data. Eclipse was brought in to perform a business analysis; assist with the development of a business case and problem summary; develop business, functional and technical requirements; and design of the logical model and physical database. The Eclipse Team interviewed ADP Staff and documented ADP’s business needs in accordance with California’s SIMM Requirements. As part of the business analysis, Eclipse also determined existing provider data repositories, interviewed the business owners to gather functional requirements and determine data elements relevant to the provider side of the Provider Repository Information Management (PRIMe) solution. Eclipse then proposed a logical design for the provider database and completed the project by providing a physical database design and technical design documentation.
- Interviewed ADP business owners to determine Provider information relevant to the PRIMe initiative, business requirements and data needs.
- Created the logical model, ERDs, data dictionary.
- Created the physical database design.
- Assisted with the functional requirements and the technical design documentation.

Governor’s Office of Emergency Services
Technical Analyst, Response Information Managements System Feasibility Study Report
OES required an FSR in order to upgrade its Response Information Management System (RIMS) from a Lotus Notes based application to a web application with a relational database. This FSR needed to identify the business needs of OES, document the deficiencies of the existing system and determine whether or not existing commercial applications would meet the needs of OES to provide an emergency management system.
The Eclipse Team, surveyed and interviewed OES Staff, counties, cities and other states, performed a market analysis and assessed the viability of the market place in terms of OES’ needs. Eclipse then prepared FSR.
documentation according to California's SIMM Requirements.

- Interviewed OES IT staff to determine current and planned infrastructure in relation to RIMS.
- Performed the market research and analysis, interviewed OES staff, other states, counties and agencies.
- Documented the Team findings, business needs, business case and proposed solution
- Assisted with the creation of presentations for executive staff.

**California Department of Corrections and Rehabilitation**

*Database Architect, Programming Services for Parole Automated Systems*

The CDCR Programming Services for Parole Automated Systems Support contract provides consulting services for application development and for maintenance upgrades of the Parole Automation Systems within the Enterprise Information Services Division (EIS) of the CDCR. The Eclipse Team provided application development services for the development of the Central FILE Tracking System (C-FILE), and the Due Process Interim Tracking System (DPITS).

- Worked with the Office of Court Compliance to determine the business requirements and technical specifications for the Due Process Tracking System.
- Translated the business rules to a logical design model and then implemented a well normalized physical database.
- Coded stored procedures which supported all data access
- Created views to denormalize certain ideas and developed functions to accommodate business needs.

- Assisted knowledge transfer to CDCR staff including training and troubleshooting Oracle issues.
- Created proof of concept web pages for reporting functionality using C# and ASP.NET.

**EDUCATION**

Clark County Community College
*English major*

Glendale Community College
*Computer Science major*

**SPECIAL SKILL SETS**

**Program Knowledge**

With a background in programming, Mr. Robinson has extensive experience in the Software Development Life Cycle (SDLC) as well as system architecture.

**Operating Systems:**

Linux, UNIX, VAX VMS, Windows

**Programming Languages**

ASP, BASIC, C, C#, COBOL, Fortran, HTML, Pascal, Visual Basic, T-SQL and PL/SQL

**Database Systems**

Microsoft SQL Server, Oracle, Sybase, MySQL

**Software:**

ER/Studio, ERwin, InterDev, Microsoft Visual Studio, TOAD, Microsoft Access, DB Artisan, dBase IV, Microsoft Office, Visio
ANTHEA MEDYN
Consultant, 2010 - Present
Public Consulting Group, Inc.

RELEVANT PROJECT EXPERIENCE

Illinois State Board of Education
Illinois Longitudinal Data System Data Architecture
Develop a data architecture for the state, focusing on 30+ identified source systems and reports that provides Illinois with a roadmap for producing a data warehouse.
- Document and research source systems and reports through interviews with subject matter experts and key data systems staff.
- Develop a detailed data dictionary containing element definitions and transactional rules.
- Map Illinois data elements to NEDM and identify gaps between the models.

Council of Chief State School Officers
State Core Model
Design a core data model for state use that contains data elements from early childhood through post-secondary education and the workforce, and provide guidance on producing federally-required reporting.
- Research federal reporting requirements and map report elements to data items.
- Create common definitions for data elements.
- Map state data elements to the State Core Model to identify gaps and best practices in collections.

U.S. Department of Education
National Education Data Model
Develop a common set of education data elements for all states to produce EDFacts reporting, ARRA, and best practices.
- Use multiple state research to create common definition of each data element
- Conduct mapping and gap analysis on NCES Forum identified policy and research questions.

PROFESSIONAL BACKGROUND

American Institutes for Research
Research Associate (2007-2010)
- Provided technical assistance to state departments of education to implement and scale up response to intervention in districts.
- Developed tools for assessing the special education capacity of New York City school district.
- Developed and led trainings in special education for use by pre- and in-service teachers, teacher educators, and consultants.

Research Assistant (2005-2007)
- Provided quantitative analysis and wrote evaluative reports delivered to U.S. Department of Education, Office of Special Education Programs, and Department of Health and Human Services, Substance Abuse and Mental Health Services Administration.

EDUCATION

Georgetown Public Policy Institute, Georgetown University
Master of Public Policy

College of William and Mary
Bachelor of Arts in Public Policy

SOFTWARE PROFICIENCY
Microsoft Office 2007, SAS, Stata, SPSS
ERIK GLAVICH  
Schools Specialist  
Public Consulting Group, Inc.

RELEVANT PROJECT EXPERIENCE

Minneapolis Public Schools  
Minneapolis, Minnesota

St. Paul Public Schools  
St. Paul, Minnesota

West Metro Consortium  
Plymouth, Minnesota

School District of Philadelphia  
Philadelphia, Pennsylvania

Memphis City Schools  
Memphis, Tennessee

- Design and develop technical specifications for HIPAA and FERPA compliant web-based special education management software systems.
- Evaluate and analyze school districts' operational policies for special education and data management.
- Develop technical specifications for the storage and transfer of student educational and health related data.
- Develop reports in platforms such as SSRS, Business Objects, and MS Excel.
- Process and submit school district data for the reimbursement of Medicaid fee-for-service claims; employ query-based analysis to determine Medicaid eligibility of health related services.
- Provide analysis and recommendations to school districts to improve Medicaid fee-for-service eligibility requirements.
- Provide training and direct support for end users.

PROFESSIONAL BACKGROUND

U.S. House of Representatives  
Committee on Government Reform,  
Subcommittee on Regulatory Affairs  
February 2005 - January 2007

Professional Staff Member
Evaluated federal agency compliance with statute and Congressional intent to improve their efficiency and effectiveness; analyzed organizational processes and operational policy within federal agencies; conducted oversight of regulatory agencies through hearings, official letters and requests, briefings, data analysis, and interaction with agency and industry representatives.

U.S. Representative Candice S. Miller  
January 2003 - February 2005

Legislative Assistant, Systems Administrator
Researched and analyzed legislative issues, advising the Congresswoman on policies such as health care, education, transportation, the federal budget, and financial services; assisted in developing policy positions and communicating consistent message to diverse stakeholders.

EDUCATION

Georgetown University, Georgetown Public Policy Institute  
Master of Public Policy, May 2006
Track: Public Management and Non-Profit Studies

University of Michigan  
Bachelor of Arts in Education, August 1999
Mathematics, Physical Education

SOFTWARE PROFICIENCY

Access, Excel, SQL Server Reporting Services (SSRS) / Report Builder, Microsoft Visual FoxPro, Business Objects/Crystal Reports, Microsoft Project, Outlook, Word, PowerPoint, SharePoint, SAS, internet research
PHILIP OBBARD  
Senior Consultant  
Public Consulting Group, Inc.

PROFESSIONAL BACKGROUND

Public Consulting Group

- Project manager and subject matter expert for accountability-focused school improvement planning projects on across North America, including:
  - Atlanta Public Schools, Georgia
  - Calgary, Alberta
  - London Region MISA PNC, Ontario
  - GreenLight consortium, Saskatchewan
- Currently overseeing a 5-district data warehousing project in western Canada
- Participated in foundational development of RTI offering currently being implemented in multiple districts across the US
- Enabled data warehouse integration of special education data in Tennessee

Wellspring Academy of California
Executive Director. Accredited, year-around therapeutic boarding school serving 100 students grades 8-12.

Slim-Fast Foods
Manager of Internet Technology. Responsible for design, development, and deployment of consumer-facing and internal web-based tools in a dozen countries. Core technologies developed using MS SQL and .NET.

Slim-Fast Foods Director of Technology. Responsible for design, development, and deployment of hosted applications serving the publishing industry.

Core technologies developed using Oracle, mod_perl, and ColdFusion.

Primix Solutions
Senior Associate. Developed and implemented larger-scale multi-tiered web-based extensions of ERP systems (primarily SAP). Designed architecture for core e-commerce offering.

PUBLICATIONS

The Sierras Weight-Loss Solution for Teens and Kids: A Scientifically Based Program from the Highly Acclaimed Weight-Loss School  
Avery/Penguin  
September, 2007

EDUCATION

Boston University
MBA with honors

Yale University
BA, History

SOFTWARE PROFICIENCY

- Microsoft SharePoint
- Microsoft SQL Server
- Microsoft .NET, IIS, ASP
- Oracle
- Perl
- ColdFusion
DIEGO SZTAINBERG

QA Manager
Public Consulting Group, Inc.

RELEVANT PROJECT EXPERIENCE

Public Consulting Group
- Defined the QA process for Montreal and Windsor offices
- Built a QA team with different skills in order to cover all aspect of the test process and testing needs
- Risk Assessment
- Defined the tools needed to implement a QA process
- Analyzed and defined the QA needs in relation with the Software Development Life Cycle (SDLC)
- Assess improvements on the SDLC
- Participate in all phases of the test activity: planning, development, execution, and reporting
- Overseeing the QA activities for the following projects and products: Jobs for the Future (Data warehousing and reporting application), NJ Smart (Data warehousing, ID management, and reporting application) all Skopus’ and SkoVision’s customers.

PROFESSIONAL BACKGROUND

Expedia Inc, Montreal
Program Manager responsible for
Gathering business requirements and turn them into detailed functional specifications. Worked with business partners to help define product strategy that meets the customers’ needs while satisfying scalability, reliability, performance, and resource costs. Effectively managing trade-offs between cost/schedule versus customer benefit. Project management including:
- planning, issue and risk identification and management, tracking dependencies and milestones, and communication of overall project status
- Senior Software Test Engineer responsible for the design and execution of Test Plans. Verified the correct functionality of products and run test cases in manual and automated modes. Run Performance Tests Conducted certification processes for partners. Logged and verified defects found during testing.

IndustryHub, Montreal
Quality Assurance Lead responsible for the definition of the QA process. Verified the correct functionality of products and ran test cases in manual and automated modes. Conducted Performance Tests using ACT (Application Center Test), VBscript and Windows 2000 Server Microsoft Management Console.
Coordinated a team of two QA analysts. Created and maintained test environments.Logged and verified defects found during testing.
Participated in use case reviews based on UML methodology. Ensured that test results were properly documented and tracked. Produced statistics to evaluate the performance of the developers.

Cextus, Buenos Aires, Argentina
Start-up Company that developed an ASP (Application Service Provider) model that consisted of a workflow management document for the shipping departments of foreign trade companies
Web-based application pilot developed in ASP, HTML, VBscript, MS SQL Server 7.0 and MS Access. Responsibilities as an e-commerce consultant included sales, marketing, and management of service development. Designed.
developed, and implemented the web application pilot.

**Censys SA, Buenos Aires, Argentina**
Project Manager responsible for the implementation of financial solutions for DaimlerChrysler, Volkswagen and the Bank of Azul. Negotiated products and services and performed management accounts tasks. Coordinated a team of three programmers, two analysts and a project lead for each account. Project management including supervision, planning, risk management, deployment, coordination and project activity. Trained and supported users. Ensured the quality of deliverables to customers.

**Velox Bank, Buenos Aires, Argentina**
Implementation Lead for the branch system called Smart Branch, provided by a third party vendor. Trained and supported users. Performed functional and performance test. Tested the correct functionality of the application working on and off line against the back-end. Was in charge of the relationship with the consulting company, which was the owner of the product. Implemented banking systems in 28 small branches and 5 traditional branches. Conducted Y2K quality assurance program approved by the Central Bank of Argentina.

**Electronic Data System (EDS), Argentina**
System Engineer responsible for the implementation of a key cashier and back-office functionalities using Sellstation (EDS Windows Programming Language and MS SQL 6.5). Implemented the Front-End verification signature system.

**EDUCATION**

Master's in Business Administration
CEMA University, Buenos Aires, Argentina
Bachelor's in Information Systems
National Technological University (U.T.N.), Buenos Aires, Argentina

Seminar: Project Management process,
Paradigm Learning

Introduction to ISO-9001, Georgia Institute of Technology, USA

Administration of Software development, Post-grade course, University of Buenos Aires

**ACADEMIC ACTIVITIES**
Member, Academic Committee of 3rd Internet, Intranet and Web Congress
Lectured on e-payment
Assistant lecturer, National Technological University
Subject: System Seminar 4th year Course: Information Systems Engineering
John Celso, PMP

Relevant Professional Experience

Choice Solutions, Marlborough, MA

Senior Project Manager/Project Director (2008–Present)

- Currently exercises general latitude in judgment over matters pertinent to overseeing of subcontract projects, building client relations, defining personnel requirements and allocating budget to ensure completion and success of all projects
- Performs other key functions, which include but not limited to the following:
  - Manages team of 12-staff members on proper discharge of duties
  - Delivers customized Data Warehouse reporting inclusive of ad hoc analysis achieved through the state’s Share Point portal
  - Creates several online data-collection applications in view of need to collect district and school-system data on students with CT
  - Successfully created, planned and led training—both by way of direct instruction and WebEx (online) correspondence—to district and school personnel, reaching several hundred participants in the process

ESP Solutions Group

Senior Project Manager (2006–2007)

- Chiefly tasked to lead teams on matters pertinent to implementing technology projects in areas of Pennsylvania and Rhode Island
- Provided adequate and detailed construction of project plans
- Designed and implemented various end-user training modules, executable both onsite and via webinars
- Maintained continuous correspondence with all project stakeholders; led cross-country meetings with various partners
- Generated up-date information and report for perusal by commissioners and other agency directors

Massachusetts Department of Education
Senior Project Manager (2006–2008)

- Chiefly responsible in providing direction to, and exercising leadership over Project Team, in view of its task to develop and implement education data warehouse to be used by district and school personnel as well as educators within MA area
- Collaborated with professionals within internal departments, districts and academic associations so as to gather both product requirements and functionality, and so further ensure that there are no legal issues acting as impediment against work plan and schedule
- Performed other relevant duties such as:
  - Managed 10-member team on providing Customer-Support to data warehouse end-users
  - Designed and implemented various training modules
  - Maintained project documents and storage
  - Provided accurate and timely reporting of relevant information to stakeholders
  - Led meetings and conferences, and constantly communicated with stakeholders and vendors

Team Member/Project Manager, (1999–2006)

- Part of team that supported hardware and software issues for over 500 agency employees
- Maintained working correspondences with various internal and external groups of people in view of achieving company goals and target results
- Promoted from being team member to Support Manager within few months after being hired
- Concurrently assigned duties relative to Project Coordinator, specifically in overseeing internal agency projects with selected vendors

Education

- AS, Marketing, North Shore Community College
- Project Management Masters Certificate, Villanova Online University

Certifications

- Project Management Professional (PMP) Certificate, Project Management Institute
- Oracle 91 DBA Certificate
- Microsoft Office MOS Masters Certificate
Douglas G. Quinton

Relevant Professional Experience

Pearson, Data Solutions

Senior Implementation Consultant/Project Manager (2005–Present)

- Directed the implementation of schools interoperability framework (SIF) in the first 40 school districts in the state of Virginia ahead of schedule although the original plan called for only 30 districts; phase 2 is now underway

- Acted as Project Manager and lead in developing the first international version of the SIF 2.0 Data Model for the United Kingdom; data model is currently being piloted in a large school district in Birmingham, UK

- Continues to provide expertise and advice to BECTA, the British organization tasked with finding a solution to interoperability across educational software applications in the United Kingdom. Established working relationships with all of the primary educational software vendors in the UK, providing training and expertise toward development of their own SIF agents. Full horizontal deployment of SIF is now planned within the Birmingham LA (local authority) in all 450 schools. Additional pilot projects are now in the planning stages as well.

- Provides technical expertise and project management to other state level projects and larger district implementations

PlaNet Software


- Orchestrated the design, development, testing, release, and support of all software and infrastructure operations within PlaNet Software

- Managed customer relationships and developing custom solutions to fit business needs Chief Architect (1996–2001)

- Provided software integration and network administration expertise to Western Governors University, the nation’s first degree-granting distance education provider utilizing a competency-based education model

- Directly responsible for provisioning, deploying, and maintaining several core university infrastructure servers in a hosted environment spending significant time integrating disparate applications in a heterogeneous portal environment

- Designed and developed the core database, installers, and distribution components of PlaNet
ManagerTM, a Web-based instructional management system which has seen several releases and updates over the past 10 years and continues to be successfully deployed in both K–12 and corporate training environments

- Provided consulting services to various K–12 education companies building their own instructional management systems and education portal environments
- Planned and managed the infrastructure servers and networks for the company Jostens Learning


- Provided design and development support to a large team of developers for several different instructional management systems held by Jostens Learning
- Developed several software components distributed with the instructional management systems, targeted mainly on Windows and NetWare platforms
- Spent a significant amount of time working with customers on site to diagnose problems and liaison with development

WICAT


- Led a small team of developers to build and maintain successive instructional management systems, IMS and LMS, built on proprietary hardware and delivered to K-12 schools
- Developed instructional management software for the K-12 marketplace as part of a much larger group using various programming languages including both the AIMS and AIMS 2 releases which was distributed to and used by all K-12 education customers
- Obtained extensive experience working with computers, servers, networks, and various network operating systems
- Trained customers and end users on the more advanced features of the delivered software systems

Education

BS, Computer Science, Brigham Young University
James W. Robertson

Relevant Professional Experience

Pearson, Data Solutions

Business Analyst (2009–Present)

Design and write ETL processes for moving data between local data repositories, SIF zones, and state data warehouses:

- Complete business process modeling and analysis
- Responsible for requirements definition and tracking
- Correlate and map source data standards to SIF and other data models
- Conduct database queries, database schema development, and performance profiling
- Implement validity checks

DigitalBridge

Senior Software Engineer and Project Manager (2005–2009)

Involved in all aspects of software design and production:

- Web-based student data applications using Java, PHP, JavaScript, Ajax
- Data warehousing, ETL, and reporting
- Correlated and mapped source data standards to SIF and other data models
- Conducted database design and query writing
- Project management, including monthly meetings with clients

Wicat Systems


Collaborated in avionics simulations, from desktop trainers to 3-D full-cockpit Flight Training Devices (FTDs):

- Completed simulations using C/C++ for multiple airframes
- Responsible for autopilot, engines, auto-throttle, flight model, flight path calculation and capture, collaborated on Flight Management Computer (FMC)
- Involved in requirements definition, project planning, time/resource estimation
- Wrote functional specifications, UAT documents, conducted UAT


Involved in all aspects of Computer-based Training (CBT) design and production:

- Managed CBT projects, principally avionics and systems training for pilots, various airframes and
Project Team Organization and Staffing Response

Illinois State Board of Education
ILDS Data Warehouse Contractor
Part I: Narrative Description

Served as instructional designer and developer for own projects, consultant on other projects, contributing task analysis, objectives, syllabus, SME interface, scripting, screen design, with development work including authoring, tool creation/enhancement, process standardization, programming.

- Carried out delivery, setup, training, acceptance
- Collaborated in creating automated authoring tools, wrote script-to-lesson macros
- Designed and developed prototype avionics simulations for use with CBT, including navigation database

Wicat Education Institute

Test Designer and Project Manager (1983–1987)

Manager and developer of educational testing projects:

- Managed test development projects: Ability test battery based on Information Processing paradigm and Practice GED tests
- Designed tests, wrote sample items, reviewed all items, arranged field tests, reviewed statistical analyses, delivered and set up software, trained users
- Utilized Computerized-Adaptive Testing (CAT) for ability tests
- Wrote generic test delivery engine that utilized system of parameterized test item banks, test specification records, and reporting/recording tools.

Education

- PhD, Experimental Psychology, Brigham Young University
- BA, Art and Design, Brigham Young University

Publications


Presentations

YVONNE CHENG
Analyste QA bilingue
Public Consulting Group, Inc.

LANGUES
Français, anglais (Je suis parfaitement bilingue)

EXPÉRIENCES PROFESSIONNELLES

TD Assurance (PTT)
Analyste QA (consultante)
Implémentation de Claim Center (GuideWire)
avec FileNet (IBM) et des rapports (Inetsoft)
dans le cadre du Programme de Transformation de la Technologie (PTT)

- Implémentation et coordination du processus qualité Agile/Scrum dans le projet ECM;
- Élaboration de la stratégie de test, du plan de test et des cas de tests business, finance, ECM, et datawarehouse;
- Coordination des tests d’intégration;
- Coordination des tests et support « UAT » et « End-to-End » dans le projet;
- Analyse fonctionnelle et analyse d’affaires;
- Transiger activement avec tous les membres de l’équipe de développement (Scrum team) : les architectes organiques, les concepteurs objets, les analystes d’affaires, les SME et d’autres équipes;
- Faciliter les workshops (ateliers) avec les experts techniques (SME) pour cueillir des requis;
- Validation des environnements d’intégration et fonctionnels;
- Vérification et tests back-end avec soapUI;
- Exécution et maintenance des tests manuels et automatisés;
- Présentation des fonctionnalités et des « user story » au « sprint review »;
- Formation des nouvelles ressources;
- Analyse fonctionnelle et validation des rapports finances et administration (InetSoft);
- Création de requêtes SQL (Oracle) pour valider des données des rapports et datawarehouse;
- Validations datawarehouse.

Telus Solutions d’affaires
Analyste en assurance qualité
Plusieurs projets web de grande envergure dans le domaine du voyage (développement par itération).

- Exécution des tests (maintenance, intégration, performance, régression, de mise en production) de plusieurs projets;
- Analyse des besoins d’affaires et élaboration des plans de tests et de cas tests à partir des exigences, les spécifications fonctionnelles et techniques et les règles d’affaires;
- Gestion (de la modification) des exigences, des spécifications fonctionnelles et techniques et les règles d’affaires de chaque itération;
- Identifier et documenter les problèmes rencontrés (bugs) et faire le suivi des correctifs jusqu’à la résolution;
- Approbation de la mise en production en termes de qualité;
- Testeur en chef pour un projet d’envergure;
- Validation XML avec Xpath.

Sirius Conseils
Développeur ASP.NET
Outil de gestion de projets, portefeuilles, budgets, objectifs, organisations au niveau
Entreprise
- Développement de nouvelles fonctionnalités front-end (C#);
- Modification de fonctionnalités;
- Création et modification de procédures stockées (T-SQL);
- Assurance qualité de l’application (performance, fonctionnel, optimisation), documentation des résultats et débogage de l’application;
- Traduction (ang-fr, fr-ang).

Source Évolution Inc.
Client interne: Fonds des Architectes du Québec
Consultante / Développeur ASP.NET
Application de gestion de sinistres (développement Client/Serveur)
- Intégration de rapports en VB.NET (VS2005) avec Crystal Report XI R2

Source Évolution Inc
Client interne
Site Web corporatif de Source Evolution (Développement Web)
- Développement d’un site Web corporatif en ASP.NET avec C#.NET avec globalisation (2 langues);
- Techniques d’accès aux données ADO.NET et procédures stockées (stored procedure) utilisées (SQL Server);
- Génération de contenu (stocké dans la base de données SQL Server) dynamique;
- Rédaction et application de feuilles de styles CSS and des JavaScripts (client);
- Tests fonctionnels;
- Migration de l’application de ASP.NET V1.0 vers ASP.NET V2.0;
- Recherche et développement.

Source Évolution Inc.
Client interne
Application de gestion interne
- Programmation en C#.NET – fonctionnalités au niveau de l’interface et du « business layer »;
- Modification de l’interface (HTML, CSS, JavaScript);
- Tests Fonctionnels;
- Techniques d’accès aux données ADO.NET et procédures stockées (stored procedure) utilisées (SQL Server);
- Migration de l’application de .NET 1.1 vers .NET 2.0 et de SQL Server 2000 vers SQL Server 2005.

Nstein Enterprise Search
Nstein Technologies (Développement Web)
- Ajout de fonctionnalités et modification d’une application web ASP;
- Ajout et mise-à-jour de fonctionnalités du client (www.cognos.com);
- Tests fonctionnels de l’application.

GPHIN – Global Public Health Intelligence Network
- Migration des rapports Crystal de la version X vers la version XI;
- Création de vues sur 3 bases de données SQL Server 2000 sur 3 serveurs différents;
- Documentation du projet.

Raymond Chabot Grant Thornton
Application Web intranet (gestion interne de RCGT)
- Développement d’une application web intranet pour les nombreux
bureaux de RCGT à travers le Québec (ASP.NET avec C# .NET);
• Technologie Ajax avec XML services Web pour l'envoi des données à la base de données pour réduire le temps d'échange avec le serveur;
• Génération et modification de schémas XSD;
• Rédaction de spécifications fonctionnelles;
• Modifications et ajouts de fonctionnalités au projet « Epicor's Enterprise solutions » avec Epicor adaptive designer.

**ABB Inc.**
Application Web intranet
• Développement Web en ASP.NET avec C#;
• Techniques d'accès aux données ADO.NET et procédures stockées (stored procedure) utilisées (SQL Server);
• Modification et rédaction de JavaScript (client-side);
• Génération de documentation de style MSDN avec nDoc;
• Génération/rédaction de documentation de base de données SQL Server;
• Tests fonctionnels.

**LogicTAX**
*Intégrateur Web (ASP.NET) / analyste fonctionnelle*
Application Web d'impôt des particuliers
• Modification du framework "I BUY SPY" portal (Microsoft);
• Rédaction de spécifications pour l'application Web et pour des outils de conversion;
• Modélisation de données;

• Analyse de l'architecture de l'application;
• Gestion du projet de certification (MRQ et CRA);
• Gestion et formation des employés;
• Implication dans les décisions au niveau de l'architecture, le développement, la conception de l'application;
• Traduction de contenu (français, anglais).

**Intégrateur Web (HTML) / support technique**
• Conception, développement, traduction, maintenance et la documentation de l'application;
• Support technique;
• Documentation des modules de support technique;
• Tests manuels.

**TECHNOLOGIES**
• Agile/Scrum
• GuideWire software
• FileNet (IBM)
• Bowne, soapUI
• Quality Center (HP)
• Version One
• MS SharePoint
• MS Project, QTP (HP)
• soapTest (Parasoft)
• InetSoft
• TOAD for Oracle
• ASP.NET/C# .NET
• Visual Studio .NET
• SQL Server 2000
• Infragistics
• AJAX
• VB.NET (VS2005)
• ADO
• User controls (.ascx)
Project Team Organization and Staffing Response

- T-SQL
- Remote Desktop Services
- IIS
- XHTML
- CSS
- JavaScript
- Photoshop
- Macromedia Flash et Captivate
- ASP
- COM
- JavaScript
- XML
- Web services
- Crystal Reports X
- Crystal Reports XI
- Sharepoint Portal
- Virtual Machine (VMWare Workstation)
- Epicor development environment
**PABLO JOSE HASSID**

Senior Quality Assurance Analyst  
Public Consulting Group, Inc.

**PROFESSIONAL EXPERIENCE**

**Intelerad Medical Systems**  
*QA Analyst*  
Jun 2009 – present

- Developed Regression test plan.
- Analyzed requirements and wrote test cases for radiology images managing system.
- Defined tests scenarios.
- Run exploratory and regression tests.
- Human interface between development team and QA team.
- Wrote weekly status reports.

**Morgan Stanley**  
*QA Analyst*  
Oct 2005 - Mar 2009

- Developed Regression test plan.
- Analyzed requirements and wrote test cases for STS (Swap Trading System, financial instruments estimator) and its diverse components.
- Defined tests scenarios.
- Defined automated tests.
- Defined test strategies.
- Run discovery and regression tests.
- Human interface between development team and QA team.
- Wrote daily status reports and progression reports for upper management.
- Test Director.

**10 out of 10 Inc.**  
*Owner*  
Jan 2005 – Aug 2005

- Started distribution company.
- Organized production.

**Industry Hub (Canada)**  
*QA Analyst*  

- Analyzed and wrote test cases.
- Reviewed use cases.
- Defined tests scenarios.
- Ran functional, performance and data integrity tests.
- VB .net SQL server Windows 2003 server. Rational Clearquest. ACT.

**IT Development Argentina**  
*Team Leader*  
Dec 2002 – May 2003

- Led a group of web developers and designers.
- Organized deliveries from Argentina to USA servers.
- Java and Html.

**AT&T Latin America**  
*Senior Business Analyst*  
Dec 2001 – Dec 2002

- Responsible for the System analysis and Quality Assurance of the Batch Invoicing system and Calls Ratter System.
- Unix/Oracle Forms and Reports and PL/SQL.
**Sonda Brasil – Transit Telecom**  
*Senior Business Analyst*  
Jan 2002 – Jun 2002
- Responsible for the analysis and QA of the Batch CRM and Sales systems.  
- Unix/Oracle Forms and Reports and PL/SQL.

**Telefonica Comunicaciones Personales**  
*(Telefonica de España SA)*  
*Business Analyst*  
- Responsible for the CRM, Sales, Inventory and Provisioning Systems. Responsible of the Functional and Data migration of the systems mentioned between two large proprietary ERP systems.  
- Unix, Ingres Database and 4GL, Oracle Forms and Reports and PL/SQL, Visual Basic.

**TECHNICAL SKILLS**


OS: Windows, UNIX, LINUX

Hardware: PC, SUN, VAX.

Languages: Oracle forms and reports / PL-SQL, Visual Basic, Ingres 4GL, Fox.


**EDUCATION AND QUALIFICATIONS**

Universidad C.A.E.C.E. (5 years degree)  

**LANGUAGES**

Native language: Spanish

Fluent in English spoken and written

Fluent in Portuguese spoken and written

Intermediate French
MAURO JUAREZ
Quality Assurance Analyst
Public Consulting Group, Inc.

PROFESSIONAL EXPERIENCE

Software Quality Assurance Analyst
PCG Canada
March 2008 - present
- Business requirements analysis, writing of test plans, test scenarios and test cases for the main components of a business intelligence solution, among them: ETL’s, reports, webparts and cubes.
- Verified the Uniqueness, Accuracy, Consistency and Completeness of the data in the DW by using SQL sentences. Coded an automatic regression tool to validate the cube’s measures.
- Documented, reported, tracked and performed regression test.

SILANIS
Software Quality Analyst
May 2007 - Dec 2007
- Wrote the test plans, test scenarios and test cases for two systems in the eContracting industry.
- Executed the test cases, documented, reported, tracked and performed functional regression test.
- Designed, recorded, ran and analyzed test of performance using Rational Robot and Rational Test Manager.

CGI (internship)
Software Quality Analyst
Feb 2007 – March 2007
- Read the software requirements and uses cases documents in order to design the tests cases of four web applications owned by the national bank of Canada; I used the Mercury Quality Center tool.
- Executed the test cases, documented, reported, tracked and did functional regression test for the software anomalies that I found for two web applications owned by the national bank of Canada; I used the Mercury Quality Center and Clearquest tools.

SOFTEK
Systems Analyst
Sep 2002-August 2005
- Identified and wrote the end user software requirements for the products and security modules of one vehicle and damages assurance software system.
- Wrote and validated with the end user the uses cases for the products and security modules of one vehicle and damages assurance software system, modeled and wrote the classes diagram and their interfaces for the modules mentioned using Visual Basic.Net.
- Made manual functional tests to the products and security modules.
- Coordinated verification activities ("Peer Reviews").
- In the health care industry I analyzed, did business processes reengineering, identified software requirements, documented uses cases and designed entity relationship models for a customized ERP system.
- In the financial industry I analyzed, documented software requirements, coded, performed manual functional tests, deployed and documented client-server applications under a n-tier architecture.

NEORIS
Software developer and technical support

- Installed, maintained, tested (system tests) and gave technical support for a customized ERP system in the cement industry.
- Analyzed, developed, tested (unitary and system tests) and documented client server applications under a n-tier architecture using COM components.
- Started a software processes improvement effort using the CMMI model.
- Provided training in the Visual Basic 6.0 Microsoft Official Certification Courses.

TECHNICAL COMPETENCIES

Software quality

- Planning and writing of test plans.
- Elaboration of scenarios and tests cases execution.
- Facility to communicate and document clearly and precisely the anomalies found.
- Realization of certification reports.
- Experience with testing and quality tools: Rational Test Manager, Rational Robot, Rational Requisite Pro, Rational Clearquest, Mercury Quick Test Professional, and Mercury Quality Center.

Programmer and Systems analyst

- Identify and document without ambiguity the customer requirements.
- Identify, design, document, and translate uses cases and class diagrams.

- Developer using: VB6.0, C#, VB.Net, ASP.Net, HTML, XML, schemes XSD and MS SQL.
- Utilization of the next tools:
  - Data base modeling (Erwin, Power Designer and Embarcadero E/R Studio).
  - Business process modeling (Microsoft Visio).

Operative Systems

- Windows 7, Xp, 2000 Server, NT, 98 and 95.

Data bases

- Experience with: "data transformation services and data replication", ETL’s.

Management


General tools

- Ms Office, Ms Project, image and video capturing tools.

EDUCATION
Collège Bois-de-Boulogne  
*AEC in software quality techniques*

Vanwest College  
*English as second language*

Instituto Tecnológico de Monterrey  
*Masters degree in information systems*

Instituto Tecnológico de Pachuca  
*Bachelor's in computer science*

**ADDITIONAL INFORMATION**

- Microsoft Certified Professional (Visual Basic desktop applications developer)
- Member of the association of practitioners of the software quality in Montreal
- Trilingual: French, English and Spanish.
Pavan Chilukuri

Relevant Professional Experience

Choice Solutions

Technical Lead (2008–Present)

- Project: Education LDS Systems Development. edFusion is a portal and directory solution that has been designed to meet the needs of statewide longitudinal data management and community access. Various new applications are involved, including data management, reporting, and Pre-K information management systems. The solutions require the utilization of the edFusion portal and directory framework to serve the right information to the right users.
- Leads Joint Development sessions
- Mentors junior developers on design and implementation issues
- Leads design sessions with clients
- Designs story boards for the client, including html wireframes
- Works with business analysts and project managers to define and implement business requirements
- Leads performance tuning of the application

Capital Technology Information Systems


- The Adverse Experience Reporting (DAERS) project enabled DAIDS and its collaborators to report Expedited Adverse Experiences (EAE) effectively, in accordance with the safety reporting guidelines set forth by FDA and ICH in the conduct of human subject clinical trials. The DAERS component was a Web-based system that provides real-time reporting of, and access to, EAEs.
- Prepared Design Document, Development, Testing and Maintenance
- Reengineered business processes and modeled the changes in Microsoft Visio or Rational Rose through activity and sequence diagrams as well as process flowcharts
- Supplemented the functional requirements with business rules, data dictionaries, and non-functional requirements
- Designed storyboards, navigation maps, mockups, and wireframes for screens, web parts, and reports in PowerPoint and Visio
- Assisted Product Managers in the planning, monitoring, and tracking of project
activities and in creating and presenting management deliverables
- Developed of Asp.Net Forms, User controls
- Performed source code management using Clear Case and Team Foundation Server
- Performance tuning of the application
- Developed class libraries using Data Adapter, Data Readers and Data sets

CGH Technologies


- Project: South Carolina Electronic Disease Surveillance System for Department of Health and Environmental Control. This web-based system was developed as an integrated and standardized electronic information system for communicable diseases. It receives disease data electronically and is used for ongoing systematic collection, management, analysis, interpretation, and dissemination of disease data essential to public health practice.
- Provided secure exchange of information (messaging) across internet connections
- Used public key cryptography method for authentication, encryption and decryption
- Generated of public and private keys using PGP 7.0.3
- Developed the capability to receive, parse the HL7 file
- Extracted information from an HL7 file and load it into a SQL Server database
- Identified user requirements during the analysis phase
- Generated DDLs to create database structures like tables, indexes, constraints
- Wrote Triggers and Stored Procedures in T-SQL to implement business logic

AZTEK Group


- Project: Employee Information System. This client-server/web-based application was developed for a consulting company. The system is used to maintain current employee information along with their skill set, wages, and benefits, and keeps track of potential job openings by company and skill set.
- Identified user requirements during the analysis phase
- Developed normalized logical Data Models and documenting them in Oracle Designer
- Documented business processes using process flow diagrams
- Converted logical data model to Physical data model
- Generated DDLs to create database structures like tables, indexes, constraints, sequences
Wrote numerous packages, Triggers (both in Database and Forms), Stored Procedures and Functions in PL/SQL to implement business logic
- Developed MDI screens for the application in Oracle Developer using various built-in packages and advanced GUI features
- Generated Reports for the application using Reports 3.0

University of South Carolina

Graduate Assistant (2000–2001)
- Project: Online Grading System (OGS). This web-based application stores information about students, courses, and their assignments, student grades. Students can login and check their grades. Faculty has privileges for creating courses and adding students in courses.
- Gathered requirements from end users
- Developed used case diagrams, sequence diagrams, and class diagrams using Rational Rose
- Worked with end users to finalize look and feel of the pages
- Developed screens for the application using Active Server Pages (ASP)

West Virginia University

Graduate Assistant (1999)
- Project: Database Developer.
- Provided technical support to the faculty and staff from various departments in the analysis, design, and development of database applications using Oracle and MS Access
- Trained users on how to open new accounts and on how to login to the Internet to search and download files
- Conducted training programs and provide user support for various software packages, including MS Office, Online Student Registration System and Library Management System
- Installed and Maintained PCs, Scanners and Software

Education
- Master of Computer Engineering, University of South Carolina
Technical Expertise

Software

MOSS 2003/07, ASP, ASP.NET, XML, XSL, VB, VB.NET, ADO.NET, C#, MOSS 2007, IIS, Java, SQL Server, Oracle®, VSS, Rational Rose, Microsoft Visio, ActiveX, FrontPage, Dreamweaver and Photoshop. Visual Studio 2k2-8, Rational Rose 98, Oracle Designer, 2.x, 6.x, ErWin

Programming Languages


Databases

Oracle 9i, 8i MS SQL Server 2005/08, 6.5, 7.0, 2000, MS-Access, Methodologies and Techniques CMMI for Development v1.2, JAD/RAD, Knowledge Management, RUP, UML 2, Use Case Modeling, User Acceptance Testing
Anand Choppala

Relevant Professional Experience

Choice Solutions Inc

Technical Lead (2010 – Present)

- Project: Maine SLDS Data Warehouse and Reporting project
  - Managing client requirements
  - Working with development staff to design and implement this robust data management and reporting solution:
    - the edFusion reporting framework provides SDE staff and external users a robust data management solution pulling from over 26 data sources into an authoritative Data Warehouse)
  - Implementing a robust reporting framework which includes:
    - At-Risk Management module
    - Growth Model module
    - Balanced Score card module

Connecticut State Department of Education

Lead Developer (2009 – 2010)

- Project: CECS
  - Web application which enables the educators to:
    - Apply, renew, and update certifications on-line
    - Check the status of their Application
    - Update their profile and contact Information
    - View their Connecticut certificates
    - Request a duplicate copy of their certificate
    - View their testing history
  - This system is also used by the internal support staff and consultants who analyze the application and initiate the certificate approval process

Department of Public Safety Middletown CT

.NET Developer (2009)
Part I: Narrative Description

Project Team Organization and Staffing Response

- Project: Family Violence Report Validation (Crimes Analysis)
  - Windows application (Win Forms):
    - Takes Family violence Report (XML Files) as input and validates against a NIEM conformant schema (XSD)
    - If the Reports are valid against the schema, the data is extracted from them and the validations or business rules are run against the data to check the validity and consistency of the data in XML File
    - If the Family Violence reports violate any rules, user readable reports are generated using the using crystal reports
    - Data from the valid reports are saved into the SQL server database

T-Mobile, Seattle Washington

.NET Developer (2008)

Dimension Mortgage, Houston TX

.NET developer (2007-2008)
- Online Loan Application

Harris County Department of Education (HCDE), Houston TX

.NET developer (2007-2008)
- Workshop Management System

Education

- MBA in Project Management - University Of Northern Virginia
- Master of Science in Information Systems - Texas A&M International University Laredo, TX
- Bachelor of Technology in Information Technology - Andhra University, India
Scott Gallant

Relevant Professional Experience

Choice Solutions, Inc.

Product Manager (2004–Present)

- Lead UI development and analysis for SEA clients
- Develop site information architecture for Massachusetts Department of Education Portal
- For LEA Learning Management Solution, designed online education toolset, which included grade book, scheduler, curriculum, lessons, activities, and assessments tools
- Technical experience includes:
  - NT/2K/2K3
  - Notes/Domino
  - Visio/Project
  - HTML/DHTML/ASP
  - CSS/JavaScript
  - Apache/IIS/Sharepoint*
  - SQL*/Access*
  - Active Directory
  - SiteServer/WebTrends
  - GetAccess/ClarityNiku
  - WinCVS/StarTeam
  - CA BrightStore

Center for Education, Leadership, and Technology

Project Manager (2005–2006)

- Acted as IT Director

TechBoston Consulting Group


- Worked within the public school district as a Project Manager for multiple small business website projects run by students

Back Bay Technologies
Independent Consultant (2005)

- Managed multiple web-based projects including JSP/PHP website transitions for investment firms, and a dynamic RSS feed sport sites

Massachusetts Department of Education

Director of Web Strategies (1999–2004)

- Oversaw operations and aided in administration of www.doe.mass.edu
- Responsible for integrity of interface engineering, graphics, style, content accessibility, and reporting
- Created approval methods for job requests, as well as billing systems and hiring criteria
- Implemented policy on design standards, code usage, style guidelines, and content writing
- Developed product brands in the form of logos, print media, photography, and PR campaigns
- Directed JAVA chat sessions, streaming video broadcasts, user testing, and curriculum trainings
- Shaped GEM, the Educator Gateway, including a comprehensive job matching service MECC
- Gathered functional specs, oversaw development of MA educator licensing system (ELAR)
- Designed ASP/PDF/Word web solution for statewide assessment testing system (MCAS)
- Migrated data collection online for 1,817 schools

Education

- BFA, Experimental Studio with minors in Architecture and Graphic Design, University of Hartford
Scott Gausland

Relevant Professional Experience

Choice Solutions, Inc.

Technical Lead (2011–Present)

Rhode Island Department of Education

Information Systems Specialist (2004-2010)

- Designed and built the State-Wide Student Identifier System. This system enables the Department to merge and link a multitude of disparate repositories of student data together for analyses thus allowing educators to gain a more complete picture of the public education system in Rhode Island. This was built with SQL Server and ASP.

- Database Administrator for the Department’s 10 installations of SQL Server. To protect the Department from a catastrophe, I instituted automated processes that make periodic copies of all the data contained in each SQL Server installation.

- Designed and built a modular data validation process to validate and clean data imported from a variety of sources. This was built with SQL Server and ASP .NET.

- Designed and built several web-based data collection applications that the school districts use to report student enrollment data to the Department. Using Microsoft .NET technology, I restructured the application by designing & building reusable .NET object components and incorporating this new technology into our existing legacy system. This was built with SQL Server and ASP .NET.

- Designed and built several OLAP cubes for advanced analysis of student enrollment, financial, special education, and student assessment data. These were built with SQL Analysis Server and SQL Server.

- Project manager, database architect, administrator & developer, and application trainer for the Department’s data warehouse system. This 1.3 million dollar project merges information from dozens of distinct sources into one coherent repository. This provides the tools to
allow educators to find out which teaching methods work better than others, which programs are showing positive results and which are not, which students need improvement or extra help and the subject areas that students may need help with.

- Designed and built the Department's Master Directory system which stores school profile and personnel information for all schools in Rhode Island.

- Designed and built a Forensic Report application that allows data analysts to identify inconsistencies between the Departments disparate data sources. This was built with SQL Server and ASP .NET

- Installed, configured and maintained RIDE's Storage Area Network. A Storage Area Network, or SAN, is a state of the art, centralized, high performance storage subsystem. It is a central repository of ultra high-speed disk drives. This system connects to dozens of host servers at once using an extremely fast fibre optic cable connection. It is an extremely complex piece of equipment.


- Upgraded the internal network domain from Windows NT4 to Windows 2003

- Key technologies used include:
  - SQL Server Integration Services
  - Oracle 7.3, 8i, 8i, 10g
  - SQL, T-SQL, PL/SQL
  - Informatica PowerMart
  - Cognos PowerPlay, Impromptu
  - .NET Framework 1.1, 2.0, 3.5
  - Visual Basic 5, 6, 7, .NET
  - HTML, CSS, XML, EDI
  - EMC Storage Area Network
  - MS IIS, ASP, ASP .NET
Serono Laboratories

Consultant (2003)

- Designed and built a data mart to analyze sales outflows of a newly acquired product family. This data is received from the IMS and details product sales to pharmaceutical facilities.

- Designed and built a data mart to analyze sales and inventory information from the four largest national drug wholesalers. The data is transmitted from each wholesaler via 867 and 852 EDI reports. These databases were built with Oracle 9i.

- Built complex mappings using Informatica PowerMart to extract, transform and load the data into a star schema data model with common dimensions. The router, normalizer, aggregator, lookup, stored procedure, filter, update strategy, sequence generator and expression transformations were all used. Mapplets, parameters, mapping variables and reusable transformations were also built and utilized.

- Created complex views using Oracle 9i’s advanced data warehouse analytical functions.

- Built reports with Informatica PowerAnalyzer as the BI tool that presents the above data to the business. Custom metrics, filtersets and calculated metrics were used to create these reports. Imported and created new schemas, including fact and dimension tables, as a PowerAnalyzer Administrator.

Education

- M.B.A., Emphasis on Computer Information Systems, Bryant College
- B.S., Business Administration, Bryant College
Adrienne Kelso

Relevant Professional Experience

Choice Solutions

Documentation Specialist/Technical Writer (2010–Present)

- Create technical documentation, including user guides, system guides, and specification sheets for a variety of clients and customized software implementations
- Confer with technical leads to guarantee that documentation remains up to date as software updates occur
- Work with clients to ensure that documentation meets specific expectations
- Test software for usability and user experience issues, making suggestions for improvement as needed
- Create internal documentation instructing Project Managers and Choice employees on internal procedures

SeaChange International


- Maintained documentation set of 13 100+ page books for external customers, as well as technical notes and short documents for internal use
- Worked as part of cross-functional team in an Agile development environment. Participated in SCRUMS, release planning, story planning and pointing, etc.
- Worked side-by-side with engineers and QA, creating documentation for features as they were developed
- Prepared documents for publication using FrameMaker and Adobe 3D
- Created technical notes documenting features and concepts relevant to internal Customer Engineering group
- Documented procedures used by Technical Publications team, for use in official departmental and procedure guide
- As Technical Publications representative at cross-functional team meetings, reviewed and approved interdepartmental documentation and provided input from Technical Publications perspective
Monster Worldwide

Global Seeker Copywriter (2007–2008)

- Created and maintained product marketing copy, UI descriptors, and email messaging for Monster's job seeker website
- Created a Monster Job Seeker Style Guide, defining accepted industry-specific phrasing, controlled vocabulary terms, and use of web control terminology
- Worked with key stakeholders from all departments to create content that enhanced usability and improved the user experience, using an iterative process to refine draft copy based on stakeholder input
- Researched industry standards and techniques to ensure delivery of effective, user-centric copy that achieved company goals

Datafarm Inc.

Documentation Specialist (2006–2007)

- Wrote all internal and external documentation for software products used by the pharmaceutical industry and worldwide regulatory agencies
- Interviewed subject matter experts to create internal specifications, SOPs, and company manuals
- Wrote and edited marketing copy for corporate website, product advertising, and press releases
- Wrote and designed user manuals and administrative guides

Monster Worldwide


- Wrote all documentation for Monster Technology's Operations group
- Interviewed SMEs (system administrators, systems analysts, department managers) to create internal server build documents and troubleshooting guides
- Documented internal procedures and policies for circulation among all departments
- Create unified documentation styles and a style guide to reflect Monster branding
Cyphermint PayCash Systems

Content Producer (2004–2005)

- Created all end-user documentation for external software
- Wrote user manuals and installation guides for in-house software
- Wrote use cases for in-development products

Education

- MS, Technical Communications, Northeastern University
  - In progress – anticipated graduation date: June 2011
- BS, English – Professional Writing, Fitchburg State College

Professional Affiliations

- Society for Technical Communication
Srinivas (Vasu) Marla, PMP

Relevant Professional Experience

Choice Solutions, Inc.

Project Architect/Lead (2008–Present)

- Manage, analyze, design, integrate, build, and test statewide educational decision support systems
- Execute projects by extensively using project management disciplines such as Project Scope Management, Project Time Management, Project Cost Management, Project Quality Management, Project Communications Management, and Project Risk Management
- Develop reporting architectures
- Define technical product roadmap
- Design, develop, and implement reporting and data warehouse solutions for SEA clients
- Technical experience includes:
  - UNIX
  - AIX
  - VAX/VMS
  - SQL Server
  - Oracle Designer/2000
  - ERWin
  - Rational Rose 98
  - ADW
  - SAP
  - Java
  - .NET

DTE Energy

Project Manager/Lead (2006–2008)

- Managed a cross-functional team to build interfaces to SAP/SRM from a client/server application as part of DTE2 project
- Responsible for activity identification, sequencing, and duration estimation
- Performed Cost estimation and budgeting
- Executed quality planning, quality assurance, and quality control
- Performed risk management and configuration management
Team Lead (2003–2006)

- Prioritized tasks, monitored progress, and communicated with stakeholders
- Identified appropriate resource, assigned work units, and measured progress
- Developed and enforced standards for application development
- Communicated with the vendors and scheduled vendor demonstrations
- Performed impact analysis


- Responsible for user requirement consolidation of all modules and database changes
- Coordinated changes with customer, DRM, and UNIX groups to comply with change management process
- Gathered requirements from end users
- Documented data and process requirements using entity-relationship diagrams and process flow diagrams
- Designed databases using ARSWEB
- Implemented business rules using PL/SQL programs
- Environment:
  - iPlanet 4.0,
  - XML4j-2.0.15
  - JDK-1.2.2
  - Oracle JDBC 8.1.5
  - Netscape LDAP SDK 3.0
  - Netscape LDAP Server 4.1
  - HTML Kit, Windows NT 4.0
  - Rational Rose 98

Ford Motor Company


- Co-led the effort in identifying the process requirements
- Performed preliminary database design including entity-relationship diagrams
- Developed screen and report specifications
- Validated the business requirements with the database design and specifications
Part I: Narrative Description

Project Team Organization and Staffing Response

- Developed applications using Stored Procedures, Packages, and Triggers
- Identified reusable components to improve performance
- Environment:
  - HP K420
  - Intel 486 based PC
  - HP-UX 10.x
  - Oracle 7.x
  - Designer/2000
  - Forms 4.5

Education

- MBA, Business Administration, Eastern Michigan University
- MS, Computer Information Systems, Eastern Michigan University
- BME, Mechanical Engineering, Osmania University

Certifications

- Project Management Professional (PMP) Certification from Project Management Institute, August 2000
- Oracle Certified Application Developer, Rel.6/6i from Oracle Corporation, March 1999
Bill Nicholson

Relevant Professional Experience

Choice Solutions

Director of Software Quality (2010–Present)

- Responsible for a team testing and delivering cutting edge software solutions to state and local education agencies

Commonwealth of Massachusetts IT—EOHHS


- Responsible for a team testing all applications that come through the Massachusetts Virtual Gateway (portal) for all J2EE Web and Web Services performance-testing utilizing Mercury LoadRunner, Soap UI Pro and Rational Performance Studio toolsets

Copyright Clearance Center/Rightslin


- Responsible for hiring, managing and training a staff of 3 QA Engineers
- Built a one-click automated regression suite utilizing Rational and Mercury Interactive technologies
- Taught the QA staff as well as selected Development staff on the Rational toolset
- Developed a Quality Assurance process to integrate into the Development Lifecycle, which was utilizing XP (Extreme Programming) practices
- Built and maintained a complete Test Lab which utilized all Microsoft operating systems as well as Unix and Macintosh technologies
- Built and maintained a Web Farm

Waterfield Technology/MarchFirst Inc.

QA Manager (1997–2000)
Directed all aspects of the Software Testing and Quality Assurance (STQA) practice
- Worked, as a billable QA resource, at client's sites to plan, establish, and test manual and/or automated Client/Server and Web projects
- Taught public and private courses on Rational Suite TestStudio and Performance Studio
- Developed and presented a paper, to many clients, on The How, Why, and When to Automate

**Fidelity Investments**

**Principal QA Engineer (1995–1997)**

- Participated in product planning and design with business analysts and software developers to provide QA knowledge and planning expertise
- Designed procedures for test creation, test automation, manual testing, build verification, transactional testing, which were utilized during System Testing

**Education**

- BS, Cartography and Computer Science, Salem State College
Relevant Professional Experience

Choice Solutions, Inc.

Business Analyst (2010–Present)

- Exercises general latitude in judgment over matters pertinent to overseeing of projects, development, QA, building client relations, defining personnel requirements and allocating budget to ensure completion and success of all projects
- Manages team of staff members on proper discharge of duties for the UTRex State Longitudinal Data System Project
- Works directly with clients to obtain requirements and translate these requirements into working documents that software solutions are developed from
- Work directly with software developers and technical leads
- Coordinate work with other companies and contractors

Solera Networks

Program Manager (2010)

- Led cross-functional teams consisting of product management, development, QA, support and operations personnel to define, build, and launch Solera Networks software and appliance products into the marketplace.
- Identified, escalated and drove resolution of issues that affect program schedule and feature commitments.
- Communicated program status to management and executives on a regular basis in both formal and informal environments
- Ensured effective communication within the engineering team and between the project team and other engineering groups.
- Developed and drove effective software development lifecycle practices within the organization.

Utah Department Human Services
Senior Business Analyst (2009-2010)

- Created a positive environment, evaluated group processes, recommended solutions or alternatives.
- Wrote and executed software test plans, documented software bugs and associated bug resolution, and ensured all systems are tested adequately.
- Selected the testing methods to evaluate the success of both reporting and analysis software upgrades and modifications.
- Identified problems or potential problem areas with data collection screens, data entry, or data interpretation and recommends solutions.

Rio Tinto IS&T

Project Manager (2006 – 2009)

- Provided high-level advice to senior managers and business sponsors on a wide range of Information Services (IS) issues relating to particular applications development and infrastructure projects.
- In accordance with PRINCE2 (Projects in a Controlled Environment) project management methodology, managed and coordinated IS software development and infrastructure projects from conception to finalization.
- Negotiated resource requirements and timelines with stakeholders and managed delivery within constraints.
- Provided guidance to team members and ensured skill sets and knowledge bases were maintained and updated relative to project deliverables.
- Recorded and maintained information in accordance with client’s requirements.
- Facilitated meetings involving stakeholders and cross-functional teams as required by the project.
- Utilized Microsoft Project for project timeline and milestone tracking through the project lifecycle.
- Lead WebEx sessions and made PowerPoint presentations as needed to review project deliverables with stakeholders and to provide training to end users and administrators.
- Lead the design and implementation of a Mine Data Warehouse solution for KUC’s (Kennecott Utah Copper) Bingham Canyon mine.
The successful execution of this project led to its adoption as the global solution for all Rio Tinto mines.

Successfully designed and communicated the project plan template employed by the Project Management Office, which incorporated project objectives, scope, deliverables, schedule and resource requirements, and relevant communications to stakeholders.

**GE Corporate Payment Services**

*Project Manager (2005 – 2006)*

- Facilitated the successful completion of a large-scale financial system upgrade with 50+ corporate clients.
- Interfaced with clients at both the technical and business level providing project coordination function back to Corporate Card Systems, Sales and Operations groups.
- Led cross-functional teams to ensure corporate IT resources were used effectively.
- Managed the development and integration of new product enhancements within estimated time and cost.
- Pro-actively identified and developed processes to streamline implementation and cycle time for new IT product initiatives.
- Developed an understanding of internal/external client systems and processes as they related to the system upgrade in order to better identify impact and provide solutions specific to each client.

**Data Services Direct**

*Project Manager (2003 – 2005)*

- Acted as single point of contact for high profile clients documenting project requirements and managing day-to-day activities of the project through project completion.
Created Project Definition Documents detailing every aspect of projects and identified roles and responsibilities for each department along with a work breakdown structure.

- Coordinated communication with production and IT departments to ensure understanding of project requirements and monitoring of milestones completed.
- Prepared monthly invoices and ensured ongoing project profitability.

BioMeridian Inc.


- Responsible for overseeing the development of BioMeridian’s product line.
- Devised, prioritized, and planned feature set requirements guiding the product development team.
- Prepared product roadmap that defined form, function, price, competitive positioning, and timing of product releases.
- Served as customer service manager over a team of customer service representatives.
- Worked closely with customers in tracking and managing the resolution of software bugs and enhancement requests.
- Recommended marketing strategies to introduce and integrate new products into the sales mix.

SonicWALL Inc. and Phobos Corporation

Product Manager (1998 – 2001)

- Defined market requirements and drove the long-term product road map.
- Worked in partnership with engineering, manufacturing and other development personnel to bring to market high quality, profitable networking products.
Established priorities and provided direction and requirements throughout the development cycle.

Attended industry trade shows nationwide, providing product-specific information to conference attendees.

Successfully launched two products (ipXpress and SSL-R6) to the market and offered both customer and technical support.

**Education**

- M.B.A., Emphasis on Information Resource Management (IRM), Westminster College, Salt Lake City, Utah
- B.S., Computer Science, Westminster College
- B.S., Marketing, University of Utah

**Certifications**

- Prince 2 Project Methodology
- ITIL (Techniques for Managing IT Infrastructure, Development, and Operations)
Emmanuel (Manos) Stefanakos

Relevant Professional Experience

Choice Solutions, Inc.

Senior Project Manager (2009–Present)

- Manage data warehouse and reporting component of multi-stranded state longitudinal data system
- Compile requirement and design documents for public dissemination of educational data
- Work with client stakeholders to establish parameters for public reports
- Coordinate scope reviews to align project plan with client requests
- Build and maintain relationships with a large list of stakeholders with differed involvement and interest in the projects

ESP Solutions Group, Inc.

Senior Project Manager (2007–2009)

- Managed multiple educational data projects of varying scale, from multi-year engagements to short-term projects
- Instituted the use of single-page “executive-level” weekly reports for client-selected stakeholders
- Created and maintained several project documents included plans and logs in several formats for easy client accessibility
- Introduced best practices from other industries to internal and client-faced processes

Coventry Health Care, Inc.

Senior Information Administrator (2005–2007)

- Managed several projects that resulted in identifying more than $30 million in otherwise uncollected revenue while also complying with government regulations
• Maintained responsibility for business analysis, process improvement, vendor oversight, creation of analysis tools including databases, senior management reports, and strategic planning

Kaiser Permanente

Project Manager (2001–2004)

• Guided regional units of national insurer on policy and reimbursement issues
• Collaborated with regional staff, vendors, and programmers to create and document processes and tools for identifying and correcting areas of non-compliance
• Created monthly reports on the progress of reconciliation and recovery efforts to and senior management
• Trained regional staff on the use of reconciliation databases
• Analyzed data to identify additional sources of revenue

Harvard Pilgrim Health Care, Inc.

Special Operations Coordinator (1999–2001)

• Managed several projects, from planning to implementation of automated databases that fulfilled previously unmet reporting needs
• Re-engineered processes to significantly reduce the amount of time and work required to complete reporting requirements

Enrollment Supervisor (1999–2001)

• Supervised a team of eight Medicare account representatives
• Acted as client project manager for several technology projects focusing on improved data analysis resulting in savings and additional revenue
• Maintained responsibility for CFO-certified reports for the federal government

Maximus, Inc.

- Authored the annual quality measurement report
- Designed and oversaw the implementation of quality evaluation and improvement projects
- Complied with government policy and contract standards
- Coordinated various internal and external sources to devise and deliver a training program for all staff on procedural and regulatory changes

Education

- BA, Political Science, University of Massachusetts Amherst
Ramesh Thuravil

Relevant Professional Experience

Choice Solutions, Inc.

AVP – Solutions Delivery (2010–Present)

- Responsible for solution delivery for multiple projects in education domain.
- Guardian for proper adherence and execution of SDLC processes.
- Interact with customers in understanding their needs and set their expectations.
- Lead 100+ person strong development team with multiple roles and groups.
- Motivate and mentor the teams to perform efficiently and effectively in meeting quality and timely deliveries.

General Electric

Senior IT Manager (2009-2010)

- Responsible for technology, architecture, development and implementation of large Securities (Fixed Income, Equities, Derivatives and Alternative Assets) Master Data Management integration project worth more than $3 MM using Tibco SOA and EAI technologies for the global investment arm of GE.
- Interacted with different application and end user groups to resolve integration issues with existing production systems.
- Provided technical and managerial leadership by leading a team of Architects and designers in the integration of components for effectiveness, performance, stability and availability.
- Liaised with senior stakeholders and set expectations on time, cost and quality metrics of the initiative.

SDG Corporation
Senior Technical Manager (2008-2009)

- Responsible for pre-sales technical interactions and post-engagement planning, setup and delivery of projects.
- Planned, mentored and guided large offshore teams to orient and bring them up to speed on new technologies and projects.
- Worked with large clients in consumer finance product domain.
- Created comprehensive project plans with optimal resource allocations.
- Implemented projects involving latest technologies in Web 2.0, Service Oriented Architecture and Enterprise Integration:
  - Implemented Mortgage and Auto Loan financing websites using IBM Process Server, IBM Portal Server, DOJO toolkit and other Open Source technologies.
  - Implemented a SOA solution for Customer Service and Collections functions using IBM WebSphere Message Broker and Sun’s Glassfish ESB and relevant Open Source standards, e.g., BPEL, WS-* etc.

Atlas Systems

Practice Head (2007-2008)

- Responsible for service delivery and business development for 3 major client accounts.
- Led teams of 50+ resources in developing and delivering solutions based on J2EE, .Net, Web 2.0 and Open Source technologies and frameworks:
  - Implemented multiple automotive dealer websites that are part of Trilogy Automotive Network.
  - Implemented browser based Automotive Service application that is used by technicians on the shop floor and well integrated with other systems.
- Mentored and worked with architects and designers to create solutions for complex design and architecture problems.
Illinois State Board of Education
ILDS Data Warehouse Contractor
Part I: Narrative Description

Project Team Organization and Staffing Response

- Improved the SDLC processes and achieved 20% improvement in output.
- Mentored and motivated teams of developers, designers and architects to apply new technologies and frameworks.

General Electric

Senior IT Manager (2002-2007)

- Worked as a Senior Development Manager for a large team of 100+ offshore development resources on a large Enterprise Contact Center project that was developed using J2EE and open source technologies and frameworks. This application handled all Customer Service and Collections functions for 90 million strong customer base of GE Money credit card portfolio. This system supported more than 8000 users across different countries and met stringent SLAs for performance, availability, scalability and maintainability.
- Saved more than USD $2 million in costs.
- Improved SDLC process by applying Six-Sigma and LEAN methodologies.
- Led a team of Architects, designers in defining and enhancing application architecture.
- Worked with senior business and IT leadership to define and set technological direction for the group.
- Prepared estimates and cost-benefit analyses for funding approvals and different yearly initiatives.
- Coordinated with teams of business analysts, QA and external application groups to implement, enhance and maintain application's changing requirements.

Education

- B.S., Information Systems, Excelsior College

Certifications
- Greenbelt 6 Sigma quality program.
- Trained and participated in multiple LEAN sessions.
Zachary R. Tussing

Relevant Professional Experience

Choice Solutions, Inc.

AVP Business Development (2009–Present)

- Lead all sales and business development for educational services division
- Establish key technical and business partnerships in the delivery of our professional services and edFusion® solution offerings
- Work closely with key clients to meet requirements and expectations as well as provide executive sponsorship

Director of Professional Services (2006–2008)

- Led professional services organization in delivering value to key account in the healthcare, publishing, and K–12 education
- Responsible for overall project P&L
- Directed staff to meet service level agreement requirements
- Executive sponsor for several key education engagements that included the development and deployment of longitudinal data systems and portals

Director of Business Development (2001–2006)

- Led sales and marketing efforts as well as strategic account and project management for various clients throughout the US
- Directed proposal response team in target industry from both a business and technical perspective
Open Systems Technologies

Sales Manager (1999–2001)
- Focused on account management and new business acquisition for 300 person technology consulting firm
- Helped establish presence in market and developed new partnerships and clients

MBS

- Managed existing accounts and focused on new business development for networked office equipment manufacturer

Education
- BS, Management, University of Connecticut

Certifications
- Currently pursuing PMP Project Management certification
Project Management Approach
Response
I.7 Project Management Approach Response

Project Management Approach (1.7.a)
PCG's project management team will be responsible for ensuring that ILDS data warehouse design, development, and implementation work are occurring within the proposed project workplan timelines and that any risks, changes, or issues are addressed in a timely manner. The project management team will be responsible for delivering updated project workplans, schedules, budgets, project deliverables, and status updates. PCG will develop Deliverable Expectations Documents in agreement with the ISBE project managers, to ensure that deliverables submitted are in accordance with Project Sponsor expectations.

PCG will attend weekly ISBE ILDS Project Status meetings and monthly executive status meetings as requested. PCG will also be available to attend monthly ILDS Data Advisory Committee meetings. PCG will submit weekly status reports to the ILDS project manager, prior to each weekly status meeting. The PCG project management team will also submit updated workplans to the ISBE ILDS Project Sponsors with the first status report of each month.

The weekly status report will be submitted in Microsoft Excel and will include:

- Project Log Containing:
  - Weekly accomplishments
  - Completed tasks
  - Activities and tasks in progress
  - Previous planned activities and tasks not accomplished, the reason for not accomplishing them, anticipated timeline and plan for bringing them back on schedule

- Risk Management Log, containing:
  - Risks and costs associated with planned activities and costs not accomplished
  - Issues and anticipated problems
  - Recommendations for issue and problem resolution

- Deliverable Status Log, containing:
  - Anticipated deliverable due dates
  - Deliverable completion status

The snapshot below is an example of a PCG Project Log, which contains a list of tasks, task owners, and task completion by week for PCG's data architecture contract with ISBE.
Table 7.1 PCG Sample Project Log

PCG's project management approach involves holding daily working sessions with the ILDS project manager, using WebEx to include the larger project team. This approach allows PCG and ISBE to be aware, as they happen, of any issues that may arise that impact the project.

Daily, PCG will review the Project Log, updating current tasks and adding new tasks as applicable. When necessary, PCG will review the Risk Management and Deliverable Status Logs. The Project Log will list all applicable tasks and the task owner, by week. Any tasks not completed will be revisited in the following week.
week, and expectations for completion of the tasks will be re-examined. Tasks may rely on collaboration with ISBE, and scheduling resources can be a barrier to completing tasks within the anticipated timeframe. PCG will note which tasks have not been completed in the expected timeframe.

Review of the Risk Management Log will be driven by identification of risks and by addressing their resolution. PCG and the ILDS project managers will review existing risks periodically during the daily working sessions. Likewise, the Deliverable Status Log will be reviewed as needed, driven by the deliverables schedule. The Deliverable Expectations Documents will be reviewed in conjunction with the Deliverable Status Log, providing clear overviews of what is expected of deliverables and when.

The daily working sessions will also provide PCG and ISBE with time to debrief on any project activities or meetings that occurred during the week, and to review Illinois specific and national issues related to longitudinal data systems. PCG feels this process best engages the ILDS project managers and provides the entire project team with clear expectations of the scope of work and status of the project.

Working with the ILDS project managers, PCG will develop the project management deliverables identified as Deliverable 2:

- Project Workplan
- Issue Plan
- Risk Plan
- Quality Management Plan

See section 1.7.c, Deliverables Descriptions, for outlines of the project management deliverables.

**Proposed Project Workplan (1.7.b)**

PCG has developed the Project Workplan displayed below. Within this workplan, we anticipate completing all work within 12 months from project kick-off, assuming no adverse impacts from the availability of ISBE resources to the project. PCG proposes implementation support for six months and additional warranty support for one year. Upon contract acceptance, PCG will work with ISBE to modify the workplan and to include specific deliverable dates.

PCG intends to include ISBE resources in the project work. PCG's project management team will hold daily working sessions with ISBE's project managers. Additionally, PCG will work with the data specialists, database administrator, and data stewards to ensure that ISBE staff will have the infrastructure to continue to evolve the ILDS project after the data warehouse work is completed.

**Project Workplan**

Included below is PCG's project workplan for the ILDS Data Warehouse. The workplan includes tasks and dependencies, milestones and deliverables, and notes any activities that involve ISBE resources. Note that tasks will occur for all ISBE systems as they do under SIS in the below workplan. Upon project kick-
off, PCG and ISBE will develop an updated, mutually agreed upon project workplan, and PCG will submit a detailed workplan in Microsoft Project.
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<tr>
<th>ID</th>
<th>Task Name</th>
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<th>Finish</th>
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Deliverables Management Approach and Deliverables Descriptions (1.7.c)

Deliverables Management Approach:
PCG will follow the steps below to manage deliverables submitted to ISBE:

- Initiation – Kick off project, meet with ILDS project director, review key starting documents
- Analysis – Document project activities and milestones, analyze work product
- Feedback – Check with stakeholders for areas of emphasis, ensure deliverables are aligned to project expectations.
- Final Deliverable – Deliver high quality action-oriented deliverables, supporting data, presentations.

The following section is a narrative that elaborates the details of what is contained in each step in the process and the deliverables ISBE can anticipate.

The PCG Education approach to meeting the needs of the State will be based on a collaborative, facilitated effort that provides a high quality result. We have provided a detailed timeline, work plan and a list of deliverables in this proposal response in order to facilitate a quick project start upon contract signing. After contract signing and prior to project initiation, PCG Education will develop documentation of deliverables that will serve as a roadmap for the subsequent Analysis phase. PCG Education will also develop a communication plan, clearly identifying roles and responsibilities by task and stakeholder. We anticipate meeting with ISBE stakeholders and the contract manager immediately after contract signing to define stakeholder roles, discuss the communication plan, present and discuss the revised work plan, and draft deliverables. Based on the initial analysis and discussions, we will coordinate with the contract manager any needed approach changes or any modifications to the work plan.

We will work closely with ISBE to develop a set of strategies to review project activities for readiness for deliverables. PCG will review deliverable outlines with ISBE stakeholders and will review the Deliverable Expectations Document with the ILDS project managers, to set expectations for the document. PCG will work with engineering, QA, and interoperability teams to ensure that the document is representative of the work performed.

PCG Education will prepare a draft report for each deliverable with easy-to-understand tables, charts, and graphs along with appropriate interpretations.
analysis, and how-to-use guidelines for ISBE to review and approve. PCG Education has significant relevant experience in the area of creating reports that are easy-to-use and that lead to further analysis and action. These reports show our commitment to ensuring that consumers of the deliverables understand the context, are familiar with key terms, are exposed to the research and activities behind the deliverables, and are prompted to think about how the project might impact their work.

Following ISBE review and approval of the draft deliverable, PCG Education will create the final deliverable including a concise executive summary suitable for sharing with stakeholders and executive staff, including source materials and/or raw data developed for the ISBE project worksite.

Presentation

It is standard practice for PCG Education to prepare PowerPoint presentations and other materials for oral presentations to clients and client stakeholder groups to summarize the results of survey and evaluation projects and make recommendations for improvements. PCG Education has substantial experience presenting to top state and legislative personnel. We will work closely with ISBE to determine how results will be summarized and reported in this presentation, including preparing a draft PowerPoint and other materials for review and final approval.

Deliverables Description:

The table below lists each ILDS Data Warehouse deliverable, the project team responsible, and the format of the deliverable. Following the table is a general description of what each deliverable will contain. PCG will submit draft deliverables in the timeframe agreed upon in the finalized workplan and will coordinate deliverable reviews with the ILDS project manager. Formal deliverable walkthroughs will be scheduled with the project sponsors based on identification of deliverables as major project deliverables.

<table>
<thead>
<tr>
<th>ILDS Data Warehouse Deliverable</th>
<th>Team Responsible</th>
<th>Format of Deliverable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Weekly and Monthly Status Reporting</td>
<td>PMO</td>
<td>Word/PowerPoint</td>
</tr>
<tr>
<td>2. Project Management Plan</td>
<td>PMO</td>
<td>Excel/MS Project/Word</td>
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<tr>
<td>3. Requirements</td>
<td>PMO</td>
<td>Word</td>
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<tr>
<td>4. System Design</td>
<td>PMO</td>
<td>Word</td>
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<tr>
<td>5. Detailed Design</td>
<td>PMO</td>
<td>Word and Tool agreed upon by ISBE and PCG</td>
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<tr>
<td>6. Unit Test Plan</td>
<td>QA Team</td>
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<tr>
<td>7. Software and Components Unit Test</td>
<td>QA Team</td>
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Deliverable 1: Weekly and Monthly Status Reporting

PCG will provide weekly written status reports throughout the life of the project. The reports will contain:

- Work completed during the reporting period;
- Activities underway during the reporting period;
- Work scheduled to commence in the next two reporting periods;
- Status of work against the project work plan including the efforts that are underway and any deviations from the planned work schedule; and
- Status of issues and risks.

PCG will work in conjunction with the ILDS Project Manager to prepare the weekly status reports for the ILDS project. PCG will provide support to the ILDS PMO in the production of monthly status reports for ED and for monthly executive management reports.

Deliverable 2: Project Management Plan

PCG has outlined the following deliverables, which will be submitted as the Project Management Plan:

- Project Workplan – Upon start of the project, PCG will update the Workplan in accordance with expectations of the ILDS project sponsors. The workplan will include:
  - A detailed timeline, including durations for each task
  - Project phases

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Jan 5, 2011
Part I: Narrative Description

**Project Management Approach Response**

- Task owners - both the PCG team and the ILDS team
- Task dependencies
- Project milestones
- Deliverables – including draft dates and timelines for ISBE acceptance

**Issue Plan** – PCG will deliver to the ILDS project sponsors a detailed issue plan. The plan will contain:
  - Roles and Responsibilities, for PCG team and ILDS team
  - Process Flow, showing timeline for identification and resolution of issues
  - Issue Management Procedures, defining the process flow
  - Issue Tracking Forms, if requested by ISBE

**Risk Plan** – PCG will deliver to the ILDS project sponsors a plan for risk identification and risk management. The plan will contain:
  - Roles and Responsibilities, for PCG team and ILDS team
  - Risk Identification Procedures
  - Risk Management Activities
  - Risk Tracking Document

**Quality Management Plan** – PCG will deliver to the ILDS project a sponsors a Quality Management Plan (QMP), containing:
  - Roles and Responsibilities, for PCG team and ILDS team
  - Quality Management Procedures
  - Quality Management Activities
  - Quality Management Tracking Documents, if requested by ISBE

**Deliverable 3: ILDS Data Warehouse Requirements**

PCG, with ISBE staff, will review and analyze the data warehouse logical models and schemas (including the ODS, staging, EAV, RDS, and EDEN Data Mart), ETL mappings and report mappings produced as part of the ILDS data architecture, and the requested data warehouse portal functionality. Through this review and analysis of systems targeted for the ILDS project, PCG will perform the work necessary to:

- Confirm the systems and data that will be included in the ILDS data warehouse;
- Identify the composition of the information that will populate the ODS, staging, EAV, RDS, and EDEN Data Mart data warehouse structures;
- Detail the functionality to be included in the ILDS data warehouse portal, including extract capabilities, analysis tools, role-based functionality, and the security features; and
- Confirm the set of reports that are to be transitioned to the data warehouse and data warehouse portal, including the visualization features and graphics that will be incorporated into the reports.
PCG will review and incorporate information from data architectures and data warehouses from other state education agencies as part of the analysis process to build a set of ILDS data warehouse requirements that will provide the basis for development of the Data Warehouse System and Detailed Design deliverables.

The ILDS Data Warehouse Requirements deliverable captures and organizes the requirements and supports confirmation by ISBE of the content and make-up of the data warehouse components.

Deliverable 4: ILDS Data Warehouse System Design

PCG will develop the selected content and produce the ILDS data warehouse system design. The system design will provide foundational information including the architecture of the ETL processing that populates the warehouse, the architecture of the data warehouse portal, and the architecture of the report processing for the ILDS data warehouse solution. The system design will contain:

- ETL Architecture, including:
  - The software and RDBMS tools that will be used to perform ETL processing.
  - The ETL tool and processes to extract, cleanse, aggregate, transform and validate data as necessary to ensure data is accurate, consistent, and loads correctly.
  - An explanation of ETL operations.
  - Processing that will be executed to create the initial data stores and an explanation of what approach is used in the event that data must be reloaded.
  - Insert/update/delete processing for ILDS structures, including how the ETL processing is executed to maintain longitudinal data structures and how dimensional data are maintained for new records, updates to existing records, and maintenance in the event that source records are merged or deleted.
  - The output that will be generated by the ETL processes that supports tracking of results and reporting of errors that may be encountered, including the approach to addressing records that might be rejected or not completely loaded during ETL execution.

- Data Warehouse Portal Architecture, including:
  - Development tool and software to be used in the construction of the portal.
  - How the portal will organize and display reports to the user community.
  - How the portal will provide role based capabilities, including:
    - Report authoring, report staging and scheduling role to support administration of the report content of the portal;
    - Public access role to view predefined reports, including parameter driven reporting when supported by the report(s);
Administrator role that enables authorized users to manage the portal and portal content;
Analyst role that supports access to ad hoc reporting and analysis tools; and
Researcher role that supports access to data extract and download capabilities.

Online help presentation.

• Reporting Architecture, including:
  • Reporting tools or software to be used to construct reports;
  • How the approach will integrate reports within the portal;
  • How the architecture supports and accomplishes report generation, batch processing, and distribution of reports;
  • Identification of reporting features that will be supported;
  • Approach to restrict views of data, in particular to prevent the identification of individuals based on presented results;
  • How the reporting architecture will accomplish the archiving of reports and access to previous report instances;
  • How the architecture will support user defined reports, ad hoc report construction, and the saving and distribution of user defined reports; and
  • The mechanism to support the capture of audit information, including user report requests and data viewed by users.

• Maintenance and Operations, including:
  • Maintenance windows – identification of the ETL processing and maintenance periods for the repositories;
  • Performance monitoring – how operational support resources monitor the performance of the repository, both during user access periods and during maintenance and data loading processing;
  • How report scheduling and batch operations are established; and
  • Email integration and report distribution mechanisms.

• Security Strategy – PCG will define and document a security approach, including how security is implemented to protect and secure data. The approach will include defining and managing security levels for the data warehouse portal and data repository, and the capabilities associated with the security levels. It will also define a control approach for the data repositories that prevents unauthorized access to the data and should address data encryption for storage and transmission of data.

• Technical infrastructure – PCG will identify the infrastructure needed to support the warehouse and associated components, including servers to deliver the data warehouse portal, report
content, RDBMS, and ETL processing. PCG will define the data storage requirements and the configuration of storage devices for the repository, including the configuration of the development and production data storage arrays. Data storage requirements will be defined for project startup and will also include sizing estimates for a five year growth period to support infrastructure planning.

- **Component Performance** — PCG will define and present the approach for evaluating the performance of each component and for optimizing performance of the modules. PCG will define an architecture for each of the components such that the components support ISBE business practices and users are able to successfully use the warehouse to accomplish their work in an efficient and timely fashion. The deliverable will present an overall architecture of the components that ensures that the design and construction approach incorporates industry-accepted best practices, ensuring component performance is optimal. This approach should include evaluation of data access requests and the tuning of SQL, indexing of data structures, and if necessary the pre-staging or aggregation of data that is needed for optimal performance. Response times for report and data requests must be optimized to retrieve and present the data with minimal waiting.

- **Configuration Management** — PCG will include the approach used to perform configuration management of the software, tools and components used to construct the data warehouse.

**Deliverable 5: ILDS Data Warehouse Detailed Design**

PCG will perform the activities necessary to develop the content and subsequently produce the detailed design of the ILDS data warehouse, including:

- PCG will develop the designs for the physical models for the ODS, staging, EAV, RDS, stores, and EDEN Data Mart that comprise the data warehouse and dimensional reporting database structures. The physical models must be compliant with State of Illinois and ISBE policies, standards, and guidelines. Models will include the physical table structures, primary keys and constraints, triggers and other database constructs that support implementation of the repositories.

- The detailed design will include the identification of updates needed for the ISBE Data Architecture documentation and data dictionary to include the data warehouse physical data structures as part of the data architecture display tool.

- PCG will develop the detailed designs for the ETL processes to be used in populating the ODS, staging, EAV, RDS, and EDEN Data Mart that comprise the data warehouse and dimensional data structures. Design content will provide source and target mappings for data; calculations and aggregations when appropriate; insert, update, and delete processing for longitudinal data structures; operational information including execution...
schedule and execution scripting, error processing, and execution results reporting for each of the ETL processes.

- ETL processing routines include processing to build both the EDEN Data Mart and the extracts for generating the files required to support EDEN federal reporting.

- PCG will develop detailed design materials for the data warehouse portal. The design will include the layout of the portal, edits and validation routines, navigation, and security protocols and processing. The portal will support a role based approach to accessing reports, analysis tools, and portal features, and will include the following roles:
  - Administrative role that supports report authoring, report staging and scheduling role to supports administration of the report content of the portal;
  - Public access role to view predefined reports, including parameter driven reporting when supported by the report(s);
  - Administrator role that enables authorized users to manage the portal and portal content;
  - Analyst role that supports access to ad hoc reporting and analysis tools; and
  - Researcher role that supports access to data extract and download capabilities.

- The portal will prevent the display or identification of individual student information. The portal will:
  - Present and provide access to reports in an intuitive, user friendly layout that minimizes the need for user training and support;
  - Provide access to links for online user help and to other report portals and systems;
  - For authorized roles, support access to analysis and research tools;
  - When appropriate, support drill-down capabilities into report data;
  - Support parameter driven reporting;
  - Provide for the archiving of reports and for the display of archived report versions;
  - Support the capability to execute reports in a batch mode;
  - Support multiple output formats, including PDF, HTML, Microsoft® Excel, RTF, or CSV;
  - Implement security to protect the privacy of ISBE education data; and
  - Capture audit information of report requests and data viewed.

- PCG will develop report designs for the set of ISBE reports that are targeted for transition to the data warehouse. Report design content will include:
• Report layouts, including detail, subtotal and total report lines and report graphics and visualization features (e.g., bar graphs, pie charts, dash boards);
• Americans with Disabilities Act (ADA) presentation of data (if needed);
• Data sources and logic for accessing the data;
• Calculations and aggregations for the reports;
• If applicable, the use of parameters for selecting data subsets;
• Drill through, sorting and filtering capabilities for the reports;
• Execution information – batch, on demand, etc.; and
• Data warehouse portal integration – how the reports are presented and integrated into the portal.

• The detailed design will include performance tuning information for those data warehouse components that access or present data.

• PCG will define and document the security model for the ILDS repository. This includes the approach, including structures and processing, that implements security for ILDS. The model includes security for the data warehouse portal, reports and for the data repositories and processes used to extract and populate them.

Deliverable 6: ILDS Data Warehouse Unit Test Plan

PCG will develop the ILDS Data Warehouse Unit Test Plan, describing the approach to be taken for performing unit testing of the data warehouse components. Components will include ETL processes, reports, the data warehouse portal, security processes and tools. The test plan describes the scripts that guide testing activities and the tracking and recording mechanisms that support the management of the unit testing activities.

The Unit Test Plan will define and present the following components:

• Test processes and how each of the components will be unit tested, including the use of test tools;
• Testing schedule;
• Format and quantity of test scripts and scenarios to be developed;
• Physical location of the testing and any testing procedures;
• Establishment of test data;
• Contractor and ISBE resources required in the performance of the testing; and
• Management approach.

Construction and submission of the Unit Test Plan deliverable will align with and reflect the implementation approach proposed by PCG.
Deliverable 7: ILDS Data Warehouse Software and Components Unit Test Results

PCG will construct and perform unit testing of the ILDS components, and will document and present the results of this testing in the ILDS Data Warehouse Software and Components Unit Test Results deliverable. The deliverable will describe the construction and testing activities, summarizes the results, and includes unit checklists and other documentation that is produced during the construction and unit testing tasks. The deliverable will present the results of unit testing activities, and signals the completion of the construction and unit testing, and the transition of tested components to system testing.

Deliverable 8: ILDS Data Warehouse System Test Plan

PCG will build the ILDS Data Warehouse System Test Plan, and present the approach to be used in system testing the various data warehouse components. The test plan will include the testing approach to be used for:

- ODS, staging, EAV, and RDS data stores;
- EDEN Data Mart;
- ETL processes;
- Data warehouse portal; and
- Reports.

The System Test Plan will describe the test scripts, test scenarios and other materials that guide testing activities, and the tracking and recording mechanism that supports the management of the system testing activities. The plan will present the approach to establishing test environments, for development of test data, and defines the testing schedule and resources that will be performing or supporting the test activities.

This deliverable will define and present:

- Test processes and how each of the components will be system tested, including the use of any test tools;
- Testing schedule;
- Format and quantity of test scripts and scenarios to be developed;
- Physical location of the testing and any testing procedures;
- Establishment of test data;
- Contractor and ISBE resources required in the performance of the testing; and
- Management approach.
Deliverable 9: ILDS Data Warehouse System Test Scripts

The ILDS Data Warehouse System Test Scripts deliverable is the set of test scripts, test scenarios and materials used to guide integration and system testing of the data warehouse components. PCG will develop test scripts and materials to be used for system testing the following:

- ODS, staging, EAV, and RDS data stores;
- EDEN Data Mart;
- ETL processes;
- Data warehouse portal; and
- Reports.

Deliverable 10: ILDS Data Warehouse System Test Results

PCG will perform system testing of the ILDS components as defined in the System Test Plan, and will construct the ILDS Data Warehouse System Test Results deliverable to present the results of the system testing activities. This will include results of test script and test scenario execution, and information on testing incidents found and corrected. The deliverable will include as attachments completed system test scripts and other documentation that is produced during the system testing tasks.

Deliverable 11: ILDS Data Warehouse Acceptance Test Plan

PCG will develop the ILDS Data Warehouse Acceptance Test Plan deliverable describing the approach to be taken for performing acceptance testing of the data warehouse components. The deliverable, developed with ISBE resources, will present the approach to be used for acceptance testing by ISBE resources of the various data warehouse components. The test plan will include the testing approach to be used for the following:

- ODS, staging, EAV, and RDS data stores;
- EDEN Data Mart;
- ETL processes;
- Data warehouse portal; and
- Reports.

The Acceptance Test Plan will describe the test scripts, test scenarios and other materials that guide testing activities, and the tracking and recording mechanism that supports the management of the acceptance testing activities. The plan will present the approach to establishing test environments, for development of test data, and define the testing schedule and resources that will be performing or supporting the test activities. The test approach will include how component performance is evaluated and verified.
PCG will coordinate with ISBE, who will be responsible for identifying test resources, performing the testing, and assisting in the tracking and management of the test activities, as well as assisting with the construction of the Acceptance Test Plan deliverable.

**Deliverable 12: ILDS Data Warehouse Acceptance Test Scripts**

The ILDS Data Warehouse Acceptance Test Scripts deliverable is the set of test scripts, test scenarios and materials used to guide acceptance testing of the data warehouse components by ISBE resources. PCG will develop test scripts and materials to be used for acceptance testing of the following components:

- ODS, staging, EAV, and RDS data stores;
- EDEN Data Mart;
- ETL processes;
- Data warehouse portal; and
- Reports.

Testing will validate that the component operates correctly, and that performance will support operation of the components in the ISBE environment. Acceptance test scripts, test scenarios and materials will be modeled from system test scripts and materials.

**Deliverable 13: ILDS Data Warehouse Acceptance Test Results**

The ILDS Data Warehouse Acceptance Test Results deliverable presents the results of the acceptance testing activities for the warehouse components, including results of test script and test scenario execution, performance validation of each of the components, and summary information on testing incidents found and corrected. The deliverable will include completed acceptance test scripts and other documentation that is produced during the acceptance testing tasks.

PCG will support ISBE acceptance test personnel to perform acceptance testing to verify the "production readiness" of the components from the perspective of those who will use or support the application. Testing will include validation that the component performance is optimized and able to support the user's business needs. Performance validation will include optimized response times to report data requests, including the use of batch report generation and other data gathering techniques that support timely presentation of information.

PCG, working with ISBE, will analyze and evaluate performance of data warehouse components, telecommunication networks, hardware, and software to validate performance of the components and submit results of this analysis in the deliverable. PCG will make the changes necessary to the ILDS components to meet performance expectations, and may suggest changes to system settings to improve and optimize performance. Completed tests, both successful and unsuccessful, will be documented in the test results with a summary description of the test outcome.
ISBE resources, with PCG support, will perform acceptance testing of the components. PCG will assist with testing activities, and will track and record the acceptance test activities.

**Deliverable 14: ILDS Data Warehouse Operations Training Materials**

The ILDS Data Warehouse Operations Training Materials deliverable will develop the materials that will enable ISBE operations staff to support and maintain the ILDS components. PCG will develop the training materials to provide information for the following areas:

- **Help desk** – PCG will define what procedures are used for addressing help desk calls on the data warehouse portal, reports accessed through the portal and responses to inquiries on data extracts. Materials will address both level 1 and level 2 calls with procedures and information that allows help desk staff to validate problems and determine next steps towards resolving the calls. PCG will develop help desk processes and procedures materials to promote reliable, consistent, and effective responses by Help Desk personnel. The materials will address the communication approach, issue escalation procedures and reporting requirements.

- **Software build** – PCG will define and document the build processes for software components including the data warehouse portal and define what steps are followed to change or update the data warehouse portal and ETL processes.

- **Report development tools** – PCG will provide training materials for the development tools used to construct the ILDS reports targeted for transition to the ILDS repository. The materials will provide guidance on using filtering, aggregation, standard reporting, extract functions and other features that supported by the report development tools.

- **Report publishing** – PCG will define how reports are published to the warehouse portal, including building new folders or other mechanisms that organize and present the data in an intuitive, user friendly fashion.

- **ETL scheduling and execution** – PCG will define how ETL processes are scheduled, what steps are taken to view execution progress, and how processes are validated for completion. This information will address what steps are taken to troubleshoot in the event of an issue, and how to restart processes in the event processing halts unexpectedly.

- **Report execution scheduling and batch processing** – present how reports are scheduled for automatic execution, and how batch or offline report execution is monitored. Information should also include how to troubleshoot report execution in the event processing halts unexpectedly.

- **Security setup and maintenance** – PCG will define how security is maintained for the data warehouse portal, including the maintenance or building of security for role based access to the portal content. Security maintenance for the data repositories and ETL processes will be included.
Maintenance procedures - PCG will include maintenance procedures for the data repositories, including backup schedules, reorganization and rebuilding of database structures and other database maintenance procedures associated with the repositories, ETL processes and reports.

The deliverable will be divided into the:

- Developers Manual - Which will outline and detail operating, maintenance, development, processes, standards, procedures, plus any other technical information required to fully support ILDS components.
- Operations Manual - Which will present the information needed to operate the ILDS components, and to troubleshoot issues that may arise.

Deliverable 15: ILDS Data Warehouse Operations Training Results

PCG will provide operations and technical training on the ILDS components, with sufficient detail and supporting materials that ISBE staff with will be equipped to operate and maintain the ILDS environment and components. PCG will work with the State to identify knowledge gaps and training needed by ISBE staff to accomplish the ILDS transition to State control. PCG will train ISBE staff in building and maintaining reports.

Training will address the following operational support areas:

- Help desk; build processes for software components, including the data warehouse portal; report development tools; report publishing; ETL scheduling, execution, and troubleshooting; report execution scheduling, batch processing, and troubleshooting; security setup, administration, and maintenance; maintenance procedures for the data repositories; system architecture training, including database structure and design, ETL architecture, and report and query architecture; maintenance training, including system administration, system operation, database management, security administration, web administration, and data administration.

PCG will provide training to database experts, application and technical experts, help desk resources, and report development resources on the operations of the warehouse components. Training for help desk workers will include an ILDS overview and specialty training to recognize and interpret errors, connection problems, and other common or expected technical issues. PCG will be responsible for scheduling and conducting comprehensive operations, technical application and development methodologies training on ILDS components for ISBE staff.

This deliverable will describe the results of the operations training provided. Information will document the methods used to deliver the training, the number and types of resources trained, when the training was provided, and attendance for the training sessions.
Deliverable 16: ILDS Data Warehouse Implementation Plan

PCG will develop an implementation plan that presents the steps to be followed to pilot and place into production the data warehouse components. The plan will detail the communication, coordination and training activities, performance criteria, assessment tools, and feedback processes for preparing for and conducting the pilot and the production implementation. This document will validate the implementation process and tools, and certify the ILDS application, technical environment, help desk and user support materials as ready to move to full production implementation.

The plan:

- Supplies a timeline for pilot of the data warehouse components and the production implementation timeline of the components.
- Defines an implementation communication plan, including internal and external web communications.
- Defines the technical readiness of the infrastructure to support implementation.
- Documents how and when to monitor and report on implementation readiness.
- Defines what contractor, ISBE, and education partner resources will participate in the Pilot activities and implementation, including what roles the resources will fill, and the timeline for resource support of the implementation effort.
- Establishes pilot and production performance criteria that can be used to determine if the components are production ready.
- Establishes the contingency plans that will be put in place in the event that unexpected circumstances occur during the implementation.
- Includes any initial or one-time execution or processing that may be needed to support implementation.
- Defines the approach for reaching a go-live decision, including ISBE resources that will participate in the go-live decision for each of the data warehouse components.
- Describes the baseline expectations for the new ILDS at the time of turnover.
- Defines approval and transitioning of the components to ISBE resources, and closeout procedures.
- Builds an Implementation Checklist.
- Defines the approach to providing post-implementation support and the timeline of the support activities.

This deliverable will provide the approach, timeline and activities required to transition the knowledge and responsibility of operating, supporting and maintaining ILDS from PCG to ISBE staff. The deliverable will define roles and identify ISBE staff responsible for the roles to ensure staff are fully prepared to take
over the responsibility. The scope of the plan will address the roles and responsibilities for the following areas:

- Data Warehouse maintenance, including ETL processing, data warehouse portal, and security;
- Configuration and release management;
- Database Administration of the warehouse RDBMS;
- Development and testing environment maintenance;
- Application, reporting, and data base server support;
- Security configuration and maintenance;
- Documentation;
- Production monitoring and control;
- Training support; and
- Help desk support.

**Deliverable 17: ILDS Data Warehouse Pilot Implementation and Recommendations**

PCG will conduct a pilot to certify the components meet requirements and to validate the implementation process and will document the results in this deliverable. For the pilot, the components will be accessible to a select set of users. The use of the components provides information on how business processes are affected by the implementation of ILDS, allowing ISBE to plan for the full implementation. PCG will fix known and discovered system errors and will install updated software. Every category of work reflected in the ILDS data warehouse components will be part of Pilot activities. PCG will provide assistance to ISBE to support pilot users remotely from the project site and via the Help Desk. Software defects will be tracked and addressed via the application maintenance process. During the pilot, PCG will perform capacity benchmark tests to analyze the system performance and predict future requirements.

Progress will be evaluated against the pilot performance criteria established in the implementation plan to determine the overall success of the pilot, and adjustments that need to be made prior to the beginning of the statewide implementation activities will be identified. At completion of the pilot, PCG and ISBE will assess the results, modify implementation and support processes, and continue with implementation when ready and when the go-ahead is issued by the ISBE Project Sponsors.

We will train Help Desk to be available at the start of the pilot. Help Desk staff will receive training in the new ILDS functionality and supporting materials. PCG will insure that they clearly understand their role and responsibility as part of the Pilot process.

Pilot participants will be fully informed of their testing responsibilities and understand their important role in the ILDS Project. PCG will provide ILDS overview information in their area of work as well as
training in the pilot process and communication of their results and experiences. PCG will provide user training and support materials as part of the pilot.

The Pilot Implementation and Recommendations deliverable describes the results of the pilot implementation and includes information on:
- Pilot sites and users that participated in the Pilot activities;
- The content or components that were included in Pilot;
- Results of the pilot including incidents reported and resolved; and
- Recommendations in preparation for production implementation – this includes recommendations for adjustments to the implementation schedule or component implementation approach.

**Deliverable 18: ILDS Data Warehouse User Training and Support Material**

PCG will develop a set of materials that provides end user training and support information for the ILDS repository. The primary mechanism for training delivery and access to the training and support materials will be online through the data warehouse portal. User training materials will provide an easy-to-navigate source of guidance for using the ILDS data warehouse and will minimize the need for support resources. Users will be able to search and quickly find training materials targeted to the functions supported by the warehouse and the portal, with navigation assisted by links and other methods that quickly direct users to the information they seek.

Training materials will be provided in
- Data Warehouse Portal Web Materials: Layout of warehouse portal; accessing reports; entering of report parameters; drill down and drill through navigation; printing of reports; extracting of report data; report development and publishing; and other features.
- Report Generation Tool: PCG will provide training guides to assist end users authorized to create ad hoc reports. The report generation tool will come equipped with documentation, including user guides and “How do I” guides, and PCG will supplement this material with additional information tailored to the ILDS repository and platform.

**Deliverable 19: ILDS Data Warehouse Implementation Memo**

PCG will prepare a Data Warehouse Implementation memo that details the results of the production implementation of the data warehouse components. Successful implementation and transfer of the ILDS data warehouse to ISBE is the primary goal of the project. PCG, with support from the ISBE resources, will implement ILDS throughout the State.

PCG will provide post implementation support of two months of primary support and two months in a secondary support role. At the conclusion of onsite activities PCG will deliver the implementation report which summarizes the results of the implementation activities.
As part of implementation, PCG will focus on fine-tuning the system and preparing ISBE staff to support it. To accomplish a smooth transition to ISBE staff maintaining the system, PCG will perform production support tasks in two phases. The first phase focuses on achieving system stability, wrapping up the system documentation and supporting ISBE staff as they take more responsibility for system operations and enhancements. PCG will provide this support for this phase for two months after all components are placed into production. The second phase will focus on transitioning responsibilities from PCG to ISBE for ownership of maintenance and operations.

During phase 1 and phase 2 of implementation support PCG will:

- Perform Defect Resolution – PCG will resolve defects discovered during rollout.
- Perform Performance Monitoring and Tuning – PCG will provide ongoing performance measurements to ensure system performance is acceptable in the production environment. PCG will be responsible for identifying and resolving potential performance issues and working with ISBE staff to manage and coordinate solutions. Performance monitoring results and summaries will be made available for review on a weekly basis throughout the transition period.
- Support help desk resources in resolving ILDS related calls.

The implementation memo will include lessons learned and evaluation of exit activities, along with:

- Number of records read from data sources and populated in the warehouse;
- Production jobs schedule implementation, including ETL processing and batch report generation;
- Number of reports hosted in the data warehouse portal;
- User access to the portal, including what user interactions have occurred during the initial implementation period of four months; and
- Performance tuning recommendations, based on implementation results, what tuning is needed to ensure optimal performance of the warehouse components.

**Deliverable 20: Initial ILDS Data Warehouse User Training and Support Memo**

As part of the pilot of the ILDS repository and portal, PCG will work directly with the pilot participants to introduce them to the ILDS repository and to the end user support materials. Initial user training and support will take place over 30 business days surrounding Pilot. Support will include one day of classroom training and familiarization, and on call support provided on an as needed basis for the thirty day period. Based on feedback from this activity, PCG will refine the end user materials in preparation for statewide implementation of the ILDS.

As part of statewide implementation, PCG will monitor the online usage of training and support materials, and based on help desk calls and user feedback will implement updates and refinements in the materials as needed. This monitoring will occur for two months coinciding with production implementation of the ILDS data warehouse portal.
At the completion of the production support period, PCG will develop and deliver a memo that will indicate the completion of the delivery of initial user training and support activities. The memo will document the number of users trained, the number of access requests made of the online training materials, the number of help desk calls received, and general information regarding updates to materials and the support provided under this task.

**Deliverable 21: ILDS Data Warehouse Ongoing Support Completion Memo**

After implementation of the ILDS repository and portal, PCG will provide ongoing support and perform the following:

- For 12 months following the successful rollout and implementation support period for ILDS PCG will provide Warranty support services.
- PCG will prepare a library of the deliverables produced over the course of the project along with any documentation created by the contractor to assist them in their activities. PCG will provide a “table of content” for the library that lists the name, type of document, and document description.
- Upon completion of successful turnover to ISBE and the completion of the post implementation support activities PCG will provide the State with a final ILDS Data Warehouse Ongoing Support Completion Memo. This memo will summarize the transition activities that took place, as well as current system status information, and outstanding problems and recommendations for system enhancements. The memo will provide assessments, conclusions and recommendations with regard to ISBE’s ability to perform maintenance, technical support and administrative support of the new ILDS.

**Workplan Management Approach (1.7.d)**

PCG’s Project Management approach also applies to the project workplan. During daily working sessions with the ILDS project manager, PCG will identify any issues with or changes to the workplan, discuss possible updates to workplan timelines, and compare the actual workplan against the baseline workplan. The PCG team will share the workplan daily via the WebEx session, allowing all participating project members to review the current workplan and coinciding project tasks. Presentation of the project workplan will include both the baseline plan and the actual plan, should they deviate. Changes between the two plans will be monitored and submitted in weekly status updates by PCG project management.

Communication with the project sponsors of deviations from the baseline workplan will be via written document and discussed at the weekly project status meetings with project sponsors, when applicable. PCG and ISBE will agree on any major changes to the project workplan before they are implemented.
The figure below is an example of how PCG would track progress to a current workplan, while monitoring progress against the baseline. This example involves two tabs in a Microsoft Excel document, but would take place in Microsoft Project at ISBE’s request.

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Component</th>
<th>Status</th>
<th>Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Project</td>
<td>Deliverable 1: Weekly and Monthly Status Reporting</td>
<td>Complete</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Deliverable 2: Project Management Plan</td>
<td>Ongoing</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>Deliverable 3: Financial Reporting</td>
<td>In progress</td>
<td>50%</td>
</tr>
</tbody>
</table>

**Figure 7.2 Current Project Workplan**

Project Management Plan Components Approach (1.7.e)

Risk Management (1.7.e.i)

Risks are inherent in every project regardless of the size and complexity. In any project the following risks may arise, all of which need to be managed effectively from the start of the project:

- Commitment for the project is not achieved early on or kept with Project Sponsors, Executive Management and other stakeholders;
- Project scope is not clearly identified early in the project and then managed effectively throughout the project;
- Needs and requirements are not well defined;
- The procurement is not structured in such a way that it negates the risk of protest;
- Evaluation criteria and the evaluation plan are ambiguous;

The PCG Risk Management Plan documents the approach, procedures, and tools used to manage risk associated with the project. A risk is any factor that may potentially interfere with the scope, time, cost or quality of the project, and it is the recognition that a problem or opportunity might occur. By early identification and recognition of potential problems, the project can attempt to avoid or minimize a problem through proper actions. The PCG Project Management Team will track and manage risks during the project, however all project stakeholders may identify risks and support their management and resolution. The State will be briefed on risk management activities during status meetings.

In addition to the ongoing project management, PCG performs project risk analysis throughout the term of the project as part of our internal risk management and quality assurance process. The purpose of risk monitoring is to have someone external to the onsite team perform a risk assessment of the project to ensure that objectives are being met and no risks are present. The primary activities of the PCG project risk monitoring process will be:

- Review random project team status reports to observe the overall project, identify and track new project risks, assess all outstanding, unmitigated risks identified in the project to date, including recommendations on mitigation alternatives.
- For identified risks and issues, PCG will work with ISBE to ensure that corrective actions are in place to address quality and risk management issues and are incorporated into the appropriate overall project management plan;
- Observe selected project sub-team meetings, work sessions, prototype demonstrations, testing activities, and production of deliverables as necessary to identify project risks; and
- Notify and resolve all significant project risks with ISBE.

Change Management (1.7.e.ii)
The purpose of the Change Management Program is to provide procedures and a structured mechanism for addressing change requests across the ILDS data warehouse initiative through:

- Identification, tracking and implementation of changes as they are requested;
- Implementation of strict controls to effectively manage, prioritize and implement change requests in a timely manner so as not to inhibit program success;
- Facilitation of the overall program management and administration processes.

A change is any item that affects agreed upon deliverables, resources, milestones, schedules, or budget of a project or program.
PMO Change Management provides the approach and necessary processes to effectively manage and control the scope of a project or program. The objectives of Change Management Program are to:

- Provide a mechanism for the user community and project/program stakeholders to initiate change requests for already approved deliverables;
- Provide standard procedures for reviewing, assessing, approving or rejecting requests;
- Implement strict controls designed to prevent change requests that have not been through the necessary approval process from being integrated into project schedules;
- Track the change request impact on project and program schedule, resources, and financial data;
- Ensure proper prioritization and scheduling of requested changes.

The procedures outlined in this program provide a structured approach to manage change requests across the ILDS data warehouse initiative. The purpose of which is to support the:

- Reviewing, denying/approving, and tracking scope changes;
- Implementation of risk controls to prevent any changes from being implemented without proper review and approval, so the overall project goals and expectations are realized;
- Facilitation of the overall Project Management processes.

PCG's Change Management deliverable will include a section on change management roles and responsibilities, identifying the appropriate ISBE and PCG staff and their responsibilities for identifying issues that create change requests. For example the ILDS Project Manager would have the role of originating change requests stemming from issues identified by user community and assisting in the implementation of approved changes.

PCG also provides a detailed Change Management Procedure:

- Change Request Need Identification
- Change Request Initiation
- PCG Project Manager Change Request Logging
- ILDS Project Team Change Request Review
- PCG Project Director reviews, evaluates and makes decisions on change requests as presented by the ILDS Project Team.
- PCG Project Manager Change Request Updates
- ILDS Project Manager Change Request Updates
Illinois State Board of Education
ILDS Data Warehouse Contractor
Part I: Narrative Description

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Issue Management: (1.7.e.iii)

PCG defines issues as anything observed in the contract, project deliverable documentation or process and practices that deviate from expectations based on the signed contract, defined project processes, procedures and applicable requirements.

Issues will be tracked by PCG in an 'issues' tracking log until resolved. The issues tracking log will provide input to the State management's decision to implement changes to current processes and/or practices.

The issues tracking log will contain:

- Issue Number
- Priority
- Description
- Actions Proposed for Resolution or Escalation
- Responsible Parties
- Date Due
- Dependencies/ Impacts
- Resolution
- Status

The purpose of the Issue Management Program is to provide procedures and a structured mechanism for addressing issues that are identified during the ILDS data warehouse project through:

- Identification, monitoring and resolution of issues as they develop.
- Implementation of strict controls to effectively manage and resolve issues in a timely manner so as not to inhibit program success.
- Facilitation of the overall program management and administration processes.

An issue is matter that is in dispute between two or more parties and needs to be discussed and resolved. A plan for issue resolution may result in one or more tasks added to a project plan. After review and research, an issue may evolve into a change request.

Issue management provides the approach and necessary processes to effectively manage and resolve issues arising throughout the program. The objectives of issue management are to:

- Facilitate the resolution of issues.
- Control and coordinate issues and their dependencies.
- Encourage issues to be logged and monitored by providing a tracking system.
- Communicate the resolution to affected areas.
- Capture the trends and types of issues that are raised over time.
PCG will create a document identifying issue tracking roles and responsibilities. For instance, any project team member may originate issues and/or assist in the resolution of issues. PCG's issue management deliverable will also identify an issue management procedure with the necessary activities for issue management identified. These include:

- Issue Identification
- ILDS Project Manager Issue Management
- PCG Project Manager Issue Management
- ILDS Project Sponsor Issue Escalation Response
- PCG Project Manager Issue Escalation Response
- PCG Project Manager Issue Updates
- ILDS Project Manager Issue Resolution

Quality Assurance (QA) (1.7.c.iv)

The Quality Assurance organization at PCG has adopted a Solution Development Life Cycle (SDLC) methodology based on current industry standards and best practices. All SDLC methodology processes and procedures are documented, ensuring that all products developed at PCG function as expected. The methodology is structured to detect design errors early during development when it is less costly to remediate them and before the product reaches production. This optimizes and streamlines the development process reducing overall cost. PCG will apply this methodology rigorously to the implementation of ILDS.

PCG’s SDLC process ensures that products developed are properly documented and follow a repeatable set of processes and procedures for operation. The paragraphs that follow provide a brief description of our quality practices used for product development at PCG.

In the PCG SDLC methodology, Quality Assurance (QA) is defined as an integrated system of management activities involving planning, implementation, assessment, reporting, and quality improvement to ensure that a process, item, or service is of the type and quality needed and expected by our client. Quality Control (QC) is defined as the overall system of technical activities that measures the attributes and performance of a process, item, or service against defined standards to verify that they meet the stated requirements, operational techniques and activities. The figure below depicts the SDLC methodology at PCG.
PCG SDLC methodology

Products development at PCG is guided by an established QA/QC SDLC processes framework starting from project definition through analysis, design, testing to production delivery. The detailed diagram below shows the PCG SDLC QA/QC Framework Flowchart. The seven phases of the methodology are described in the paragraphs that follow.

Figure 7.3 SDLC Framework Flowchart
Phase 1 – Project Definition: During the Project Definition phase, a core team is assembled to establish the project management approach. The team will identify internal project stakeholders at ISBE and establish communications with the internal project team. The objectives are:

- Define Project Roles and Responsibilities
- Develop Project Communication Strategies
- Create and Publish Detailed Project Plans
- Establish project metrics and milestones
- Identify knowledge transfer areas for administration, support and maintenance
- Report project status to HCPS

At this time, the QC team starts identifying the scope of the test, the resources, the testing risks, and the main testable components in order to start preparing the Test Plan.

To exit this phase, the QA organization and Project Management meet to verify that all process steps have been completed and that the next phase can be started.

Phase 2 – Solution Analysis and Design: The Solution Analysis and Design phase follows the Project Definition phase. The activities in this phase are performed once the Project Definition phase is fully defined and agreed upon by both PCG and ISBE. The purpose of this phase is to formalize the user requirements, analyze them and design a strategy for both developing and testing the solution. For the ILDS, this process will be greatly aided by the preexistence of detailed requirements and dashboard and scorecard prototypes.

The development team translates ISBE business requirements into functional specifications. Once completed, the functional specifications will contain the details and guidelines on how the data warehouse solution must be implemented in order to meet the desired requirements. The solution design is then documented in one or more technical specifications. The business requirements, the functional specifications and the technical specifications developed during this phase are the support documentation on which the code development and the test design, planning and solution implementation are based.

Quality Assurance Test Planning: During Solution Analysis and Design, the Quality Assurance Test Plan is also developed. Test Planning is considered the most fundamental activity in securing a successful outcome to testing activities and provides the cornerstone for product quality verification. The test plan contains all agreed upon technical activities that must be implemented to ensure that the new data warehouse solution components developed satisfy the stated functional requirements and performance specifications.

These are some of the main topics included in a Test Plan:
Creating the test plan early in the project lifecycle will ensure that testing requirements and dependencies are identified early. This quality strategy also enables the team to think through the entire testing life cycle at a high level before getting immersed in the details. The test plan may best be revised at the start of the Build Verification phase if necessary but it may be updated at any time.

Test Plan format complies with IEEE 928 Test Plan Standard. To exit this phase, the QA organization, Project Management and Development meet to verify that all process steps have been completed and that the next phase can be started.

**Phase 3 – Solution Build**: The Solution Build phase follows the Solution Analysis and Design phase. During the Solution Build phase the Project Manager reviews the project documentation and assigns work to the developers. The developers start code development based on the Functional Requirements and Technical Specifications. As the developers code, they unit test the code in a private workspace within the development environment. The purpose of unit testing is mainly to make sure that the code compiles correctly and runs without errors and that whatever internal logic it implements conforms to the Functional Requirements and Technical Specifications documents. Unit testing does not rely on the structure of test cases and test scripts. The tests are mostly manual, with the possible exception of regression tests, which may be automated. The amount of structure applied to unit testing is a decision that will be made at the beginning of the project as part of the quality plan.

Developers store the changes they make to the code in a version control tool repository which provides version control. The code-unit test process may go on for several iterations, until the developer is ready to test changes in the context of the entire application. At this point a quality assurance review is held with the developers. After the QA/Development code review walkthrough, development will create a new baseline in the software version control repository and identify the code as ready to migrate the code to the Build Verification phase.

**Test Design and Preparation**: During the Solution Build phase, the Functional and Technical Specification documents created during Solution Analysis and Design are used by the QA Test Team to create verification tests in the form of documents called Test Cases. The Test Cases are a set of step-by-step
instructions specifying user inputs, test execution conditions, test data needed, and expected results. The Test Cases will then be organized into manual Test Scripts of one or more Test Cases. The Test Scripts created are then divided into those test scripts that can be converted to automation and those that do not lend themselves to automation. When and where practical the Test Scripts will be automated to decrease test time and therefore cost.

The focus of test preparation activities is to allow test execution to start once the function to be tested is available in the test environment. At test preparation completion, all the activities required for test execution are in place. All management and technical procedures necessary to support execution are defined, documented and published. Test preparation activities are carried out in parallel with development activities thereby presenting the opportunity for significantly reduced elapsed time.

To exit this phase the QA organization, Project Management and Development meet to verify that all process steps have been completed and that the next phase can be started.

**Phase 4 – Build Verification:** The Build Verification phase follows the Solution Build phase and is where the test plan created in the Solution Analysis and Design phase is executed. The Build Verification phase is comprised of three Test Levels:
- System Functional and Component Test Level
- System Integration/E2E Test Level
- Performance Test Level

Each Test Level performed is detailed in the test plan and follows the process flow as shown below:

The testing performed will verify that the data warehouse solution meets QA standards, performs the functionality required of the ILDS, has the expected usability and can operate in an environment that models production. It also verifies that the ILDS will be able to support the loads specified under realistic conditions, can be installed properly and can be staged into production.

The QA Test Team will drive and influence all supporting and dependent activities. Any errors found are fixed, and tests are signed off once they have completed successfully.

Once the Exit Criteria detailed in the test plan are achieved, promotion from one Test Level to another is accomplished. The Quality Assurance organization will call a quality gate meeting and the stakeholders will evaluate the tests performed, the defects tracked to resolution and the pass/fail decisions made. Once the stakeholders validate that the planned quality for the test level has been achieved a QA Test
Evaluation Summary Report is written and submitted. The Test Reports generated provide the written verification that the PMIS complies with all documented requirements and specifications.

*System Functional Test Level and Component Test Level:* The purpose of the System Functional test level is to verify proper solution functionality to ensure that the user functional requirements and specifications are met. The Unit Test Level requested in the RFSP happens at this point. Function Testing verifies that each business function operates as specified in the design documents. The testing objectives are to verify that the system components perform control functions, perform inter-system tests, and demonstrate that the system performs as specified. Limited interface testing is also carried out during System Functional Testing when all the components are available and working. The following areas are tested:

- Documentation and Procedures
- Error Handling
- Functions / Requirements
- Components such as:
  - Data Elements
  - ETLs
  - Cubes
  - Portal
  - Reports
- Regression
- Transaction Flow (Path)
- Information is processed in accordance with agreed upon standards, policies, and procedures

To exit this phase the QA organization, Project Management and Development meet to verify that all process steps have been completed and that the next phase can be started.

For example, a System Functional Test for the scorecards and dashboards in ILDS would require that both elements are validated for the following:

- **Layout:**
  - Anything related to the format of the dashboard or scorecard such as Structure, Language, Spelling, Colors, Font type, Font Size, Paragraph, etc
- **Data Content**
  - Anything related to Titles, Headers, Parameters, Tables, Totals, Grand Totals, Data Values
- **Functionalities**
  - Anything related to: Drill-thru scenarios, Printing (Printing, Preview) and Export functionalities to different formats
Security
  - The tester will validate that each role can only have access to the data corresponding to the role

**Systems Integration/E2E Test Level:** The purpose of the Systems Integration/E2E Test Level is to verify in a production-like environment the integration of all solution components (ETL, data warehouse and Analysis Tools) with all external systems. The quality testing will include internal and external interfaces as well as the ETL, DW, and Analysis processes, procedures and reporting documentation. The testing performed verifies the solution components work together in the physical environment as a total system and ensures that the solution when released can be deployed into the production environment.

Security of an application system is required to ensure the protection of confidential information. This protects the data against loss, corruption, or misuse; either by deliberate or accidental actions. Tests should focus on, and be limited to those security features developed as part of the system, but may include security functions previously implemented but necessary to fully test the system. Security testing can begin at any time during System Testing, continue in UAT and are completed in Production Release. The objectives are to ensure or verify that:

- Proper parameters and data are correctly passed between the applications
- The applications agree on the format and sequence of data being passed
- Proper timing and coordination of functions exists between the application systems and that the processing schedules reflect these
- Interface documentation for the various systems is complete and accurate
- Missing data files are properly handled
- It is not possible for the same file to be processed twice or to be processed out of sequence
- The security features cannot be bypassed, altered, or broken
- Security risks are properly identified and accepted, and contingency plans tested
- The security provided by the system functions correctly

To exit this phase the QA organization, Project Management and Development meet to verify that all process steps have been completed and that the next phase can be started.

**Performance Test Level:** The purpose of Performance Testing is to verify that the ILDS solution meets the desired level of real-time response in a production environment. Performance testing is an automated testing activity that includes Load and Stress testing. It is focused on measuring specific system parameters such as throughput or response time under different loads of concurrent users. It is not necessary to have all solution functions fully tested in order to start the Performance Testing phase. The objectives are to verify in a production-like environment that the PMIS solution:
Project Management Approach Response

- Can process large transactions volumes within the time frame as stated in the requirements and specification design documentation
- Architecture and construction is capable and adequate to process the data volumes and turnaround time as stated in the requirements and specification design documentation
- Operation conformance covering real time and batch jobs, startup and shutdown, recovery and backup

Often, performance tests and load tests are thought of as the same test. However there is a difference between them. Performance Testing consists of activities that attempt to determine the responsiveness of the system in relation to usual workloads. Load Testing is the activity of identifying the limits of the system (beyond usual workloads). Both tests measure and evaluate response times, transaction rates and other time sensitive requirements in conjunction with resource utilization.

Performance test focus the attention on how many requests per hour the system can handle when managing a normal specific business scenario (i.e., with a standard workload for the application). For example: Can we ensure that the response time will be less than 5 seconds when running reports?

On the other hand, the Load test will indicate if the system is capable of managing requests under a specific load. The load test will answer questions such as:

1. The existing database size is 2 million records. Can the system handle a database with 5 million records?
2. Typically 50 users access the same functionality. Can 100 users work concurrently using that same, specific functionality without "breaking" the system?
3. The system has never reached more than 50,000 requests per hour. What will happen if the system should support 60,000 requests per hour?

In order to perform a Performance or Load test, the following activities take place to create the performance/load test environment:

Creation and configuration of the Environment

- Data Population
- Configuration of the performance tool to access the environment
- Recording of the scenarios: record the scenarios that will be repeated upon time execution
- Scheduling of test scenarios: When and how the load will be injected in the test run.
Next, a planning process determines which specific tests to perform.

1.1 Define the Performance/Load Strategy Test Plan

*Document topics such as:*

- **Performance objectives:** The reasons why the performance or load tests have to be performed
- **Scope:** The system under Performance or Load Test
- **Performance or load requirements details:** This section includes definitions of how responsive should the system be under a certain scenario. For example, how many requests per hour can the system handle under a specific load?
- **Entry/exit criteria:** Which conditions the activity should meet in order to be able to run the tests or exit them?
- **Environments needs:** What is the environment where the test will take place? Mimics production?
- **Risks:** Which are the identifiable risks associated with the test and how they will be mitigated?
- **Business scenarios:** Which business scenarios should be included in order to analyze the performance or load of the application?

1.2 Configure the environment and the Performance Tool *(Rational Performance Tool)*

This activity consists in configuring the tool and the environment in order to execute and meet the performance and load objectives and requirements. Tasks involved include:

1. Creation and configuration of the Environment
2. Data Population
3. Configuration of the performance tool to access the environment
4. Recording of the scenarios: record the scenarios that will be repeated upon time execution
5. Scheduling of test scenarios: When and how the load will be injected in the test run.

1.3 Execute the Performance Test

Execute the test scenarios while monitoring resources and assessing the status of the test when needed.

1.4 Analyze and exhibit Test Results

Gather, Analyze, and expose the performance results based on the objectives and requirements that should be met. Results include information about Performance and Load goals as well as details of the resource utilization.
Phase 5 – User Acceptance: The User Acceptance phase follows the Build Verification phase. The purpose of this testing phase is to ensure in conjunction with ISBE that the solution is usable day-to-day. Whereas functional testing looks for solution accuracy, this phase is focused on security, documentation and regression tests. Finally, this phase demonstrates to ISBE that the ILDS solution performs as designed and ISBE accepts the solution as developed. The objective of this phase includes:

- Solution operation demonstration to the end-user
- Information storage and calculation accuracy
- Demonstration of all rules, functional requirements, technical requirements and design standards compliance
- Demonstration that all screens and output are clear, concise and easy to use
- Help screens or clerical instructions are readable, accurately describe the process and are expressed in simple language
- Input processes whether via terminal or paper follow natural and intuitive steps

To exit this phase the QA organization, Project Management, Development and ISBE meet to verify that all process steps have been completed and that the next phase can be started.

Phase 6 – Production Deployment: The Production Deployment phase follows the User Acceptance phase. Installation tests are performed when the solution developed will be installed and run in an environment remote from the development location. A set of Test Scripts written in the Solution Build phase will be executed by the IT personnel that perform the installation process to validate the deployment. The objectives of this phase are to verify:

- All required components can be installed as a package
- That all modules and programs are available and operational
- The installation procedure documentation is complete, accurate and easy to use
- The backup and recovery procedures are well documented
- Resources conducting the recovery are adequately trained
- When normal conditions return, the system and all its processes and data can be restored
- All on-line commands and procedures function properly
- All batch functions can be completed within an acceptable window of operation

To exit this phase the QA organization, Project Management and Development meet to verify that all process steps have been completed and that the next phase can be started.

At this point, PCG turns to post-deployment support. This includes Tier 2 and Tier 3 issue resolution over the term of the contractual agreement with ISBE.
Knowledge Transfer Approach (1.7.1)
The PCG team recognizes and supports ISBE's desire to achieve an internal capability to maintain and operate the new SLDS application independently in the future. Our approach includes the transfer of technology knowledge to key ISBE personnel through teaming and training sessions to help facilitate that transition.

The PCG team believes the most effective method for knowledge transfer involves including ISBE staff from project inception to completion. This method has added benefits of enabling ISBE to provide input throughout the entire implementation process.

This will ensure that the ISBE receives necessary knowledge to maintain and operate the SLDS application, and that the SLDS implementation meets the expectations of the ISBE at each deliverable.

As an additional benefit, this close collaboration provides an opportunity for the ISBE to support and assist in decision making process and issue resolution throughout the project life cycle.

Skills Assessment
This is an important step in determining in what additional training is required is to assess the ISBE personnel for skills relevant to the knowledge transfer. Two aspects frame the skills assessment phase of the knowledge transfer.

1. Final responsibility for the finished products and its components
2. Skills already held by the ISBE personnel that would aid in the transfer of knowledge.

The PCG Team will work with the key ISBE personnel to draft a skills assessment document to record all the relevant findings pertaining to the ISBE skills assessment. This document will outline the areas that will be analyzed based on the deliverables for the project. The assessment matches the deliverables to the current level of skill related to each deliverable held in the organization, the most appropriate role and responsibility to match to the deliverable.

Knowledge Transfer Plan
The Knowledge Transfer plan is created using the Skills Assessment plan as the primary input. The Knowledge Transfer plan provides the means for implementing the necessary remedies for the knowledge gaps identified in the Skills Assessment plan.

At its core, the Knowledge Transfer Plan matches a recipient (ISBE personnel) with a sponsor (PCG Personnel) for each deliverable. The Knowledge Transfer Plan identifies the desired skill level of the ISBE personnel subsequent to the knowledge transfer, and ties in the activities to the overall project plan outline. This will ensure a tight integration of the knowledge transfer activities with the overall project scope and provide the ISBE with the skills inventory necessary at each project deliverable.
Initial Training:
Prior to the beginning of each task identified in the approach, the PCG team will provide extensive training to the ISBE personnel identified in the Knowledge Transfer Plan. This provides an orientation to the purpose of the deliverable and methodology by which it will be produced.

Compliance with Standards:
In the RFSP, ISBE states that proposers must comply with: All information technology, including electronic information, software, systems and equipment, developed or provided under this contract must comply with the applicable requirements of the Information Technology Accessibility Act (30 ILCS 587) and the standards required under Section 15 of the Act (see http://www.dhs.state.il.us/itaa).

Our solution provides database-level suppression of cells and fields, multiple browser support, multiple language support, and Section 508 compliance. Our solution also allows sophisticated intermingling of chart, graph, and table data for maximum information output and Section 508 Amendment to the Rehabilitation Act of 1973 compliance.
I.8 Business and Technical Requirements Response

Our Understanding of ISBE’s Needs

Through PCG’s current contract with ISBE to develop the ILDS data architecture, PCG is thoroughly familiar with the systems and reports targeted for the ILDS. PCG knows the data elements and the databases for ISBE systems, and understands which reports draw from which sources and how data is currently captured. PCG’s in-depth, extensive, foundational knowledge of ISBE data systems and data architecture positions us uniquely to hit the ground running in developing the data warehouse.

We understand the specific tasks involved in implementing the ILDS data warehouse, and will accordingly perform the following:

- Build the physical data models for the ODS, staging data stores, EAV, RDS and EDEN Data Mart that comprise the ILDS data warehouse as defined by the logical models developed by PCG and ISBE during the ILDS data architecture initiative;
- Build Extract, Transform, Load (ETL) processing to populate the ODS, staging data stores, EAV, RDS and EDEN Data Mart schemas that comprise the ILDS data warehouse;
- Build a data warehouse portal that supports role-based access to reports, data analysis tools, and information contained in the ILDS data warehouse;
- Implement the ILDS data warehouse;
- Develop the necessary processing to transition the identified reports to source their data from the ILDS repository and utilize the data warehouse portal to display the results;
- Develop online training materials to assist users of the data warehouse; and
- Develop operations documentation and conduct knowledge transfer that enables ISBE support staff to operate and maintain the data warehouse.

PCG understands that the following systems and reports are targeted for the ILDS and has comprehensive knowledge of the specific technical specifications and current source information of each system or report. We will develop a solution that supports the following systems and reports:

<table>
<thead>
<tr>
<th>ISBE Systems Targeted for ILDS</th>
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<tbody>
<tr>
<td>Illinois Student Information System (ISIS)</td>
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<tr>
<td>Student Information System (SIS)</td>
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<tr>
<td>Special Education Systems, Approval and Reimbursement System (SEARS)</td>
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<tr>
<td>The Funding and Child Tracking System (FACTS)</td>
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</table>

January 5, 2011
PCG

Illinois State Board of Education
ILDS Data Warehouse Contractor
Part I: Narrative Description

Business and Technical Requirements Response

- Annual Financial Report (AFR)
- Child Nutrition System (CNS)
- Application and Claim Entry System (ACES)
- Educator Certification System (ECS)
- Teacher Certification Information System (TCIS)
- Teacher Service Record System (TSR)
- Electronic Grants Management System (eGMS)
- Special Education Data System (SEDS)
- Financial Reimbursement Information System (FRIS)
- Management Information Database Accounting System (MIDAS)
- Non-Public Registration, Enrollment and Staff Report (Non-Public Fall Housing)
- Facilities and Inventory

**ISBE Reports Targeted for ILDS**

<table>
<thead>
<tr>
<th>Annual School Report Card</th>
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<tbody>
<tr>
<td>Federal Career and Technical Education</td>
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<tr>
<td>Bilingual Education Reports</td>
</tr>
<tr>
<td>Regional Safe Schools and Truants Alternative &amp; Optional Education Program reporting</td>
</tr>
<tr>
<td>Report information on Truants Alternative &amp; Optional Education Program</td>
</tr>
<tr>
<td>Child Nutrition Services</td>
</tr>
<tr>
<td>Federal Special Education – Annual Performance Report, Part B</td>
</tr>
<tr>
<td>Biennial EEO-5</td>
</tr>
<tr>
<td>Teacher and staff demographics</td>
</tr>
<tr>
<td>District Special Education Profile</td>
</tr>
<tr>
<td>Teacher Reduction</td>
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<tr>
<td>Educator Supply and Demand</td>
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<tr>
<td>Pre K At Risk</td>
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<tr>
<td>Annual Report of the Budget</td>
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<tr>
<td>General State Aid</td>
</tr>
<tr>
<td>Annual Statistics Report</td>
</tr>
<tr>
<td>Education Data Exchange Network (EDEN) – per federal requirements</td>
</tr>
<tr>
<td>Consolidated State Performance Report (CSPR) – per federal requirements</td>
</tr>
</tbody>
</table>

**Solutions Overview**

PCG's approach to the longitudinal data system space has been a partnership-centered approach, working with both our clients and other vendors to create a platform which is open, robust, and extensible. Outlined below are solutions which have been implemented in various states and have been
architected to work together seamlessly. This architecture/solution will be at the core of the solution delivered to ISBE and helps to greatly reduce risk while providing maximum leverage from work that has been done in other states.

Figure 8.1 Solutions Overview

In implementing a secure data warehouse, the following issues will be addressed:
Portal: Resource sharing and data dissemination

Enterprise Security: Ensuring that only the right people have access to the right data and resources

Data Movement: Focusing on quality of data into the system, as well as that data movement between layers

Data Management: A data model which allows for all required data systems' information, as well as one that can accommodate for growth over time

Reporting/Decision Support: How do we effectively access the data once in the DW?
Determine the reports and methods to access that data

Support: Provide required training, documentation and ongoing support to help the client effectively manage the solution

Recommended System: Choice Solutions edFusion stack
If selected, PCG’s partner, Choice Solutions, will provide its comprehensive solutions set – edFusion Data Warehouse and Decision Support System – as the foundation for meeting ISBE’s Longitudinal Data Management needs and strategy. The edFusion solution set consists of:

- edFusion Enterprise Portal and Directory Manager (Security, Authentication and Authorization)
- edFusion Data Warehouse (ODS/EDW/DM)
- edFusion Data Integrity and Quality Management (ETL)
- edFusion Metadata Management
- edFusion Enterprise Reporting Framework

These solutions support all the key components of an enterprise data management and decision support environment.

edFusion
The Education Data Warehouse and Decision Support System. Choice Solutions, working with the Microsoft Education team, has developed a statewide, open, enterprise data warehouse, portal, and directory manager solution optimized for state education agencies called edFusion. The edFusion Data Warehouse includes the edFusion Directory Manager, Portal Manager, and Communication Center, which integrates natively with various Microsoft tools, such as SQL Server, Windows Server, Microsoft Office and the entire .NET framework. The scalable, open, enterprise-grade solution offers a decision support system with analysis and reporting tools, Family Educational Rights and Privacy Act (FERPA) compliant security and authentication, seamless integration, and an extensible, industry standard development platform.
edFusion Portal and Directory Manager

Central to the solution is robust directory and identity management developed specifically for the U.S. education market. This provides Role Based Access Control (RBAC) for people and entities throughout the organization, supporting required roles as well as the flexibility to easily add additional roles as needed. This level of security is required to ensure a FERPA-compliant environment in which only the right users have access to information.

The edFusion Directory and Identity Manager authorization model is based on four core concepts:

- Users
- Roles
- Organizations
- Functions (which can be either Applications or Services)

Figure 8.2 edFusion Architecture Component Stack
The solution is completely web-based, intuitive, and allows for distributed management of resources. Organization and access policies can be managed at a state, district, school, or even class level, greatly reducing the overall IT burden on a single entity.

Figure 8.3 edFusion Enterprise Portal Architecture

The edFusion solution provides a robust platform to increase the availability of services provided through the computer network. This platform delivers applications through a portal environment to educators, staff, students, parents and other community members. Each of these programs requires the development of an enterprise-computing model to support the delivery of information services throughout the state, district and school network.

The edFusion Portal & Directory Manager is natively integrated with various Microsoft tools. All of these are integrated as part of a scalable, enterprise-grade solution offering enhanced security, seamless integration with other Microsoft products, and an extensible, industry-standard development platform. The edFusion® Portal & Directory provides access for collaboration with employees, partners and other organizations as easily as co-workers while protecting sensitive enterprise information. The buddy lists and groups/projects are created as part of the user management and group management functionalities of the Enterprise Directory Manager which in turn are built upon Active Directory and SQL Server.

Security Components Built Into the LDS Solution. The edFusion Portal and Directory Manager framework will provide a consistent security model for the Data management solution.
Security Components Provided by the edFusion Education Identity Manager Framework

<table>
<thead>
<tr>
<th>Logging and Access Rights Security</th>
<th>Managing Security and Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robust security infrastructure</td>
<td>Role management functionality</td>
</tr>
<tr>
<td>Password protected system</td>
<td>User roles created according to ISBE preferences</td>
</tr>
<tr>
<td>Private passwords</td>
<td>Permanent system roles</td>
</tr>
<tr>
<td>Limited number of failed login attempts</td>
<td>A user creation and role assignment process</td>
</tr>
<tr>
<td>Password reset function</td>
<td>Functional capabilities for the system administrator</td>
</tr>
<tr>
<td>User notification</td>
<td>Ability to assign roles to an application</td>
</tr>
<tr>
<td>Define security permissions at any level</td>
<td>Page controls management function</td>
</tr>
<tr>
<td>Comprehensive and integrated identity management</td>
<td>System administration capabilities</td>
</tr>
<tr>
<td>Individualized access</td>
<td>Ability to associate pages with an application area</td>
</tr>
<tr>
<td>User authentication stored in LDAP structures</td>
<td>Centralized administration of security and administrative access</td>
</tr>
<tr>
<td>Seamless management of application-based user access</td>
<td>Organizational hierarchy</td>
</tr>
</tbody>
</table>

edFusion Data Warehouse

The edFusion Data Warehouse has been built with the most recent Microsoft technologies. The solution was developed with the guidance of educators, National Standards, State Education Agency (SEA) clients, and the Microsoft education solutions team. With the edFusion Education Data Warehouse, ISBE will have a solution that is both educationally and technically relevant, as well as one that will be supported and easily maintained well into the future.

At the core of our solution is a proven and extensible data model. Based upon the existing ILDS data elements, there will be no need for any significant modification of our data model to support ISBE’s long-term reporting requirements. Our solution supports all the NCES data elements as well as the new CCSSO State Core Model. As ISBE’s needs change, including (for example) a desire to support higher education or workforce data, the data model has been designed to be easily modified to accommodate these changed needs.
**Figure 8.4 edFusion Data Domains**

The design of the data warehouse database schema incorporates the principles of dimensional modeling so that dimension tables and fact tables represent the business data for viewing and querying. The dimensional modeling results in a star database schema. This schema facilitates cube design and reduces the number of multiple-table joins when querying the database to process dimensions and cubes. Fact tables usually hold the vast majority of data in the data warehouse, sometimes containing hundreds of millions of rows.

**edFusion Data Integrity and Quality Management**

Moving data into the ILDS, around the ILDS and out of the ILDS requires a high level of expertise and experience. Having a solution in place that has existing ETLs from both source systems and between the layers of the ILDS will greatly reduce risk. Nonetheless, we cannot stress enough the need to focus on data quality:

- **Data Consistency Control** – ISBE can alleviate and control data consistency, data quality, and data timeliness issues using a metadata-driven approach. The ETL process uses business rules associated with cleansing, consolidating, and transforming the data. Because the rules are stored in the metadata, ISBE can readily update them as educational analytical needs change.

- **Disparate Data Source Integration** – PCG’s team designed the ETL process to load data from text files as well as integrate data from any commercially available database. To accommodate manual data sources, the solution also has numerous data entry tables to integrate and enrich
state and district data. In addition, the solution can also accept mainframe data from virtual storage access method (VSAM) files.

**edFusion Metadata Management**

The centralized data management tool defines and catalogs the metadata that enables constituents and stakeholders to define and view enterprise data definitions. The master data management strategy consolidates and streamlines transactional data from disparate sources into an operational, centralized, and reportable data structures. The solution allows import of metadata from external source systems.

**edFusion Reporting Framework**

One of the most critical aspects of any data system is the ability to collect additional data as demand, internal or external, requires. It is our experience that the sometimes adversarial relationship between LEA’s and SEA’s as it relates to data can be eliminated once LEA users actually see meaningful outputs. Providing the ability for LEA users to input additional data into the data warehouse can greatly impact how meaningful the reports are for that district. By providing an open platform ISBE or a vendor can create data entry applications that will result in better data to impact outcomes.

Our focus is on creating a solution for the integration of various applications as well as the ability to develop and integrate additional modules on top of the existing framework.

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**Figure 8.5 edFusion Reporting Framework**
The focus for this project is to deliver a robust and secure data warehouse as well as the desired reports outlined by ISBE. This is just the beginning of what can be done and what has already been done for other SEA clients. Once ISBE’s data is in the data warehouse, a larger set of reports can be turned on, which have been developed to specifically meet the needs of the SEA market. The proposed solution framework provides ISBE with the option to quickly and easily deploy an addition set of robust pre-developed reports and a rich zero client analysis module.

- **edFusion Snapshot reports**: Providing over 200 drillable and comparable reports for the SEA and all constituent districts. Snapshots answer those most commonly asked question, from our multiple state clients.

![Figure 8.6 Example of Snapshot Report](image)

- **edFusion Data Tables**: Extending the number of reports. Data tables as implemented in Maine and Connecticut greatly extend the number of reports currently available to users. We have implemented over 900 reports that are drillable and available out of the box to support Illinois’s data needs. These reports, as with snapshots reports, can easily be configured to meet ISBE’s main decision support needs. This is an ideal solution to provide researchers and “data geeks” with access to large amounts of data for further analysis.
Figure 8.6 Example of Data Table report

- edFusion Analysis Services – A zero client analysis and visualization tool to drive deeper into all your data, providing users who want to dig deeper the tools and visualization to create, save and share valuable reports with their constituents.

Figure 8.7 Simple Analysis Services functional view

- Research and Reports – The research and reports functionality for the creation and storage of important or historical reports that have been run. Only authorized users can publish and view reports, as this section is also controlled by a robust Directory and Identity Management solution.
The proposed approach to the reading and organizing data into multidimensional objects such as dimensions and cubes allows for optimized reporting and storage. When creating and processing dimensions and cubes, the analysis server uses the SQL Server database relational engine to access the data warehouse database. Therefore, our data warehouse schema design and relational database performance have a significant effect on the ease of designing cubes and on the performance of processing cubes.

![Diagram: Data Warehouse Dimensions]

**Figure 8.8 Data Warehouse Dimensions**

For example, ISBE could eventually use the data mart to:

- Determine the total attendance count of the state for an academic year
- Determine the total attendance count of the state for an academic year for a given grade and race
- Compare attendance statistics between multiple districts

The State Core Model supports all current federal reporting requirements and NCES data elements. We know federal requirements change, and all clients are available for upgrades with the data model, reports and security enhancements.

The data warehouse is driven via a cutting-edge OLTP relational OLAP practice supported in a Star Schema and leverages cube-based analytic services for accurate performance engineered data retrieval. As more than just a storage and archiving facility, the warehouse focuses on intelligent analytics that support business decisions. The backend technologies as well as the front-end delivery mechanisms have been optimized to support education agencies. Determining proper base for longitudinal archives...
and ETLs, normalization protocols, as well as consideration for augmented management of operational transactions in readily available systems are processes in delivering a product that Illinois end users will be happy to use.

Microsoft Business Intelligence also includes applications specifically designed for data visualization and geospatial analysis, which enable users to explore data sets graphically and conduct ad hoc analysis in a simple, yet powerful interface.

The proposed Data Warehouse solution can support virtually unlimited numbers of student files (including historical data) for as many years as the State requires. edFusion is architected on the highly flexible and extensible Microsoft platform, providing it with open-ended upward scalability, so there are no functional limits on the numbers of students or end users built into the system. Adding either student records or end users is a matter of additional hardware capacity rather than application capacity.

Project Structure (1.8.a)
Our team has worked on multiple SLDS opportunities across the United States. From these engagements, we have refined our approach to both implementation and software development. To best answer your question as it relates data warehouse development methodology, we have outlined our generic SLDS development approach with notes for ILDS as appropriate. Core to our approach is the
ability to adapt to changing needs, requirements and the inevitable discoveries which will be made during this project.

Development Methodology Philosophy

PCG and our partners take a pragmatic view of investments into the information technology. To manage an information technology initiative, every team member’s key to success is to provide the maximum business value for the minimum cost. In order to achieve this, we align the application development with the needs and priorities of ISBE. We increase the overall effectiveness and minimize the risks in delivering new projects and applying new technology. Furthermore, we gain and maintain control over the increasing complexity of the enterprise application development environment by adhering to proven methodologies in the information technology space.

Figure 8.9 Development Methodology

To maximize value, we suggest the three main stakeholders – Business, Application Development Team, and IT operations – need to work together smoothly. Solutions that do not address the needs of all three groups will fail. We view that application development for the client means much more than just writing code. Managing the development process involves delivering the results in three ways:

1. Maximize Business Value
2. Increase IT effectiveness
3. Control complexity
Meeting these needs requires good communication between the business and involved IT communities to be successful. Implementing standardized processes and procedures dramatically increases the odds of the projects to succeed. PCG’s team has experienced many successes by adhering to standardized processes and procedures, thus minimizing the risk associated inherently with any software development project.

Our methodology’s goal is to ensure the development of high-quality software that meets the needs of its end-users while meeting schedule and budget goals. This model is based upon relevant process templates when building software systems (web applications of different scales, business support systems, network applications, etc.). For instance, our use of incremental and iterative model allows us to smoothly incorporate changing customer requirements into a project’s final system architecture, so that we can tailor the end product to meet our customer’s real needs.

Considering these briefly discussed goals, PCG’s team plans on using the “Incremental and Iterative” design methodology using UML to the system software development.

**Incremental and Iterative Methodology**

The incremental model combines elements of linear sequential model with the iterative philosophy of prototyping. Each linear sequence produces a deliverable increment of the software. When an incremental model is used, the first increment is often the core product. The basic requirements are addressed but many supplementary features remain undelivered. The customer uses the core product and user feedback is obtained on the core product. Based on user feedback, a plan is developed for the net increment. The plan addresses modifications of the core product as well as the additional features and functionality. This process is repeated following the delivery of each increment until the complete product is produced. The details of each iteration are documented following sections. The summary of each iteration consists of the following process components:
Figure 8.10 Incremental and Iterative Methodology

The developers do not assume that all requirements are known at the beginning of the lifecycle; indeed change is anticipated throughout all phases. Each increment builds a subset of the full software system. Usually prototyping will be done to accompany this work so that you can get a firm understanding of what the pieces entail.

This type of lifecycle is a risk mitigation driven process. Technical risks are assessed and prioritized early in the lifecycle and are revised during the development of each iteration. Risks are attached to each iteration so that successful completion of the iteration mitigates the risks attached to it. The releases are scheduled to ensure that the highest risks are tackled first. Building the system in this manner exposes and mitigates the risks of the system early in the lifecycle. The result of this type of lifecycle is less risk coupled with minimal investment.

This Iterative and Incremental methodology consists of several iterations, or a repeated cycle or process, involved in the development cycle. Every iteration of the cycle will contain several phases, the utilization of several phases helps to ensure that changes are addressed early, and these changes can easily be validated before negatively impacting overall project outcomes.

The following phases encompass each iteration of the development life cycle:

- Organizing the system with packages
• Modeling with Use Cases, and using them to capture system requirements
• Modeling with Sequence and Collaboration diagrams
• Modeling behavior with State and Activity diagrams
• Modeling software components, distribution, and implementation
• Relational database design

Organizing the System with Packages. One of the key tasks to modeling a large software system is to break it down into manageable areas first. Whether these areas are called domains, categories, or subsystems, the idea is the same: break the system into areas that have similar subject matter. Packages can be used on every level, from the highest level, where they are used to subdivide the system into domains, to the lowest level, where they are used to group individual Use Cases, classes, or components.

Use Case Modeling. Use Case modeling is the simplest and most effective technique for modeling system requirements from a user’s perspective. Use Cases are used to model how a system or business currently works, or how the users wish it to work. It is not really an object-oriented approach; it is really a form of process modeling. It is, however, an excellent way to lead into object-oriented analysis of systems. The Use Case model consists of actors and use cases. Actors represent users and other systems that interact with the system. They are drawn as stick figures. They actually represent a type of user, not an instance of a user. Use cases represent the behavior of the system, scenarios that the system goes through in response to stimuli from an actor. They are drawn as ellipses. Each Use Case is documented by a description of the scenario. The description can be written in textual form or in a step-by-step format. Each Use Case can also be defined by other properties, such as the pre- and post-conditions of the scenario – conditions that exist before the scenario begins, and conditions that exist after the scenario completes. Activity Diagrams provide a graphical tool to model the process of a Use Case. These are described in a later section of this document.

Capture and/or Verify Requirements. The final objective of any software design is to satisfy the user requirements for the system. These requirements can be software requirements, product requirements, or testing requirements. The goal of capturing and verifying user requirements is to ensure that all requirements are fulfilled by the design, and that the design conforms to the defined requirements. Often times, system requirements exist already in the form of requirements documents. Use Cases are used to correlate every scenario to the requirements it fulfills. If the requirements do not exist, modeling the system through Use Cases enables discovery of requirements.

Organization of Use Case Diagrams. During business analysis of the system, we develop one Use Case model for the system, and build packages to represent the various business domains of the system. We may decompose each package with a Use Case diagram that contains the Use Cases of the domain, with actor interactions.
A Use Case for Every Scenario. The goal is to build a Use Case diagram for each significantly different kind of scenario in the system. Each scenario shows a different sequence of interactions between actors and the system, with no 'or' conditions.

Model Alternate Sequences through "Extends" Relationship. Typically, we model each Use Case with a normal sequence of actions. The user then considers "what if" conditions for each step, and develops Use Cases based on these alternate sequences of events. The alternate sequences are modeled in separate Use Cases, which are related to the original Use Case by an "Extends" relationship. The Extends relationship can be thought of as a Use Case equivalent to inheritance, in that the Extending Use Case inherits and overrides behavior of the original Use Case.

Eliminate Redundant Modeling through "Uses" Relationship. To eliminate redundant modeling of a chunk of behavior that appears in multiple Use Cases, the chunk of behavior can be modeled in a separate Use Case that is related to the other Use Cases by the Uses relationship. The Uses relationship can be thought of as a Use Case equivalent of aggregation.

Use Cases Aid in Testing System against Requirements. Use Cases are also used to build test scripts that are used to verify that the application satisfies the business and system requirements. When we arrive at the lowest Use Case level, we create a Sequence diagram for the Use Case. With the Sequence and Collaboration diagrams, we then model the implementation of the scenario.

Sequence Diagrams. The Sequence diagram is one of the most effective diagrams to model object interactions in a system. A Sequence diagram is modeled for every Use Case. Whereas the Use Case diagram enables modeling of a business view of the scenario, the Sequence diagram contains implementation details of the scenario, including the objects and classes that are used to implement the scenario, and messages passed between the objects. Typically, we examine the description of the Use Case to determine what objects are necessary to implement the scenario. If we have modeled the description of the Use Case as a sequence of steps, then we can 'walk through' the steps to discover what objects are necessary for the steps to occur. A Sequence diagram shows objects involved in the scenario by vertical dashed lines, and messages passed between the objects as horizontal vectors. The messages are drawn chronologically from the top of the diagram to the bottom; the horizontal spacing of objects is arbitrary. During initial analysis, the modeler typically places the business name of a message on the message line. Later, during design, the business name is replaced with the name of the method being called by one object on the other. The method called, or invoked, belongs to the definition of the class instantiated by the object on the receiving end of the message.

Collaboration Diagrams. The Collaboration Diagram presents an alternate to the Sequence Diagram for modeling interactions between objects in the system. Whereas in the Sequence Diagram the focus is on the chronological sequence of the scenario being modeled, in the Collaboration Diagram the focus is on understanding all of the effects on a given object during a scenario. Objects are connected by links, each
link representing an instance of an association between the respective classes involved. The link shows messages sent between the objects, the type of message passed (synchronous, asynchronous, simple, balking, and time-out), and the visibility of objects to each other.

**Analysis and Design with the Class Diagram.** The class diagram is the main static analysis and design diagram for a system. In it, the class structure of the system is specified, with relationships between classes and inheritance structures. During analysis of the system, the diagram is developed with an eye for an ideal solution. During design, the same diagram is used, and modified to conform to implementation details.

**Use Case Driven Approach.** In a Use Case-driven approach to OO analysis, the Class diagram is developed through information garnered in the Use Cases, Sequence diagrams, and Collaboration diagrams. The objects found during analysis are modeled in terms of the classes they instantiate, and the object interactions are mapped to relationships between the instantiated classes.

**Responsibility-Driven Extension.** The CRC card technique is sometimes used as an extension to UML for responsibility-driven analysis. Class definitions are refined based on the class’s responsibilities and other classes it collaborates with to fulfill responsibilities. Each class is represented on an index card, and designers play-act the roles of classes in the system to determine their job, and who they need to collaborate with to fulfill their responsibilities. This information translates directly into a class diagram; responsibilities correspond to class methods, collaborations translate to associations between classes.

**Design of System with Class Diagram.** During design, the class diagram is elaborated to take into account the concrete details of implementing the system.

**Modeling Class Behavior with State Diagram.** While interaction and collaboration diagrams model dynamic sequences of action between groups of objects in a system, the state diagram is used to model the dynamic behavior of a particular object, or class of objects. A state diagram is modeled for all classes deemed to have significant dynamic behavior. In it, we model the sequence of states that an object of the class goes through during its life in response to received stimuli, together with its own responses and actions. For example, an object’s behavior is modeled in terms of what state it is in initially, and what state it transitions to when a particular event is received. We also model what actions an object performs while in a certain state. States represent the conditions of objects at certain points in time. Events represent incidents that cause objects to move from one state to another. Transition lines depict the movement from one state to another. Each transition line is labeled with the event that causes the transition. Actions occur when an object arrives in a state.

**Activity Diagrams.** The Activity Diagram is a multi-purpose process flow diagram that is used to model behavior of the system. Activity diagrams can be used to model a Use Case, or a class, or a complicated method. An Activity Diagram is similar to a flow chart; the one key difference is that activity diagrams can show parallel processing. This is important when using activity diagrams to model business
processes, some of which can be performed in parallel, and for modeling multiple threads in concurrent programs.

**Using Activity Diagrams to Model Use Cases.** Activity Diagrams provide a graphical tool to model the process of a Use Case. They can be used in addition to, or in place of, a textual description of the Use Case, or a listing of the steps of the Use Case. A textual description, code, or another activity diagram can detail the activity further.

**Using Activity Diagrams to Model Classes.** When modeling the behavior of a class, a UML State Diagram is normally used to model situations where asynchronous events occur. The Activity Diagram is used when all or most of the events represent the completion of internally generated actions. We assign activities to classes before we are done with the activity diagram.

**Modeling Software Components.** The component diagram is used to model the structure of the software, including dependencies among software components, binary code components, and executable components. In the component diagram we model system components, sometimes grouped by package, and the dependencies that exist between components (and packages of components).

**Modeling Distribution and Implementation.** Deployment diagrams are used to model the configuration of run-time processing elements and the software components, processes, and objects that live on them. In the deployment diagram, we start by modeling the physical nodes and the communication associations that exist between them. For each node, we can indicate what component instances live or run on the node. We can also model the objects that are contained within the component. Deployment diagrams are used to model only components that exist as run-time entities; they are not used to model compile-time only or link-time only components. We can also model components that migrate from node to node or objects that migrate from component to component using a dependency relationship with the becomes stereotype.

**Relational Database Design.** The class diagram presents an implementation neutral mechanism to model the data storage aspects of the system. Persistent classes, their attributes, and their relationships can be implemented directly in an object-oriented database. However, in today's development environment, the relational database remains the predominant method for data storage. To capture this information we utilize an Entity Relation (ER) diagram. The class diagram can be used to model the logical framework of the database, independent of it being object-oriented or relational, with classes representing tables, and class attributes representing columns. If a relational database is the chosen implementation medium, then the class diagram can be mapped to a logical ER diagram. Persistent classes and their attributes map directly to logical entities and their attributes; the modeler is faced with choices on how to map associations over to relationships between entities. Inheritance relationships are mapped directly to super-sub relationships between entities in an ER diagram.
Once in the ER diagram, the modeler can begin the process of determining how the relational model fits together; and which attributes are primary keys, secondary keys, and foreign keys based on relationships with other entities. The idea is to build a logical model that conforms to the rules of data normalization.

When implementing the relational design, it is an advised strategy to map the logical ER diagram to a physical diagram representing the target RDBMS. The physical diagram can be denormalized to achieve a database design that has efficient data access times. Super-sub relationships between entities are resolved by actual table structures. In addition, the physical diagram is used to model vendor-specific properties for the RDBMS. Multiple physical diagrams are created if there are multiple RDBMS's being deployed; each physical diagram representing one target RDBMS.

**Programming/Development.** Our off site development team provides the bulk of programming services as part of our implementation effort. Our Team intends to utilize the off site team for development of system program modules as part of the project. This will provide the client with the most cost effective solution for the programming phase of the application development.

We realize the importance of Knowledge Transfer for this project. As part of the programming phase, we intend to maintain appropriate complement onsite team personnel as detailed in our organization chart in our response. This team will guide the project and work with the client for components requiring significant staff collaborations. This will help achieve client’s goal of being included in the programming development phase.

During the programming phase of the project, the onsite team will work with the client build and component test the modules of the system. The programming phase will constitute the building and component testing of application component modules. These include the Architecture and Application programs that will make up the application.

**Proposed Tools Used in Data Warehouse Components**

There are several tools that we that we will utilize in throughout this project to support the development of this project including source code control software, issue tracking software, Quality management software (PCG), project management software and an integrated project library to provide simple and easy access to all the required project resources.

- **ISBE SourceGear or VSS:** Source code and configuration management. As changes, and versions of the system are updated we will deploy version/revision control to manage these changes and help to create a consistent path forward as it relates to software quality.

- **Gemini by CounterSoft: web based issue management software.** All projects have issues and it is how we address those issues that are critical. We utilize Gemini for its simplicity and our ability to seamlessly integrate it with our SharePoint system.
SharePoint Project Library: Easy access to all project documents. A place to store all project documents, calendars and resources, externally hosted and managed by our team.

Approach to Maintaining Longitudinal Data (1.8.b)

The following details our approach to maintaining longitudinal data. The language contained within this section of the proposal is from a physical model to facilitate the comprehension of the contents since more people are familiar with physical terms (table, fields) as opposed to the logical terms (entity, attributes). Entity Relationship Diagrams (ERD) provide a visual representation of how the tables, or ideas, within a data model pertain to each other.

Naming Conventions. Consistent naming is important to modeling in that it allows information to be more easily digested. The State Core Model utilizes best practices naming conventions:

- Table names and field names are descriptive and written in camel-case (first letter of each word/acronym is capitalized).
- The name of a parent table may be used as the first part of a child table. For example, a person's (table Person) demographic information (table PersonDemographic) contains races (table DemographicRace). We can see how the migration of the name helps us identify the relationship of the data.
- The singular form is used for table and field names, unless the lowest level of an element is plural (e.g., 'OtherAcademicSubjects' is one idea, not many in that we do not know all of the subjects, we just care whether or not they exist).
- All reference data tables are prefixed with 'Ref' to indicate the nature of the data.
- Surrogate keys are the table name plus 'Id.' A table named 'Person' will have a surrogate key named 'PersonId.'

Tables. Tables are represented as a rectangle. The rectangle is divided in two by a horizontal line. Everything above the horizontal line is the table's 'primary key'.

```
Table
 TableId
 FieldName
```

The function of the primary key is to uniquely identify one record from all other records within the same table. The State Core model has utilized a design standard of 'surrogate keys.' Surrogate keys do not replace primary keys, but they simplify using them. Essentially, the Dewey Decimal System is a
surrogate key mechanism. One number is referenced instead of the title and author of the book. A table with rounded corners means that it is a child of an identifying relationship.

**Relationships.** The heart of the ERD is illustrating how data relates to itself. By effectively using lines and boxes, we can gather understanding from a simple diagram:

```
- Person
  - Address
- PersonJob
- RefJob
```

This tells us that a Person has an Address and a Job. We also know that the job has to have a valid piece of metadata (a record in `RefJob`) in order to be associated with a Person.

The majority of relationships within a data model are either 'identifying' or 'non-identifying.' Whether a relationship is identifying or not has to do with whether the parent table's primary becomes a part of the child table's primary key. To illustrate this point, consider the four tables above. What uniquely identifies a person's job record? Does the Person alone uniquely identify a `PersonJob`? No, since a person can have multiple jobs. Does the Job uniquely identify a person's job? No, since any number of people can have the same job. Consequently, to uniquely identify a Person's Job, we need to know the person and the job.

Since the State Core Data Model uses surrogate keys, the presence of identifying relationships is predominately reduced to sub-type/super-type relationships (0).

**Non-Identifying Relationship** A non-identifying relationship is represented by a dashed line between two tables. The diamond indicates the parent table and a solid dot denotes the child table.

```
- Person
  - PersonId
  - FirstName
- PersonJob
  - PersonJobId
  - HireDate
  - PersonId (PK)
```

**Identifying Relationship** An identifying join means that the parent's primary key is added to the child's primary key.
An identifying relationship is represented by a solid line between two tables. The solid dot indicates the child table.

Sub-Type/Super-Type Sub-type/super-type relationships indicate that a record of super-type may have a corresponding sub-type record, but a sub-type record cannot exist without the parent super-type. The power of super-type/sub-typing is that it allows one object to have a different set of properties. By extension, this mechanism allows for multiple tables to be referenced by one common object.

The horizontal line through the solid relationship line(s) indicates a sub-type/super-type relationship.

The following six subject areas are necessary to fulfill the functional objectives of a SLDS:

1. Data Sets - Time
Below, the six subjects needed for the core data warehouse are defined and described:

Data Sets - Time

The first subject that must be documented to establish a common understanding between agency staff and data warehouse engineers is somewhat abstract. The concept of "Data Set" can be understood as similar to what a header record is to a file or a card catalog is to a book. The Data Set subject must define each repository and functional component sufficiently to describe the context, type, and version of the repository.

Critically, the Data Set must distinguish between two types of date and time:

- **System Date** - When did the data warehouse access and acquire the data.
- **As of Date** - When is the data about?

This distinction is critical to managing most official reports. While the data in the system may change every day, there are certain snapshot periods or critical annual dates such as September 30 and December 1 that are used for state and federal reports. Because the data originates in district systems and there is inherent latency as it gets uploaded, validated, and corrected in the state system, the data can never be pulled on the specific date of interest. Therefore, a second date needs to be recorded documenting the date that the data is pulled.

Subject Detail: Data Set
This model does not represent source structures; it is an Operational Longitudinal Data Structure normalized and optimized for storage, not entry or reporting. There exists a global table called "Data Set". All (100.00%) data represented in the model will have relationship to a specific Data Set.
Organizations

After time, the next most central component of an education data warehouse is the directory. Organizations are entities that are not people. The most common type of organizations are public schools and local education agencies (school districts), however, there are many other types and sub-types.

In the context of postsecondary education, an organization may be broken into a variety of sub-entities.
Organizations have relationships to each other. The most common type of relationship is "parent" to "child," indicating that one organization contains or controls other organizations, forming a hierarchy. For instance, an LEA organization parents numerous school organizations which in turn parent numerous section organizations.

Indicators tend to be associated with organizations for a period of time (such as a school year). Organization indicators can cover a wide range of topics such as:

- Key Performance Indicators
  - Median Student Growth Percentile
  - NGA Graduation Rate
  - Chronic Absence Rate
  - Entered Employment Rate
  - Employment Retention Rate
  - Employee Earnings

- Financial Indicators
  - Total Revenues by Category
  - Total Expenditures by Category

Subject Detail: Organizations

(1) Organizations share few attributes in common. However, the normalized table is used for IDs and to hold relationships. The sub-type structure is used to hold the attributes specific to the primary organization types:

1. EC State Agency
2. EC Program
3. EC Group
4. K12 SEA
5. K12 REA
6. K12 LEA
7. K12 School
8. K12 Program
9. K12 Section
10. PS State Agency
11. PS Institution
12. PS Program
13. PS Section
14. WF Employer
15. WF Program

(2) A complex set of relationships between organizations is needed to accommodate multiple hierarchies within a single jurisdiction. The OrganizationRelationship table holds multiple roll-up hierarchies to accommodate states that vary the relationship between school, district, workforce programs, workforce employers, and region for AYP/accountability, financial systems, special education cooperative services, career technical education, and other subjects.

(3) Organizations often have academic years which are different from the calendar. The OrganizationCalendarRollup table is used to associate calendar days with such as terms, semesters, trimesters, quarters, and school years associated with a particular jurisdiction.

(4) Organizations often get specific aggregate statistics calculated annually or more frequently. These statistics are considered to be Indicators by the Model and are stored in the OrganizationStatistic table.

(5) Organizations and People can share locations. Location is described more fully in its own subject.

Additional Logic:

1. An EC Program may or may not be part of a SEA
2. An EC Program may or may not be part of a LEA
3. An EC Program may or may not have multiple locations or sub-types, called EC Groups.
4. Every K12 school is part of an LEA.
5. Every K12 section is part of an LEA and is usually part of a school.
6. A PS institution may be comprised of zero, one or many campuses and schools.
7. Every PS institution includes at least one program of study.
8. Every PS section is part of a PS institution and is usually part of a program.
9. A workforce employer can include a covered establishment or a Federal agency.
10. Most workforce programs collect monthly, quarterly and annual information from Workforce Employers.

**People**

A key requirement of the State Core Model is that people must remain consistent, despite varying roles and relationships with organizations. At any one point in time, Jane could be:

- A teacher in a K-12 school
- A parent of a student named Johnny
- A student herself in a post secondary institution.

Over time, these complex relationships become common. The State Core Model must contain an integrated, current view of each person, drawn over time from early childhood, K-12, post-secondary, and workforce sources.

Subject Detail: People

For the most part, People attributes are associated with a particular Person-Organization Relationship. People tend not to have roles or types outside of their relationship to an organization. A person is not a student unless and until they are enrolled in a school.
(1) **PersonName** and **Person Demographic** tables are shared across all types of people and can be more strictly controlled to restrict record and aggregate access in compliance with FERPA.

(2) The **PersonID** in the Person table is a synthetic key (generated by the system).

(3) **Person ID** and **Person Name** should be considered highly secure and should not be made available to any individual without clear authorization under FERPA and/or HIPPA. Highly secure tables can directly identify records associated with specific people. This information must be used for identity resolution and access by educators with legitimate educational interests.

(4) **Person Demographic** and **Location** must be kept secure at the record level as they can be used to identify individuals. However, they often play an important role in research and reporting, particularly in aggregate. Low N masking should be used when reporting this data to ensure that privacy is preserved.
(5) The **PersonIdentifier** table holds all types of Person IDs including the following types stored as a reference list in **RefPersonIdentifier** field:

1. Social Security Number
2. EC Local ID
3. EC State Assigned ID
4. K12 Local ID
5. K12 State Assigned ID
6. PS Institution ID
7. PS State Assigned ID

(6) The **PersonRelationship** table is used to store relationships between people that are not dependent on an organization (i.e. student-teacher):

1. Parent
2. Guardian
3. Child
4. Ward
5. Sibling
6. Tutor
7. Relative
8. Care Giver

(7) The **PersonIndicator** table can hold any information about a person that may or may not be derivable from other sources in the model. For example, HS GPA. A well organized taxonomy of **PersonIndicator** types can be used to create a person profile and transcript. States are encouraged to work together to compare such structures. The next version of this model will attempt to provide a common reference list.

**People-Organization Relationships**

The fourth core component of the State Core will contain a greater volume of data than all the others combined. It will hold a standard representation of each change in relationship between a Person and an Organization. Examples of these relationships include every time a student enrolls in a school or changes grades over the summer, or every time a teacher changes assignments within a district.

---

1 We understand that Social Security Number is not collected by ISBE and is included as an optional PersonID and should be used only for sanctioned workforce activities. In some cases workforce IDs are used for non-citizens as a replacement for SSN.
In addition to storing the relationship between people and traditional organizations, it must also hold the relationship between other groups of people used for counting at particular dates for state and Federal reporting. These "programs include:

- Special Education
- Free and Reduced Lunch
- Title I – Students in Poverty
- Title III – English Language Learners
- Perkins - Career Technical Education
- McKinney –Vento -Homeless
- Migrant
- Neglected and Delinquent
- Gifted and Talented
- 504

This Person-Organization Relationship must be the central component to the more normalized, "operational" portion of the data warehouse.

Most importantly, each change in relationship between a person and organization must record a single start date and, if applicable, end date. This subject establishes a common time dimension and is essential for creating proper snapshots of data at particular "as of" dates to fulfill state and Federal reporting.
States allow enrollment split by FTE.

allow students to be a member of more than one school or district on any one day, although some states do not. Service school/district is where the student attends and receives services. Most states do not
hold the student for AYP. The resident school/district has jurisdiction for where the student is
enrolled in a school/district as a member. Resident or service district is the member school/district. A student can be enrolled in a school/district as a resident, member, resident of service district. The member school/district is

snapshots are greatly facilitated.

snapshots of specific reporting data. By normalizing this key attribute, the process of producing RDS
field, and where applicable, an Extract make a standard containing time dimension to facilitate RDS
This

snapshot.

The third primary subject is the central core of the Model, the Relationship between People and

Subject & Detail: Person/Organization Relationship

Business and Technical Requirements Response

REDACTED
(3) K12 students are recognized as participating in certain federal, state, and local reporting programs for vertical reporting and counting. Reporting programs include: Special Education, LEP, Migrant, Homeless, Neglected and Delinquent, Medicaid, Title I, CTE, Immigrant, and 504.

(4) Workforce employers report on workforce employees' social security number, wages and the workforce employer's industry. A workforce employee's social security number, employment status, and earnings can be used to track common workforce performance measures within and across federally funded workforce employment and training programs.

(5) Workforce employees who are employed or formerly employed can participate in workforce employment and training services provided by federally funded workforce programs.

Additional Logic Rules:

1. EC Child or pregnant EC Parent can be enrolled in one or more EC Program.
2. K12 Student can be member enrolled in a grade in a school in a district.
3. K12 Student can be resident enrolled in a district, and sometimes a school in the district.
4. K12 Student can be serviced by a school in a district.
5. K12 Student can be enrolled into one or more section in a school in a district.
6. K12 Staff can be assigned to one or more section in a school in a district or just to a school or district, but start out un-assigned.
7. PS Student can be enrolled in one or more PS institutions.
8. PS Student can be member enrolled in one or more programs within a PS institution.
9. PS Student can be enrolled in one or more sections in a PS institution.
10. Workforce employees are either currently or formerly employed by a workforce employer.
11. A workforce employee can also be a student.
12. Workforce employees who are no longer employed can apply for and collect unemployment insurance benefits.

Subject Detail: Student-Teacher Link

One particular type of Person-Organization Relationship of special note is the Student-Teacher Link. While this subject shares the general structure of the OrganizationPerson table with EntryDate and possible ExitDate, it requires a specialized set of elements needed to establish one or more
TeacherOfRecord. The structure must also be able to capture the roles and details of the relationships between a student and each contributing educator within the context of a course-section.

The most common representation of the Student-Teacher Link will be one in which the Organization is a Section of a Course scheduled within a school, with at least one teacher and a roster of students. The State Core Model provides the structure for maintaining this relationship and leaves flexibility to education agencies, based on local policy, as to the allowable roles and participation weighting of the contributing educator relationship.

Standards & Assessments

The last two subjects are not central to the model, but are sufficiently important to warrant their own subjects. The first is Standards and Assessments. These entities have relationships to both People and Organizations.

They include:

- Assessments
- Assessment Result Sets (Student Scores)
- Learning Standards.
Subject Detail: Standards & Assessments

The Assessment, Learning Standards, Content subject are based heavily on the SIF 2.4 specification.

Much of the data structure exceeds that which is typically maintained by an SEA as data.

1. Tables such as AssessmentAdministration would like need to be entered by a person. However, they would only need to be entered once for a statewide assessment administration.
2. The primary field to hold student's scores is the ScoreValue in the Score table.

Special Events

The final subject area contains a set of topics with a common relationship to time. In general events happen to individuals on a particular day and include:

**Special Education**
- Referral
- Evaluation
- Determination
- Placement
- Services

**Discipline Incidents**
- Suspensions
- Annual Review
- 3-Year Review
2. Expulsions
3. Weapons

Attendance
1. Daily
2. Period
Subject Detail: Special Events

The Special Events subject deals with the sequence of events associated with special education, response to intervention (RTI), dropout early warning intervention systems (DEWIS), and positive behavior intervention systems (PBIS).

1. In all the process starts with a Referral event. Either a Person or an Organization can Refer a student as a result of a Child Find or screening process.
2. If the referral is to special education, the student's parents must be notified and (3) consent received to evaluate the student.
3. The Evaluation results are used as part of a SpecialEventMeeting to determine if the student is eligible to receive services.
4. The specific services to be provided are organized into a Plan.

Relationships Between Subjects

As important as the subjects are is the relationship between them. The conceptual model below shows the relationship between the primary subjects and sub-types. The model operates at the level of abstraction of people and organizations. Location is global.
ODS: A Physical View of the Logical Model
Entity Attribute Value (EAV)

The EAV schema is a normalized structure for recording changes to the ODS and maintaining each jurisdictions official data dictionary and maps to other data dictionaries and specifications.

(1) The AttributeDataDictionary table is used to store the ODS metadata and RDS Data Dictionary of the State Core Workbook.

(2) One possible way of creating maps from the ODS to the RDS would be to represent attributes in ODS to create a results set to represent part or all of the reports in RDS. This would enable persistency for ad hoc reporting.

(3) RefJurisdiction is used to store the jurisdiction of the specific instance of the model being used. For example, ISBE would be stored as a value in the Jurisdiction field in the RefJurisdiction table to indicate whether a specific value is local to a jurisdiction (e.g. LEA code) or is a global (e.g. Sex) value.
RDS: Snapshot

The RDS schema is a single theoretical reporting data structure. In implementation, multiple versions of the RDS would be used and optimized together, however, a single, standard RDS schema can be used as a foundation of common transformations to create a data set "as of" a specific date. Subsequent transformations (such as exclusions/filters) can be layered next to create usage optimized data marts.

Additional Logic:

1. Student transcript is a view of a student profile. Student profile is a portion of an RDS snapshot drawn from across the ODS.

Data Warehouse Web Portal (1.8.c)

Enterprise Portal

The delivery of data to users must go beyond just simple visualization and analysis capabilities, but also include the ability to interact with and collaborate on that data. One of the significant benefits of
working with the PCG team is that our gateway to the system is a powerful and proven educational Portal built upon SharePoint. This portal is a proven implementation and could provide a new, cost-effective, communication and collaboration infrastructure for all ISBE's educational systems users.

Enterprise portals are not a new concept. When first introduced, they provided rudimentary single sign-on and content management capabilities. In fact, first generation portals provided little more than static web pages and document sharing (collaboration) facilities. Today, portals have the potential to provide an extensive environment for managing structured and unstructured content of all types such as multimedia files, text documents, web pages, spreadsheets, presentations, etc. It is in this context that Choice’s edFusion Enterprise Portal was envisioned as the single landing point for all users. edFusion Enterprise Portal* is an integrated suite of server capabilities that can help improve university effectiveness by providing comprehensive content management and enterprise search, accelerating shared business processes, data analytics, and facilitating information-sharing across organizational boundaries for better decision making.

The edFusion Enterprise Portal, which is built upon Windows SharePoint foundation, supports all intranet, extranet, and Web applications across an enterprise from one integrated platform, allowing the aggregation of the disparate systems present in most SEA and LEA organizations. The portal is designed to address common IT issues facing education agencies:

- Creating a uniform and consistent access to digital assets.
- Reducing complexity and increasing collaboration amongst agency personal and systems.
- Delivering an enterprise directory and security framework enabling single sign-on across all agency assets.

As the edFusion Enterprise Portal Architecture figure depicts, edFusion builds on a number of enabling technologies that provide connectivity to disparate information stores found throughout the enterprise. EdFusion allows for searching across different data stores and enables integration of SEA and LEA applications and functional areas into the portal. The portal is designed to deliver:

- Personalized unified communications and access to enterprise resources (e.g. e-mail, instant messaging, URL links, and bookmarks).
- Centralized personal storage management (i.e. “virtual hard drive”) and access to agency content.
- Targeted and personalized message dissemination (e.g. Real Simple Synchronization feeds and Blogs).
- Comprehensive security model to enable single sign-on across agency IT infrastructure.
- Managed content dissemination (i.e. Reports, Data for Analysis, Digital Rights Management).
The edFusion Enterprise Portal enables the creation, management, collection, and sharing of data from a centralization point of access. It provides a security infrastructure that limits access to sensitive organizational and/or student performance data based on the user’s credentials.

**Web-Based Administration**

Our proposed ILDS solution features a web-based administration console that does not require additional software at client workstations. Two components also include a desktop client automatically installed with the server that does not require any additional software installations.

**Proposed Implementation Approach (I.B.d)**

At the core of our proposed technical approaches is a commitment to open standards, scalable architecture, and a sustainable business approach. Having worked on several similar initiatives in K-12 clients, we have seen what works and what is to be avoided in a data warehouse solution. We are committed to utilizing our lessons learned to help ISBE create the forward thinking and impactful K-12 Statewide Longitudinal Data System (SLDS).

To do this, we are committed to providing ISBE with a highly qualified team that can exceed all expectations. These resources will have detailed knowledge of the proposed technologies as well as prior experience working on or with similar projects in the education space.

When we undertake the ILDS development effort, it is critical for us to align ourselves with all the key stakeholders, both internal and external. From our prior experience, we understand what is critical in an education portal, but subtle differences make all the difference in a successful implementation. Although we are certain we can implement a solution that meets the majority of your needs, our ability to gather all information and the ongoing feedback from your users will be critical to create the type of solution that will insure your long-term success.

The first two steps we look at in this design are:

1. Establish Stakeholder Communication Channels
2. Stakeholders need to be defined, identified; their vision needs to be introduced.
Stakeholders include the users of the portal (Teachers, Administrators, students, parents, etc) and the technology staff at ISBE.

Establish Relationship and Interaction Guidelines

Once the stakeholders are identified, it becomes necessary to develop the interaction guidelines and define peoples’ relationships to the project. What we would recommend is a committee with at least two members of each user type included.

Result: Every stakeholder’s needs and vision are documented.

Establishing a Project Management Office

We will establish a Project Management Office with key management staff from both ISBE and PCG. This team will oversee the project’s progress and assess the results to ensure the project is moving as per the plan.

Here is our proposal for Project Management Office for this initiative:

Key objectives of the PMO:

- Managing human relationships in the project organization.
- Maintaining the balance between technical, analytical and managerial project functions.
- Coping up with risks associated in managing an enterprise system development.
- Surviving organizational restraints.

Detailed PMO activities are found in Section 1.7.

Results of Stage – 1:

- A highly integrated and powerful Project Management Office is established to oversee all the development phases of the project life cycle.
- Stakeholder commitment
- Stakeholder’s vision communicated
- Architectural goals established
We believe that there are several key components that must be addressed to assure the future success of the ILDS; Architecture and Design (including UI), Development, Project Management and Testing. Without a high level of quality, scalability and accuracy, an effective and scalable SharePoint Portal can never be a success.

There is no substitute for experience and we are confident that our team will provide you with the exact experience you need to make the future of ILDS a success. This experience, effectively coupled with your staff's knowledge from both a technical and business perspective, will assure success.

**Technical Architecture**

*Goal*

The goal of the Software Architecture phase is to enable ISBE to use effective software architecture practices to exert significantly greater control over key product qualities such as reliability, security, modifiability, performance, and affordability and to mitigate the risks involved in achieving and making the necessary tradeoffs among these qualities. Our prior work with ISBE in building the ILDS data architecture sets us apart from other bidders in our advanced knowledge of the data architecture and ILDS requirements.

*Our Approach*

ISBE needs the ILDS to be modifiable, easily maintainable and to perform predictably. ISBE also needs it to be secure, interoperable, portable, usable, and reliable. These quality attributes depend on choosing the correct software architecture. As systems become larger and more complex, software architecture takes on an even more important role.

By achieving this goal, ISBE will have a best of the breed application that will work well using the latest web application technologies and will stay ahead of the technology ensuring future maintenance will not be an issue for years to come. An advance in only the underlying technology is by no means the sole objective; advanced technology must also come with increased performance, reliability, maintainability and usability.

In order to minimize the risk, prove the architectural framework and provide an efficient turnaround and accurate design specifications, the PCG team will work to:

- Utilize extensive knowledge and expertise in SharePoint, SQL Server, AD and .NET;
User Interface Design

Many technological innovations rely upon User Interface Design to elevate their technical complexity to a usable product. Technology alone may not win user acceptance and subsequent acceptance. The User Experience, or how the user experiences the end product, is the key to acceptance. And that is where User Interface Design enters the design process. While product engineers focus on the technology, our UI designer will focus on the user interface.

While User Experience Design includes the human-computer interface, it is about designing the total user experience, which consists of all aspects of a product or service as perceived by users. Creating a successful user interface needs to be a completely collaborative effort between product users and owners.

Design Principles

Simplicity: Don't compromise usability for function

Keep the interface simple and straightforward. We believe that users will benefit from function that is easily accessible and usable. A well-organized interface that supports the user's tasks fades into the background and allows the user to work efficiently. Basic functions should be immediately apparent, while advanced functions may be less obvious to new users. Function should be included only if a task analysis shows it is needed.

Support: Place the user in control and provide proactive assistance

To give users control over the system, enable them to accomplish tasks using any sequence of steps that they would naturally use.

Familiarity: Build on users' prior knowledge

A small amount of knowledge, used consistently throughout an interface, can empower the user to accomplish a large number of tasks. Concepts and techniques can be learned once and then applied in a variety of situations. Users should not have to learn new things to perform familiar tasks. The use of concepts and techniques that users already understand from their real world experiences allows them to get started quickly and make progress immediately.

Obviousness: Make objects and their controls visible and intuitive
Wherever we can, we use real-world representations in the interface. Real-world representations and natural interactions (direct action) give the interface a familiar look and feel and can make it more intuitive to learn and use.

*Satisfaction: Create a feeling of progress and achievement*

Allow the user to make uninterrupted progress and enjoy a sense of accomplishment. Reflect the results of actions immediately; any delay intrudes on users' tasks and erodes confidence in the system. Immediate feedback allows users to assess whether the results were what they expected and to take alternative action immediately.

Having worked with several clients in the past to create a new and dynamic User Interface, we understand the challenges inherent in creating a new user experience. There is no substitute for working sessions utilizing software tools and whiteboards to create with key product stakeholders.

We believe by showing our clients multiple designs, color schemes, and layouts we can more accurately and quickly provide our clients with the true look and feel they desire. This iterative approach leverages the clock as well as cost savings.

**Summary of Incremental and Iterative Methodology**

The incremental model combines elements of linear sequential model with the iterative philosophy of prototyping. Each linear sequence produces a deliverable increment of the software. When an incremental model is used, the first increment is often the infrastructure services and small business functionality - core product. The basic requirements are addressed but many supplementary features remain undelivered.

ISBE will use the proof of concept to provide the feedback on the core system. Based on the user feedback, plan is developed for the net increment. The plan addresses modifications of the core product as well as the additional features and functionality. This process is repeated following the delivery of each increment until the complete product is produced.

**Results of Stage – 2:**

- Technical architecture established.
- Technical architecture is proven with identified business functionality of the first iteration.
- An effective and realistic project plan will be delivered with the X number of subsequent iterations defined and scheduled.

This type of lifecycle is a risk mitigation driven process.
Building the system in this manner exposes and mitigates the risks of the system early in the lifecycle. The result of this type of lifecycle is less risk coupled with minimal investment.

Our Approach

Given the functionality and number of interfaces required to support the ISBE’s requirements, the programming phase will continue throughout the project life cycle to support the various iterations and builds to ISBE. The development team will utilize its implementation methodology so that each build adheres to coding, review, testing and quality standards as outlined at the commencement of the project.

The programming methodology involves completing a variety of key tasks. Each task defines a repeatable process to provide for consistency in the programming effort across each of the multiple builds of the ILDS.

We also feel that once the technology approach is proven this will provide us with the ideal opportunity to involve your existing staff with discrete components of this effort. The involvement of existing staff will provide ISBE with a unique opportunity to aid in the overall development as a method of ramping up existing staff on the new architecture.

Iterations

We are committed to providing accurate status of progress at periodic intervals. As the clear proof of our progress can be clearly demonstrated using measurable results, we deploy software in iterations on both our own and ISBE’s infrastructure for the key stakeholders to review the status of the software.

An iteration delivery plan will be defined at the end of Stage-2. This will enable ISBE and the PMO to understand the status and understand the risks (or lack of) of the project and will help everyone to take necessary steps to mitigate the risks.

Communication Plan

Establishing an efficient communication plan is extremely vital in any development engagement. We use a series of tools and methods to create nearly seamless communication between teams and locations.
Tools

The foundation of our communication process is the utilization of our SharePoint portal which is established for each initiative. Utilizing SharePoint for the past three years has provided us with a robust and cost effective collaboration tool for document management, project tracking, and scheduling.

In addition, we have utilized several commercial and opensource bug tracking software including Footprints, Bugzilla and Jira. Depending on your needs and comfort level, we will utilize one of these tools or others if needed. When working on any enterprise engagement, it is critical that all bug tracking is done in an efficient way to avoid rework.

Unit Testing

After performing a detailed design and building the components of the ILDS, our team will test and implement the system applications required to support the primary business processes of each capability release. We utilize a proven testing methodology to help facilitate the testing approach, which provides the following benefits:

- Improved quality and reliability
- Reduction in the amount of rework
- Reduction in the cost of problem correction
- Efficient testing by focusing on the objectives of the various tests
- Requirements traceability, allowing informed scope decision
- Improved risk management
- Success criteria determined up front, encouraging a more focused effort

Results of Stage – 3:

- Iterative development resulting in a successful delivery of the new ILDS
- Effective source code management
- Telephone conferences are scheduled at pre-defined intervals for updating the status to key stakeholders
- PMO telephone conferences are scheduled at pre-defined intervals
- Written status reports
- Project progress is published on SharePoint site at pre-defined intervals
- Real time reporting of bugs and issues on a Bug Tracking system
- Real time connectivity to ISBE will provide the ability to deploy software on ISBE’s infrastructure
- Detailed design documentation created and used by the development team for each of the modules
We recommend system level testing to validate the functionality of the Illinois Longitudinal Data System. The goal of system testing is to check that the functions in the ILDS have been implemented correctly. During this period, ISBE will conduct the acceptance testing and report all the issues in the bug tracking system.

Our team will develop a system test plan along with the ISBE team early in the System implementation. This plan will define the specific testing to be performed, the timing and method of the testing and the personnel involved. Members of our team and personnel from ISBE will work together to develop scenarios to test each condition. The test conditions will be grouped into test cycles to test the business processes and operations of the system.

In addition to verifying that the ILDS functional requirements have been addressed, the system test will confirm the following:

- Interfaces pass and receives required data
- Code tables are completely populated with correct values
- On-line performance requirements are addressed
- Batch processing requirements are addressed

Guiding Testing Principles

Throughout the system testing process for the System development, our team will be guided by the following principles:

Plan early: This facilitates starting the test on time and staying on schedule.

Test the most important things first: The testing effort will be sequenced based on the ISBE's priorities and values. We often use the risk assessment techniques to understand what ISBE's priorities are for the specifications and testing stages accordingly.

Minimize gaps and overlaps in testing: Our team will clearly define the objectives of each test stage and will establish entry and exit criteria to help ensure that those objectives are met.
Define test conditions and cycles: This is often achieved as part of specification development in order to enable that the specification is complete and can be tested.

Develop well-documented, repeatable test models: This facilitates analysis of problems and regression testing in the current release, as well as testing of future releases.

Automate testing: Tools currently exist for documenting test models, issue tracking, script recording and playback, data generation and manipulation, comparison of actual to expected results, and configuration management. Using these tools simplifies the testing process, and can result in significant cost and schedule savings.

During this stage of the life cycle, our team will answer questions raised by ISBE observers and users, and will correct critical deficiencies identified during the application software acceptance-testing period that prevents the operation of a required capability and that was documented/entered through bug tracking system or an issue tracking system. Our team will work with ISBE to define a four step process to categorize the bugs in the system. The four categories can be:

- Critical
- Serious
- Medium
- Low

During this stage, the PCG team will work diligently to fix all the issues. The priority of the bugs/issues will be addressed in the order mentioned above. When all the Critical issues are resolved, then we move on to the Serious issues, and then to Medium and Low. By the end of this stage, we will be confident that all issues of Critical nature have been addressed. If there are any Serious, Medium, or Low category issues, they will be addressed during the warranty period.
As mentioned, we view our clients as partners and we must establish a level of trust and cooperation to effectively work together. Over the development process, we will have established ourselves as teammates and creating continuity is a critical factor in handing over any application. We are committed to working with ISBE to develop not only the ILDS but existing staff members into the ongoing maintenance and support of this application if desired by ISBE.

To maximize the effectiveness of any post-implementation/maintenance engagement, PCG and ISBE will have to define the processes and components to be utilized. Implementing standardized processes and procedures dramatically increases the odds of the projects to succeed. The PCG team has experienced many successes by adhering to standardized processes and procedures, thus minimizing the risk associated inherently with any software maintenance project. For example, Choice Solutions achieved ISO 9000:2001 certification mapping to CMM Level 4 in November 2001, validating our processes and procedures.

Our methodology's goal is to ensure the enhancement and maintenance of high-quality software that meets the needs of its end-users, while minimizing interruptions and adhering to specific schedules and budgets. This model is based upon relevant process templates when building software systems (web applications of different scales, business support systems, network applications, etc.). For instance, our use of incremental and iterative models allows us to smoothly incorporate changing customer requirements into a project's final system architecture, so that we can tailor the end product to meet our customer's real needs.

**Systems Design and Development Approach (1.8.d.ii)**
System design and development approach is addressed in the proposed implementation approach section above, and also in section 1.7.d.

**Testing Strategy (1.8.d.ii)**
Testing strategy is addressed in the proposed implementation approach section above, and also in section 1.7.d.

**Implementation Strategy (1.8.d.iii)**
Implementation strategy is addressed in the proposed implementation approach section above.

**System Maintenance and Support Approach (1.8.d.iv)**
System maintenance and support approach is addressed in the proposed implementation approach section above.
Help Desk: Support (1.8.dv)

Support for ISB!
To assist in the ongoing success of the implementation, Choice Solutions provides an experienced team of support professionals.

Support Team
The support team will provide ongoing support and maintenance for ILDS. Technical support is available through the following venues:

Phone Technical Support:
Phone Hours: 8 AM to 5 PM Eastern Standard Time (USA), Monday through Friday, excluding U.S. national holidays
Toll Free Phone Number: 877-548-4067

E-mail Technical Support
Email Hours: 24 hours, 7 days per week, 365 days of the year (response time may vary)
Email Address: support@choice20.com

The Choice Solutions Collaborate Portal offers downloads of the latest versions of our products, the ability to open or view support cases, browsing technical support bulletins and product documentation, and access to our technical knowledge base. It is located at:

http://collaborate.choice20.com/sites/support/ProductionSupport/default.htm

Support Levels
We use the following Support Levels to provide timely, cost-effective, and logical resolution of any support issues. Level 1, Level 2, and Level 3 will all be available up to and during the performance period; Level 3 will continue for 12 months under the warranty.

Level 1 Support
Level 1 support for end users includes providing answers to basic how-to questions about the use of the product, response to requests for materials and media, and providing entry level consulting on use of the solution.

Level 2 Support
For end users and support personnel, Level 2 support includes answers to more advanced questions regarding use of the product; investigation of data-related problems using system level utilities; and research implementation and integration problems. However, Level 2 support does not include any services which reasonably would require access to source code.

ISBE shall determine its own methods for escalating support requests from Level 1 to Level 2 as long as those methods are consistent with the terms of the Final Agreement.

**Level 3 Support**

Intended for state support personnel, Level 3 support supplies support services to provide technical resources for in-depth product concerns or data manipulation and advanced consulting as well as resolving problems that cannot be resolved with Level 2 support. Choice Solutions will provide Level 3 support to ISBE at no additional cost.

**Warranty (1.8.d.vi)**

We provide a one-year warranty for the products proposed in our response to the RFP. The warranty period begins when ISBE accepts delivery of the system. During the one-year warranty period, we will diagnose and fix system features and functions that do not function as stated in the product documentation or in this RFP.

We also provide a software warranty that the products delivered to ISBE will function according to provided product documentation. Issues reported by ISBE will be addressed by our team at no charge to ISBE.

**Version Control Approach (1.8.d.vii)**

**Software Configuration Management Process**

**Process overview**

**Software Configuration Management (SCM)** is a set of activities that are designed to identify software work products that are likely to change, establishing relationships among them, defining mechanisms for managing different versions of these software work products, controlling changes that are imposed, and auditing and reporting on the changes that are made.

SCM is the process used during software development and maintenance to identify, control, and report functional and physical configurations of software products (e.g., source code, executable code, databases, test scenarios and data, and documentation).

The objectives of SCM are to:

- Identify, record and control Configuration Item (CI) versions and changes throughout the SDLC.
• Track and report the status and history of each CI as it is developed, modified and base lined
• Record the status of each new build of the project
• Control and authorize new versions and releases

Software Configuration Management activities are:
• SCM Planning
• Configuration Control
• Change Management
• Configuration Status accounting
• Configuration audit

Software Configuration Management Process Stages

1.) Process overview
Technical Lead prepares a Configuration Management Plan for the project as a part of the Project Plan. Configuration Management Plan is reviewed and approved by Project Manager.
Configuration management plan reflects the configuration management activities as outlined in this procedure, applicable for a specific project or product.
Based on the configuration management plan, the System Administrator creates the project specific directories in the server.

2.) Responsibility
Technical Lead – Preparation of Configuration Management Plan
Project Manager – Review and approval of Configuration Management Plan
System Administrator – Creation of project directories

3.) Entry criteria
Release of work order for development

4.) Inputs
Identification of Configuration Items (CI)

5.) Activities
Prepare Configuration Management Plan
Configuration Management Plan consists of CI Identification with identification numbers - Define Product Structure - Define Product baseline Identification - Baseline Configuration Documentation
Review Configuration Management Plan
Approve Configuration Management Plan
Creation of project directories

6.) Exit criteria
Performance

Perform Performance Modeling

At the core of our approach is designing our solution to address your performance requirements for both speed and growth. At the core of this approach is our performance modeling which will take into account known characteristics of the system, including the need to confirm to that system:

- Handles peak processing volumes
- Provides ISBE with processing flexibility
- Interfaces with number of external systems
- Handles multiple channels
- Address data integrity, data security and disaster recovery processing
- Handles a large and diverse user population

Our standard performance methodology prescribes an iterative process where the three key phases: perform performance modeling, analyze performance estimates, and set performance goals are repeated in order to accurately measure and facilitate the performance requirements of the system.

By utilizing estimating models that we have developed from assisting other clients, we will create the performance model and estimates for the Longitudinal Data System. The model will include standards parameters such as transaction demands, number and distribution of users, data storage requirements, and response time guidelines. ISBE specific inputs to the model will include parameters such as the number of applicants, the size of each application, the number and type of processing rules, and the number of steps in the workflow.

Our team will review the performance estimates to create the performance goals for the Longitudinal Data System. The estimates will be compared to similar sized projects as well as actual results created from initial system testing and eventually, production testing. Differences will be documented and researched. The results of the analysis will be used for performance tuning tasks.
The performance goals for the Longitudinal Data System will articulate the desired performance and will be detailed and quantified to allow for measurement. These goals need to be agreed to by all the parties.

Our solution has been architected in conjunction with Microsoft's product team to ensure consistency and scalability of the solutions. Our team will work with ISBE to understand your existing infrastructure as well as work with your team to understand your desired implementation architecture. Our solution supports clustering, virtualization and other architectures to ensure this solution meets ISBE's term objectives.

Training Approach (1.8.e)
We believe it is critical to train, then install, then train again. This training reinforces learning for ILDS users and drives their ownership of the solution.

Designing Training for ISBE Users
For each district solutions user group, our team will provide training tailored to their specific needs—designed to educate on the day-to-day use and support of the solution. Basic training includes installation, configuration, and continued maintenance of the ILDS infrastructure. We will customize ownership training to the needs of ISBE.

System Administration Training
We will provide up to two weeks of ownership training for system administrators, which cover the following topics:

- Managing security and user access
- ILDS maintenance and support
- Adding data sources
- Updating and adding the extract, transform, and load (ETL) process with external databases
- Data validation and cleansing
- Fact and dimensional table modeling
- Creating and updating online analytical processing (OLAP) cubes
- Creating queries, ad hoc, and standard reports
- Creating complex queries
- Exporting tables and data to external databases
- Maintaining and updating training and online help documentation

Supplementing Installations with Training
Additionally, on-the-job training is provided so state personnel can observe and participate in one or more remote installations with our personnel in support.

Proposed Technical Environment (1.8.f)
The following sections describe our proposed technical architecture that will provide an integrated longitudinal data warehouse environment.

Software and Hardware (1.8.f.i)
We will comply with the software and hardware proposed by ISBE.

Solution Infrastructure (1.8.f.ii)
The figures below document a proposed hardware configuration. The revised physical architecture will be provided as part of the project.
We understand and we will comply with ISBE's requests. SQL Server 2008 will be used for the database platform for the ILDS solution. We will work with ISBE operations staff in the development of maintenance procedures, including the backup and recovery strategy and procedures for production, development, and test environments.

Proposed Hardware and Operating System Platform and Software Components (I.E.iii)

The table below provides proposed hardware and operating system platform and software components.
### Recommended Server | Purpose | Configuration
---|---|---
Dell R610 or R710 if rack environment | Portal Server - Web Server (Clustered for High Availability) SharePoint Cluster Portal Server1 Portal Server2 | Production Configuration: All the servers are physical. Windows Server 2008 R2 Ent x64 No Service Pack SharePoint 2010 x64 SP2 Internet-Extranet 2 Quad CPU = 8 Cores @ 2.93 MHz 48 GB Memory 146 GB 15K RAID 1 - OS 146 GB 15K RAID 1 - SharePoint & Dundas 146 GB 15K Hot Spare Databases on Clustered SQL Servers

Dell R610 or R710 if rack environment | Reports Server | Windows Server 2008 R2 Ent x64 No Service Pack SQL Server 2008 Enterprise x64 SP1 2 Quad CPUs = 8 Cores @ 2.8 GHz 48 GB Memory 300 GB 10K RAID 1 - OS 300 GB RAID 1 + 0 - DB Logs 300 GB RAID 1 + 0 - DB Files

Dell R610 or R710 if rack environment | Data Warehouse Server | Windows Server 2008 R2 Ent x64 No Service Pack SQL Server 2008 Enterprise x64 SP1 2 Quad CPUs = 8 Cores @ 2.8 GHz 48 GB Memory 300 GB 10K RAID 1 - OS 1200 GB 10K (5 drive) RAID 5 - SQL 300 GB 10K Hot Spare Back up on SAN or NAS

Dell R610 or R710 if rack environment | SharePoint Transactional Server | Windows Server 2008 R2 Ent x64 No Service Pack SQL Server 2008 Enterprise x64 SP1 2 Quad CPUs = 8 Cores @ 2.8 GHz 72 GB Memory 300 GB 10K RAID 1 - OS 1200 GB 10K (5 drive) RAID 5 300 GB 10K Hot Spare Logs and databases on NAS/SAN

### Software (1.8.f.v)

<table>
<thead>
<tr>
<th>OEM</th>
<th>Software</th>
<th>Functionality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft</td>
<td>Microsoft Server 2008 r2 EE</td>
<td>Operating System</td>
</tr>
<tr>
<td></td>
<td>SQL Server 2008 R2 EE</td>
<td>RDBMS</td>
</tr>
<tr>
<td></td>
<td>SharePoint 2010 EE</td>
<td>Portal and UI</td>
</tr>
</tbody>
</table>

**Performance and Availability and Problem Resolution Requirements:**

We will meet the performance and availability and problem resolution requirements as stated in the RFSP. The environment will perform in a manner that provides sufficient system response time and
minimal system downtime. PCG will validate the requirements during testing and implementation of each phase.

Proposed Security and Security Architecture (1.8.g.i-iii)
The ISBE, like all SEAs, has a diverse and challenging set of users to provide meaningful and impactful data to. It is critical that we create a security solution that protects that data and only allows the right people to see that information. Luckily, this is a challenge we have been working on since 2000 and have now implemented for SEA and LEA clients throughout the country.

As identified, security and user/identity management is one of the most complex and critical components of any data system. Opening up a data system to a broader audience requires a level of policy and system engineering which is not for the faint of heart. Luckily, this is not a problem we have just started dealing with but one that has its birthplace within the Massachusetts Department of Education almost a decade ago.

When looking at the security requirements of any educational entities, it is readily apparent that the challenges with user management become increasingly complex due to the various federal mandates (HIPAA, FERPA), internal IT security Policies, and organizational policies, as well as the various roles that one individual might have within an entity. The answer to those problems is to implement an enterprise-wide Role Based Access Control (RBAC) using the edFusion Directory and Identity Manager, as described earlier in this section of our response.

The solution will provide ISBE with a granular level of security and access control capabilities for the data warehouse. We have designed an education-specific enterprise directory to power the edFusion portal and provide comprehensive and integrated identity management. The portal and directory will allow ISBE to effectively manage all educational resources and provide users with relevant and useful information.

Strict Access Control to Maintain Security
Through the user-friendly enterprise directory manager interface, ISBE can set access rights for individual users as well as groups. Our team will give the State Administrator role the ability to manage roles, users, and organizational settings. Views for administrators are customizable.

Finely-tuned access control to every application is managed through the security profile assigned to each user's role. The role management process recognizes the organizational hierarchy level. Users can be assigned roles based on organization level.

The directory integration protocol will store, synchronize, organize, and present user IDs. Every user in the system will have a secure user ID and password. Users will access the ILDS through a single login.
edFusion

Identity Management Solution. The directory integration protocol will store, synchronize, organize, and present user IDs.

Through the edFusion Education Identity Manager, our solution will provide a consistent, enterprise-grade security model for the ILDS solution. The edFusion Education Identity Manager framework leverages commercial-off-the-shelf (COTS) software, customized code, and IT education systems domain expertise to deliver a single collaborative environment for education. The architecture of the edFusion Education Identity Manager framework is based on the comprehensive, yet modular, set of solutions to address ISBE needs while not overlooking existing investments or systems.

Our solution also allows for the edFusion Directory and Identity Manager to control data constraints like small-cell suppression based on n-values and controlling user’s access to reports based on the four pillars described above.

Security components provided by the edFusion Education Identity Manager are illustrated by the following figure:

<table>
<thead>
<tr>
<th>Security Components Provided by the edFusion Education Identity Manager Framework</th>
<th>Managing Security and Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logging and Access Rights Security</td>
<td>Role management functionality</td>
</tr>
<tr>
<td>Robust security infrastructure</td>
<td>User roles created according to ISBE preferences</td>
</tr>
<tr>
<td>Password protected system</td>
<td></td>
</tr>
</tbody>
</table>

Figure 8.13 edFusion

January 5, 2011
<table>
<thead>
<tr>
<th>Logging and Access Rights Security</th>
<th>Managing Security and Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private passwords</td>
<td>Permanent system roles</td>
</tr>
<tr>
<td>Limited number of failed login attempts</td>
<td>A user creation and role assignment process</td>
</tr>
<tr>
<td>Password reset function</td>
<td>Functional capabilities for the system administrator</td>
</tr>
<tr>
<td>User notification</td>
<td>Ability to assign roles to an application</td>
</tr>
<tr>
<td>Define security permissions at any level</td>
<td>Page controls management function</td>
</tr>
<tr>
<td>Comprehensive and integrated identity management</td>
<td>System administration capabilities</td>
</tr>
<tr>
<td>Individualized access</td>
<td>Ability to associate pages with an application area</td>
</tr>
<tr>
<td>User authentication stored in LDAP structures</td>
<td>Centralized administration of security and administrative access</td>
</tr>
<tr>
<td>Seamless management of application-based user access</td>
<td>Organizational hierarchy</td>
</tr>
</tbody>
</table>

Security Components Built Into the ILDS Solution. The edFusion Education Identity Manager framework will provide a consistent security model for our Data Management solution.

Compliance with the Information Technology Accessibility Act
We understand and will comply with the applicable requirements of the Information Technology Accessibility Act and the standards required under section 15 of the Act.

ILDS Supplemental Requirements
Our team understands all stated ILDS supplemental requirements as found on pages xx-xx of the RFSP. We will comply with all supplemental requirements, and this response to the RFSP is responsive to all states requirements.

Options.
In this response, we have made our best efforts to fully respond to every question posed by ISBE with a complete, transparent, direct response. However, we also wanted to take this opportunity to share...
several add-ons, in addition to the edFusion Portal and Report Framework, we have used for other SLDS projects that have added significant value for our clients.

Advanced Analytics

- **Balance Scorecard Data Mart**: our solution brings a unified approach to a balanced scorecard model implementation created by the DSAC by integrating the edFusion Portal and edFusion Data Warehouse & Decision Support System. Our solution will provide the ISBE with a single location through which Michigan can define a process of self-assessment, a set of organizationally significant objectives, strategies to accomplish the goals, measures to monitor the objectives, and assign projects associated with each objective at an organizational unit level.

![Figure 8.14 Balanced Scorecard Data Mart](image)

- **Growth Model**: Our solution's reporting and analysis function will provide Client with the ability to design, develop, and support growth models based on student performance, school performance, and school unit performance. The reporting solution will also allow Client to apply growth models to State, LEA, school programs, and classroom data sets.
A growth model can be an integral part of our longitudinal solution. It is not a separate stove pipe component, but a piece of functionality available at all levels of Data Support System (DSS) reporting stack. The DSS views all data with a static, longitudinal, and predictive component.

A traditional growth model is an application of predictive analysis to a particular cohort of students based on their common range of assessment scores. Although that is the most common use case—and one which our solution supports—any measure that is vertically scalable can be used to develop predictive cohorts as long as there is at least two years of data.

Influence Spectrum Management

The US education system faces many challenges, including how to reduce dropout rates, improve graduation rates, and improve early literacy and overall student performance to ensure post-secondary completion. A data management component we have recently developed is the Influence Spectrum Management (ISM) module, which was developed specifically to aid in the management and identification of at-risk trends.

ISM answers the industry's need for an extensible, web-based solution that identifies real-time risk and accelerated learning patterns, manages interventions and enrichment programs, and tracks goals and
successes. Our solution focuses putting actionable data in the hands of teachers and administrators on a timely basis.

**Figure 8.16 Influence Spectrum Management**

**ISM for Dropout** – ISM will blend student key performance indicators with soft influences, such as family and community, to create predictive outlooks and intervention recommendations. Aggregate reports and alerts will influence programming and planning while ISM pinpoints student growth potential as well as building school, family, and community strength. The ISM will alert Staff by providing a dropout warning. The dropout warning will allow Staff to do each of the following:

- Identify students in or trending towards high risks in known areas including but not limited to attendance, absenteeism, dropout, graduation, literacy, and classroom performance, benchmarks, and summative assessments.
- Intervene and plan remediation through a variety of avenues for students deemed at risk.
- Reduce overall school and district dropout rates.
• Determine/rate success factors for programs.
• Assist accelerated students with enrichment programs and activities.
• Establish threshold based alerts to users who can impact outcomes

National Transcript Center
In this proposal to the Illinois State Board of Education, Pearson is proposing as an option:

• A statewide deployment of the NTC software in a hosted model branded specific to Illinois (working title: "Illinois Transcript Center"); this site would have the ISBE logo and include a smaller “powered by NTC” reference
• Assistance in creating a state data standard for record/transcript exchange
• The deployment of user accounts and training materials to every LEA
• The ability for LEAs to send data as well as PDFs to every PK-20 public education institution in Illinois
• And more, as described in this proposal.

The National Transcript Center (NTC) product line is owned and operated by Pearson Education, the world’s largest education company. Pearson acquired NTC in March 2009 and made this service a key component of Pearson’s corporate-wide longitudinal PK-20 data system strategy.

NTC is the official state student record and transcript system for SEAs in seven states:
• California
• Colorado
• Iowa
• Texas
• Utah
• Virginia
• West Virginia
• Wyoming

NTC is a highly scalable, enterprise class solution and serves over 14 million students and over 25,000 education institutions.

Moreover, the NTC product is backed by the corporate strength and stability of Pearson Education. During a prolonged recession, small and undercapitalized firms might not have the staying power to finish out a contract and might fail to meet deliverables as outlined in a contract. Pearson is a 165-year old, publicly traded international corporation with a current market capitalization of over $10 billion (US$). Pearson stands fully behind the NTC product line.

The deliverables for this option would be:
- Implement electronic record and transcript exchange for all public PK-12 districts and Postsecondary institutions in Illinois
- Exchange electronic records and transcripts with other states (interstate)
- Create and deploy the "Illinois Transcript Center" (working title)
- Create a state data standard for record/transcript exchange
- Create and deploy user accounts to every LEA
- Create and provide training materials for users and administrators