State of Vermont

Agency of Education – VADR Project
Independent Review Report
Formal Acceptance

Prepared By: Barbara Cormier
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AOE VADR Independent Review Report
Formal Acceptance

Oversight Project Manager (OPM):	Barbara Cormier	**Project Sponsor:**	Bill Talbott
Project Phase:	Planning / Procurement		
Deliverables completed and/or accepted?			
1. Independent Review Report			
Were completeness and correctness criteria established?	Yes		
If yes, do the deliverables meet the criteria?	Yes		
What activities were done to ensure acceptance? (testing, inspection, peer review, etc.).			
Review of document / report by CIO, OPM, and AOE stakeholders (Bill Talbott, Brian Townsend); presentation of Report by David Gadway, Strategic Technology Services, Inc.			
Overall comments:			

Approvals

Role	Name and Title	Signature	Date
CIO	Richard Boes, CIO for the State of Vermont	E-SIGNED by Richard Boes on 2014-02-27 18:40:19 GMT	February 27, 2014
OPM	Barbara Cormier Oversight Project Manager, DII	E-SIGNED by Barbara Cormier on 2014-02-27 18:07:04 GMT	February 27, 2014

Independent Review of Proposed Vertical Data Reporting Solution for Department of Information and Innovation (DII) and Agency of Education (AOE)

Submitted by:

Strategic Technology Services, Inc.

February 27, 2014

February 27, 2014

State of Vermont
Office of the Chief Information Officer (CIO)
Department of Information and Innovation (DII)
Attn: Mr. Richard Boes, Commissioner and CIO
133 State Street, 5th Floor
Montpelier, VT 05633-6601

Dear Mr. Boes:

I am pleased to submit this analysis containing an Independent Review of the *Vermont Automated Data Reporting* project for Department of Information and Innovation (DII) and Agency of Education (AOE).

It is my hope that you find this analysis clear and succinct, and it provides State of Vermont the information necessary to decide whether and how to proceed with the proposed project.

Should you have any questions or require clarification on any items in this report, please do not hesitate to contact me directly.

Sincerely,

David Gadway, **MBA, PMP, MCSA**
PMP: Project Management Professional
MCSA: Microsoft Certified Systems Administrator
President
Strategic Technology Services, Inc.
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dgadway@techstrategy.biz

Attachments:

1. Amazon_General_Terms.docx
2. FINAL-REVIEW-SOW-DII-AOE-Vermont_Automated_Data_Reporting-IR-STS_Project-Cost-Detail.xlsx

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EXECUTIVE SUMMARY

The purpose of this Independent Review is to provide an assessment of the proposed State of Vermont (SOV) Agency of Education (AOE) and Department of Information and Innovation (DII) *Vermont Automated Data Reporting* project, relative to costs, benefits, funding source, project team, risks and risk mitigation, adherence to technical standards of State of Vermont, soundness of project plan, and proposed implementation partner.

In **July, 2013**, SOV Office of Purchasing and Contracting issued an RFP seeking to procure "SOFTWARE and PROFESSIONAL SERVICES: Operational Data Store and Supporting Data Marts and System Implementation to support Agency of Education **V**ermont **A**utomated **D**ata **R**eporting Project", (VADR).

In **December, 2013**, Choice Solutions, Inc. of Marlborough, MA, (now a division of Houghton Mifflin Harcourt (HMH), located in Boston, MA), was selected as the software and implementation partner.

NOTE: AS CHOICE WAS NOT YET ACQUIRED BY HMH WHEN THEY SUBMITTED THIS PROPOSAL AND AS THE DOCUMENTS SUBMITTED HAVE CHOICE'S NAME ON THEM, GIVEN THE NOW LEGAL ENTITY BEING CONSIDERED IS HMH, WE USE BOTH CHOICE and HMH AS THE VENDOR REFERENCED THROUGHOUT THIS DOCUMENT.

At the time of the writing of this report, the following contracts/SOWs are under review:

1. ***HMH contract with several Attachments;***
2. ***Existing Agilis SOW and proposed SOW/contract for remainder of project;***
3. ***Amazon Web services. (AWS standard public hosting contract only. It is not clear whether this contract will be executed or AWS GovCloud (or other service) will be contracted for.***

All items related to this project, including **some** items related to the contracts, have been assessed and are considered in this report.

RECOMMENDATIONS

Based on the analysis conducted for this Independent Review, State of Vermont should proceed with the proposed project if SOV can:

1. Adequately mitigate to their satisfaction, the risks identified in the Project Risk Register found in ***Appendix 1***;

2. Achieve favorable contracts terms with HMH and Agilis Technology, specifically in terms of deliverables, overall project schedule, deliverables schedule, and pricing tied to deliverables. Consider language with clear exit strategies for both vendor contracts;

3. Define hosting solution and costs, and achieve favorable hosting contract.

PROJECT PROFILE: SOLUTION, SCHEDULE, COST, FUNDING, and SCOPE SUMMARY

HMH SOLUTION SUMMARY

1. Software (edFusion): **$880K**
2. Implementation Services: **$1.288M**
3. Software Maintenance and Support: **$1.385M**
4. Hosting via Amazon Web Services Public Cloud: **$1.926M (Not yet firm numbers)**

AGILIS TECHNOLOGY SOLUTION SUMMARY

1. Project Management/Technical Leadership Services: **$794.4K**

OTHER COSTS

1. AOE Incremental Project Costs: **$873K**
2. DII 3% Fee: **$214K**

COSTS

Total project costs over a 10 year period are **$7.36M**.

FUNDING SOURCES

Project will be funded through a combination of US Department of Education Statewide Longitudinal Data System (SLDS) Grant funds and the recovery of expenses AOE currently pays to maintain systems being replaced by proposed solution.

Please see ***Appendix 3*** which details the Project Funding Sources and Uses, Cash Flow, and Net Change in Operating Cost.

The project costs are expected to be fixed, based on HMH and Agilis committing to stated pricing.

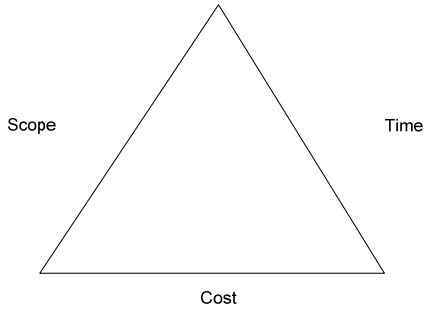
SCHEDULE

It is anticipated that this project will require **29 months** to implement: 2/2014 – 6/2016.

Please see ***Appendix 4*** which describe the Project Phases, Milestones and Schedule.

SCOPE

Every project operates under a triple constraint, also known as an "Iron Triangle". That is, for a given Project Schedule, Project Cost, and Project Scope, if any one of those 3 items changes, the other 2 must change. For example, if the Scope expanded, the Cost and Timeline will also typically change.



While the project scope is not *completely* defined, the requirements articulated in the RFP and the vendor responses to those requirements define the "boundaries" for this project.

Further, Agilis is working with HMH during this contracting period to further define the scope of work and associated deliverables. While this helps define scope more clearly, the full scope will not be fully defined until HMH is contracted with and completes the Requirements Definition phase, which is the initial phase of the project.

The chart below provides more detail of the areas evaluated in this analysis.

AREA EVALUATED	RELEVANT FINDINGS
Risk Mitigation Plan	See ***Appendix 1***.
Acquisition cost assessment and funding considerations	Major project costs have been documented and are competitive when compared to similar projects and other bids for projects of this scope. 10 Year Total Project Costs are **$7.36M.** The source of funds is expected to meet the use of funds.
Technology Architecture	The proposed technology is based on current technology used by State of Vermont: Microsoft Windows Server 2012 Standard and Enterprise, Microsoft .NET, SQL Server 2012, SQL Server Analysis Services, IIS, SharePoint, Visual Studio and anticipating the hosting environment with Amazon Web Services (public or GovCloud) accessed via client browser. The WAN impact is not expected to be significant, as many users initiate contact from their schools, and internal users will use public Internet service vs. GovNet service.
Assessment of Implementation Plan	The Implementation Plan is 29 months. The plan is being finalized as part of the contract discussions, with the attempt to merge HMH approach with AOE's desire to tie effort to deliverables to payments.
Assessment of Implementation Contractor	Choice has a solid track record delivering solutions on time and on budget, and has experience delivering solutions *nearly* the same as that proposed to Vermont, specifically Washington State Office of State Public Instruction and Utah.
Cost/benefit analysis	This analysis can be found in ***Appendix 7***.

OVERVIEW OF THIS DOCUMENT AND BACKGROUND

Key terms used throughout this report are defined as follows:

1. CEDS: Common Education Data Standards: a specified set of the most commonly used education data elements to support the effective exchange of data within and across states, as students transition between educational sectors and levels, and for federal reporting.
2. EDFacts: a U. S. Department of Education initiative to put performance data at the center of policy, management and budget decisions for all K-12 educational programs. EDFacts centralizes performance data supplied by K-12 state education agencies (SEAs) with other data assets, such as financial grant information, within the Department to enable better analysis and use in policy development, planning and management.
3. Ed-Fi: An educational data standard and flexible tool suite designed to integrate and organize raw education data and information from a broad range of existing disparate data sources so it can be integrated, analyzed and put to use every day. The Ed-Fi solution transforms data into insights that make it easier for teachers to teach, for students to learn and for schools to succeed. The organization actively solicits feedback and input from licensees and education technology leaders. The Ed-Fi Alliance is a wholly-owned subsidiary of the Michael & Susan Dell Foundation.
4. EDW: Education Data Warehouse.
5. FERPA: Family Educational Rights and Privacy Act: Federal law that protects the privacy of student education records. The law applies to all schools that receive funds under an applicable program of the U.S. Department of Education.
6. NEDM: National Education Data Model: conceptual but detailed representation of the education information domain. The Education Data Model strives to be a shared understanding among all education stakeholders as to what information needs to be collected and managed at the local level in order to enable effective instruction of students and superior leadership of schools. This standard has been absorbed by CEDS.
7. ODS: Operational Data Store: State level central data repository for all live, transactional data from near real time or scheduled data collections. This new ODS will be modeled after the CEDS Data Model and the National Education Data Model (NEDM) to ensure comparability and interoperability across systems.
8. SIF: Schools Interoperability Framework: data sharing open specification for academic institutions from kindergarten through twelfth grade (K-12). The specification is composed of two parts: an XML specification for modeling educational data, and a Service-Oriented Architecture (SOA) specification for sharing that data between institutions. The Schools Interoperability Framework (SIF) is not a product, but a technical blueprint for enabling diverse applications to interact and share data related to entities in the pK-12 instructional and

administrative environment.

SIF is designed to:

a. Facilitate data sharing and reporting between applications without incurring expensive customer development costs;
b. Enhance product functionality efficiently; and
c. Provide best-of-breed solutions to customers easily and seamlessly.

SCOPE OF THIS REVIEW

This overview describes what is included in the scope of this Independent Review effort. It is also important to state explicitly those areas that are outside the scope of this review:

Included in this Independent Review:

1. Acquisition cost assessment.
2. Technology architecture review.
3. Implementation plan assessment.
4. Cost and benefit analysis.
5. An impact analysis on net operating costs for the agency carrying out the activity.
6. Project Risk assessment.
7. Procurement Advisory services (*additional analysis may need to occur in the future, as the contract is in the process of being developed at the time of this report submission*). See ***Appendix 8*** for details.

Excluded from this Independent Review:

1. Review of vendors who comprised the finalist vendor list.
2. Review of how vendor was selected for this project.
3. Anticipated Post Implementation Activities.

The following actions were taken to gather the data used to analyze the proposed project and provide this Independent Review report:

1. Interviews with:
    a. Interview key AOE staff:
        i. Brian Townsend, Project Director
        ii. Denise Sanders, Implementation Lead
        iii. Lisa Gauvin (Contracted AOE Project Manager/Technical Leader)

    b. Interview key State of Vermont staff:
        i. Barbara Cormier (DII PMO Oversight)
        ii. Michael Morey (DII Enterprise Architect)

    c. Interview key HMH staff:
        i. Shadd Schutte, HMH Project Manager

    d. Interview key Agilis Technology staff:
        i. Lisa Gauvin, Project Manager/Technical Leader for AOE

2. Analysis of:
    a. SOV RFP
    b. Agilis Project Management/Technical Leadership Proposal
    c. HMH ODS Pricing Proposal
    d. HMH ODS Technical Proposal
    e. HMH VR Pricing Proposal
    f. HMH VR Technical Proposal
    g. HMH End User License Agreement
    h. HMH Support & Maintenance Agreement
    i. Review of HMH support web site: http://collaborate.choicep20.com/Maintenance_v2/login.aspx
    j. Review of HMH Testing Plan
    k. Standard Amazon Web Services contract

3. Development of:
    a. Project budget, including Use of Funds (Expenses), Source of Funds (Revenue), Cash Flow, and Net Change In Operating Cost
    b. Risk Register, including Risk Assessment and recommended Risk Mitigation strategies
    c. This Independent Review document

STATUTE DEFINES AN INDEPENDENT REVIEW

It is important to establish the scope of this review. The scope of this document is fulfilling the requirements of Vermont Statute, Title 3, Chapter 45, §2222(g):

> The Secretary of Administration shall obtain independent expert review of any recommendation for any information technology activity initiated after July 1, 1996, as information technology activity is defined by subdivision (a)(10) of this section, when its total cost is $1,000,000 or greater. Documentation of such independent review shall be included when plans are submitted for review pursuant to subdivisions (a)(9) and (10) of this section. The independent review shall include:
>
> (1) An acquisition cost assessment
> (2) A technology architecture review
> (3) An implementation plan assessment
> (4) A cost analysis and model for benefit analysis
> (5) A procurement negotiation advisory services contract
> (6) An impact analysis on net operating costs for the agency carrying out the activity

HISTORICAL BACKGROUND

In the summer of 2012, Vermont was among 24 states and territories awarded a longitudinal data system (LDS) grant of $4,947,261 for the period of July 1, 2012 through June 30, 2015. The purpose of this grant is to support design, development and implementation of a statewide, longitudinal kindergarten through grade 12 (K-12) data system.

In January, 2013, SOV Office of Purchasing and Contracting issued an RFP seeking to procure "PROFESSIONAL SERVICES: Technical Lead/Project Manager to support Agency of Education Vermont Automated Data Reporting Project.

In April, 2013, Agilis Technology was awarded the work resulting from this RFP.

In July, 2013, SOV Office of Purchasing and Contracting issued an RFP seeking to procure "SOFTWARE and PROFESSIONAL SERVICES: Operational Data Store and Supporting Data Marts and System Implementation to support Agency of Education Vermont Automated Data Reporting Project" (VADR).

In December, 2013, Choice Solutions, Inc. (now HMH) was selected as the preferred vendor.

In December, 2013, STS was selected to perform the Independent Review of this project and both vendors (Agilis Technology and HMH).

PROJECT COST SUMMARY

The 10 year cost of this project is anticipated to be **$7.36M.**

The project costs are expected to be fixed, based on both vendors committing to stated pricing.

LIMITATIONS OF THIS REVIEW

The contracts are still yet to be finalized, so additional procurement-related analysis may need to occur.

Further, the hosting solution/environment has not yet been selected.

PROJECT OBJECTIVES

The objectives of this project are:

AOE Objectives

1. The work must support Vermont's goals for student assessment and the transition to the new SBAC assessments.
2. Aid and support next generation accountability (using multiple measures of assessment) and public assurance systems.
3. The system must aid and support Differentiated Intervention and the evaluation of these interventions.
4. The system and reports generated by the system must support the goal of continuous improvement of learning for all students.
5. The system must have the ability to support integration of data from the following:
    a. Prekindergarten
    b. Post-Secondary
    c. Labor/Workforce
    d. Other state agencies in order to support an integrated approach to services.

Governance Committee Objectives

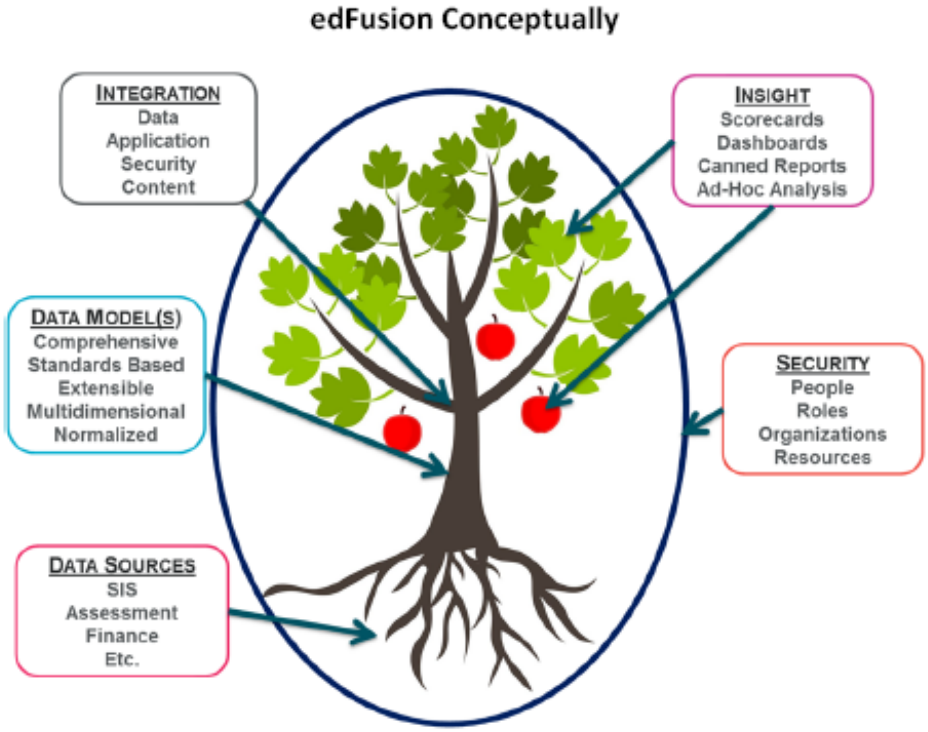
In addition to the grant and AOE objectives, the Governance Committee will advise the project with the following objectives in mind:

1. The complexity and nature of the project means "scope creep" is a very real temptation that could bring a high degree of risk to the project. The Governance Committee is committed to guarding the project against this risk.
2. The project team must show value and success early on in order to be worthy of the efforts of district partners. The committee will advise the project team on actions and priorities that target early wins and value added project work.

PROJECT SCOPE

The following summarizes the project scope per the RFP.

First, it helps to understand the components of this project. HMH provided the following diagram in their proposal:



A successful edFusion data warehouse is analogous to a tree:

- the **ETLs and Web Services (including SIF)** are ***the roots*** that pull data into the system,
- the **data model** is ***the trunk***—just as the trunk of a tree contains xylem and phloem that help move nutrition through the tree, the data model's underlying structures help move the data to where it needs to go
- the **integration and the data marts** are ***the branches*** that partition information in a usable fashion and, finally;
- the **reports** are ***the leaves and fruits*** that provide value to the end users and in turn help nurture the data warehouse in the future.

The goals of this project are summarized below:

1. Goal 1: Reconstitute Vermont's SLDS Governance Committee.
2. Goal 2*: Streamline and automate the collection of data from all school districts while improving the quality of data through multi-level data validation and correcting of data errors at their source.
3. Goal 3*: Establish a centralized data repository utilizing a data model that adheres to the Common Education Data Standards (CEDS) to hold all collected data.
4. Goal 4*: Automate and increase the frequency of the data load processes from the data repository to VT AOE data analysis tools.
5. Goal 5*: Provide access to and training on VT AOE's data analysis tools to ALL Vermont school districts.
6. Goal 6*: Streamline and automate VT AOE's EdFacts reporting.
7. Goal 7*: Establish a Growth Data Mart to measure and report on student, educator, school, district and state growth as part of Vermont's efforts to enhance its accountability and education delivery system.
8. Goal 8: Establish an improved evaluation system that gives stakeholders the ability to provide feedback on system components and training.
9. Goal 9: Publish data documentation regarding data dictionaries, data accessibility and data available for research.
10. Goal 10: Pursue additional funds that will help sustain system success.

*Goals supported by the SLDS grant. Other goals will be met outside the SLDS grant and are not part of the scope of work.

MAJOR TASKS AND DELIVERABLES

Appendix 4 highlights the timeline of the major tasks and deliverables for this project as of the date of this report.

SUMMARY

The project, as described and defined, addresses all of the Project Objectives.

ACQUISITION COST ASSESSMENT

This section provides both a summary of the hardware, software, staffing, services, and other costs associated with the project.

PROJECT COST SUMMARY

Project costs related to the entire project can be found in ***Appendix 3***, and are **$7.36M** over a 10 year period.

HARDWARE COSTS

There are hosting costs through Amazon Web Services (AWS) hosting solution at **$1.926M**.

However, these numbers are not yet firm due to a lack of a final decision of hosting solution plan.

SOFTWARE COSTS

The costs associated with Software are **$880K**.

SERVICE COSTS

The costs associated with Professional Services are **$1.288M** with HMH and **$794.4K** with Agilis, for a total Services cost of **$2.08M**.

STAFFING COSTS

The costs associated with temporary staffing are **$0K**.

SYSTEM INTEGRATION COSTS

All System Integration costs are included in the “Service Costs” analysis above.

ADDITIONAL COSTS

There are additional costs of **$874K** for miscellaneous AOE items outlined per the cost detail found in ***Appendix 3*** and **$214K** for DII Enterprise Architect (EA) and Project Management (PM) Services.

There are also limited funds for changes of scope or cost overruns in this project, unless additional funds can be secured.

SUMMARY

The TOTAL 10 year Project Costs are **$7.36M**.

The total project costs appear to be within range of comparable projects, based on this analysis:

The following chart shows Choice's reply by providing numbers for 3 comparable projects. The proposed Vermont costs are included with the chart. The chart uses color coding to show the HIGH, MIDDLE, and LOW PRICES for each price component. As you will see, the Vermont AOE project is either in middle or low price in all categories.

Choice Cost Comparison: VT vs. Similar Projects	**Utah Data Alliance Data Share**	**Hawaii Data partnership Exchange**	**Puerto Rico Department of Education**	**Vermont AOE**
Software	$990,000.00	$950,000.00	$850,000.00	$880,000.00
Implementation Services	$1,246,354.00	$1,018,250.00	$2,300,000.00	$1,288,000.00
Software Maintenance and Support (Annual)	$226,000.00	TBD	TBD	$138,500.00
Software Hosting (Annual)	NA	$155,500.00	$300,000.00	$192,000.00
High Price				
Middle Price				
Low Price				

The only provisions for change of scope or additional costs in the project budget are additional grant or operational funds, which, at the time of this report, have not been identified.

TECHNOLOGY ARCHITECTURE REVIEW

SUPPORT FOR THE STATE'S STRATEGIC ENTERPRISE SYSTEMS DIRECTION

The primary hardware and software components of this initiative are closely aligned with the State's supported technology.

Specifically, the proposed technology is:

1. OPERATING SYSTEM: Windows Server 2012 (Standard and Enterprise)
2. DATABASE: Windows SQL Server 2012
3. APPLICATION/WEB SERVER: Microsoft IIS Server and .NET Framework

AOE is considering contracting through HMH to utilize Amazon Web Services (AWS) hosting services (Public Cloud or GovCloud). The specific AWS service to be used is still being determined.

Security Analysis

The proposed solution data encryption at the proposed AES 128-bit achieved through the web browser.

The proposed module assigned to control security, edFusion Identify, maintains granular user permission capabilities that can be associated to an individual or group through Role-Based Access Control.

Role-Based Access Control

Directory and identity management capability developed specifically for the US education market. This provides role-based access control for organizational people and entities. Our security model provides the AOE the ability to be compliant with FERPA. Only the users who have a specified need have access to student information. The authorization model for the identity management capability is based on the following four pillars:

- **Users**. These are the actual people logging into the system.
- **Roles**. These are the duties users have within the system. Roles indicate general system areas that will be available to each user.
- **Organizations**. These provide scope for users because the amount of data available to them is determined based on the organizations to which they belong. For instance, a principal can only see the students in his or her school, while a AOE administrator may be able to see all student data from the territory.
- **Functions** (Applications or Services). These are the special tasks assigned to particular users regardless of roles. Functions can be assigned specifically to users.

System roles typically include the following:

- System Administrator
- Program Administrator
- Principal
- Teacher

At the core of edFusion Identify is a web-based solution for distributed management of resources. Organization and access policies can be managed at a state, supervisory union (SU), district, school, or even class level, which greatly reduces the overall information technology burden on any single entity.

edFusion Identify manages:

- Authentication
- Authorization
- Auditing

For further protection, the following security features are provided:

Security Components		
Logging and Access Rights Security	***Managing Security and Access***	
Robust security infrastructure	Role management functionality	Defined permissions
Password protected system	User roles created according to AOE preferences	Ability to use relationships between users and organizations
Private passwords	Permanent system roles	Ability to copy roles and defined access rights
Limited number of failed login attempts	A user creation and role assignment process	Streamlined data creation and load process
Password reset function	Functional capabilities for the system administrator	Built-in communications and notification manager
User notification	Ability to assign roles to an application	Controlled access to query results
Define security permissions at any level	Page controls management function	Limited access to individual reports
Comprehensive and integrated identity management	System administration capabilities	Report sharing based on roles and security rights
Individualized access	Ability to associate pages with an application area	Maintains integrity of AOE records
User authentication stored in Lightweight Directory Access Protocol (LDAP) structures	Centralized administration of security and administrative access	
Efficient management of application-based user access	Organizational hierarchy	

Additionally, AOE has included language in the draft contract requiring vendor to have an annual third-party security assessment conducted on all internet accessible systems housing Student Data. Evidence of the security assessment and mitigation of any vulnerability must be provided to the State in the form of a letter from a third-party security consultant. In this letter, the consultant must attest that the minimum security assessment was performed, and all identified vulnerabilities were mitigated.

Finally, we were unable to connect with Mr. Waringa regarding Security as part of the Independent Review. However, having discussed this topic with Mr. Waringa recently as part of a separate Independent Review, we understand he is in the process of developing Security Standards. It is expected that the then current version of those security standards be reviewed as part of the Security Assessment.

Disaster Recovery Plan

The proposed solution is expected to utilize the BC/DR plan available with the AWS offering as well as HMH performing data backups.

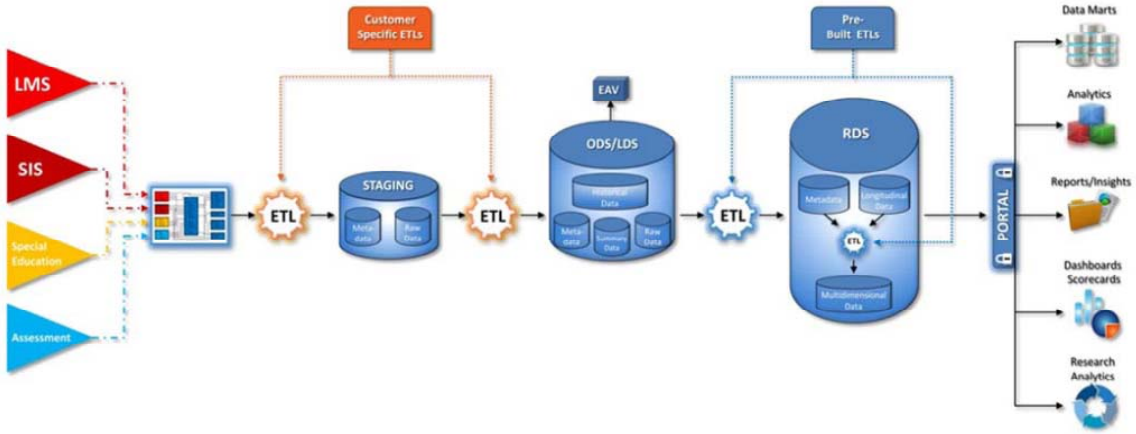
State-wide WAN/LAN Impact

Choice has not provided data to allow for a determination of required bandwidth, but we are of the mind that WAN impact may actually decrease, as this solution is hosted in the cloud, and the traffic will now go out over the public Internet vs. GovNet network.

SYSTEM INTEGRATION REQUIREMENTS

This entire project is largely a system integration effort: that is, collecting data from School Information Systems (SIS) and porting that data to the Operational Data Store and appropriate Data Marts.

The diagram below shows the data sources (LMS: Learning Management System; SIS: School Information System) and how those are run through an ETL (Extract, Transform, Load) process to a Staging area before landing in the ODS (Operational Data Store) and related Data Marts before another ETL process to feed the Reporting System:



HMH claims the proposed solution "can load from any source, any database, and any application".

The ETL process uses Microsoft SQL Server Integration Services (SSIS) and is implemented as follows:

- Each SSIS package contains data flow tasks to apply data validation and transformation rules, perform other operations, and move data;
- SSIS packages have exception handling tasks to record data validation and transformation problems by writing rejected data and the corresponding problems to an exception database for reporting;
- SSIS packages are configurable to the environment so that connection strings and other package metadata can be edited to move packages between development, test, and production environments;
- SSIS packages can be managed using the Microsoft SQL Server Agent service to execute packages on a schedule or on-demand basis; and
- The ETL process is based upon standardized practices.

Per the proposal, the following provides an overview of how the edFusion pulls the data together and presents it to the user community:

The edFusion solution will be a traditional data warehouse with the following areas:

- **Staging Area** with tables designed to accept data from source systems.

- **Operational Data Store (ODS)** is a highly normalized database that uses referential constraints to increase the reliability and quality of the data that it contains. The ODS is loaded with data from the Transaction/Staging Data Stores (reporting data stores, or RDS) by an Extract, Transform and Load tool that performs audit and edit checks and applies business rules to condition the data before loading it into the ODS. The ODS is necessary for improving the quality of data that will make its way into the data warehouse environment. Only the State of Vermont staff will have direct access to the ODS.

- **Data Warehouse (DW)** is a denormalized group of tables designed to provide a multidimensional (hierarchical) representation of dimensions and measures that will be provided to the business intelligence tools. The groups of tables are referred to as star schemas; groups of star schemas are called universes. The DW is loaded from the ODS using the ETL tools in edFusion Foundation, applying business rules to transform highly normalized data into flattened hierarchical structures.

- **Data Mart (DM)** is usually a combination of normalized and multidimensional tables that are a subset of data warehouse data, structured to support a specific functional need (e.g., Financial Data Mart, Student Assessment and Performance Data Mart, Student Discipline Data Mart, Teacher Certification Data Mart). The DMs are loaded with data from both the ODS and the DW using the ETL tools in edFusion Foundation. All users who are granted access to the data warehouse will gain access to data in data marts, through the use of database views. Access will be provided via a web-based query tool, using role-based security.

- **Business Intelligence (BI)** serves as the front end to the data warehouse. Data in the form of dimensions and measures are loaded into universes and cubes (Online Analytical Processing software), from which data can be easily sliced and diced with drilldown into the detail levels of the data. These cubes are used to generate reports and input to dashboards much more effectively and efficiently that typical reporting tools and with far fewer staff. The BI tool is loaded with data from the DW and/or DMs using the ETL tools in edFusion Foundation.

- **Data movement** through the data warehouse environment is directional and begins in the Staging Area, then moves to the ODS, DW, DMs, and finally to the BI tool. All data movement is managed and conducted through the ETL tool and without a single line of code.

Multiple Ways to Upload Data to the ODS

Looking at the existing structure of most SEA clients, there is a need to provide multiple ways for users to upload data into the ODS. SIF is one of the few practical methods for automation, but there is also need to have alternate channels for users in those organizations not yet ready to use SIF for whatever reason to upload data.

- **SIF:** As you indicated in your RFP, the ODS solution must be SIF-aligned; we have extensive experience with state integrations using SIF across multiple states. Not only did we import SIF XML formats transported over SIF 2 and SIF 3 protocols, but in multiple states we have performed complete security and portal integration of SIF-based vertical reporting systems with the edFusion solution.

  Non-SIF automation: For districts that have non-SIF compliant data systems, custom ETLs can be created to support the creation or loading of data required by Vermont. These ETLs can be over traditional file-based transports such as SFTP, direct database connections via ODBC, or a web service call.

  ETL Console: The edFusion console provides authorized users a 100% web based management console to upload data, schedule jobs, process uploads, manage errors and replace or append previous data loads, regardless of which method (SIF or non-SIF) was used for delivery.

    - Rules Engine - Central to our solution is the implementation of a robust and comprehensive validation process to manage data validation by establishing an easy to use and manage rules engine. Our integrated, best in class .NET-based rules engine greatly reduces the time to create and manage your data validation rules. Our rules engine simplifies the automation of complex decision logic by separating it from application code and implementing it as business rules. We will use the rules engine to:
      - validate each file based on your technical specification
      - process each file student by student and run edits based on your technical specification
      - report back errors/warnings back to the edFusion UI

Regarding data standards, the following describes how CEDS and SIF work together:

CEDS and the Schools Interoperability Framework (SIF)
CEDS is really the heart of education data moving forward. It represents a logical static data representation. SIF has always been about data movement. In upcoming versions, the SIF Association has adopted the CEDS data model, transforming the SIF model into a moving version of CEDS. The 3.0 version of SIF will include all that is in SIF 2.6, all of EdFi, the UK's ISB standard, the AU's global data model, the Common Core Consortia's data framework, IMS' APIP/QTI, and all of CEDS 3.0.

The data model includes two schemas: a **Domain Entity Schema (DES)** and a **Normalized Data Schema (NDS)**. The DES uses less technical syntax and organizes data elements by domain to represent the conceptual structure of the CEDS elements.

The Domain Entity Schema (DES)
The DES provides a user friendly structure to easily identify CEDS elements organized by domain, entity and attribute category. The domains for CEDS 3.0 include:

- Early Learning (abbreviated as EL)
- Elementary and Secondary Education (abbreviated as K12)
- Post-secondary Education (abbreviated as PS)
- Assessments
- Learning Standards

Entities are commonly thought of as persons, places, events, objects, or concepts about which data can be collected. An entity provides context for a data element. Some examples of entities are Early Learning Child, K–12 Student, K–12 Staff, Post-Secondary Student, Post-Secondary Institution, etc. There are over 20 entities in the DES.

Attribute categories represent a group of related attributes associated with one or more entities. Some examples are Demographic Information, Health Information, Section Enrollment, and Academic Record, just to name a few.

The Normalized Data Structure (NDS)
CEDS supports standardizing educational organizations and their relationships with other organizations, people, and time. This focus is necessary to support existing state and federal reporting and for analysis and comparison of aggregate statistics. The latest release of CEDS also focuses on use cases that support people's relationship with learning standards and assessments.

The NDS Logical Model provides a logical database model, normalized to Third Normal Form, for integration of P–20 data systems through a well-normalized operational data store. When physically implemented, a sub-model supporting the audit of edits to all attributes will be utilized.

Comparability of state/department education data has some exciting possibilities for all educators, administrators and vendors. Similar to how XML provides comparability/interoperability for data-in-motion, CDM is for data-at-rest. It serves to provide a level of interoperability that means:

- Standardized terminology promotes more effective communication and streamlines knowledge transfer
- Mapping takes less effort
- Development of reports/imports/exports/dashboards/modules can be shared across organizations
- Centralized or base-lined design documentation
- Resources can be shared

NDS utilizes four super-types:

- Person: Data about people
- Organization: Anything that is not a person, such as a district, a school or a course
- Role: A person's data that relates to an organization, such as a student's attendance

- Location: Physical addresses, phone numbers, email addresses, websites, GPS, and any type of data that serves to identify a location/contact method

Reporting Architecture

As the user navigates to the specific report he wants to view, edFusion stores those navigation choices into session variables to be later passed as report parameters. By infusing the Reporting Services web control into the page, the look and feel of the report is much cleaner than the standard Reporting Service report. Those ugly drop-down boxes are eliminated from the report, so instead of choosing from multiple drop down boxes, parameters are passed from session variables from when the user chooses, which organization to view, which grade to view, etc.

Also, navigation is much easier for the user because the application guides them towards the reports he wishes to view based on the clicks they have chosen. There is no need for the user to scroll through a huge list of reports.

edFusion Insight (Enterprise Reporting Framework)

The Vermont reporting framework built on the edFusion Insight module will contain several dozen pre-built reports that have a number of graphs and charts infused into the report. After the report has been rendered, the user will then have numerous ways to filter the results, compare the selected organization to other organization in Vermont, and to change the grouping of attributes.

Our EdFusion Insight includes several features to support your short and long term reporting needs:

1. Smart Reports (Set of drillable organizational reports for both public and private views)
2. Data Analysis (Zero Client cube driven ad hoc analysis)
3. Insights/Score Cards (Score Card and metric driven views of data)
4. Dashboards (Data views for rapid user consumption on particular topics)
5. Report & Dashboard Generator (Non-technical report and dashboard management and generation, not part of proposed implantation)
6. Person Profiles (detailed view of complete person level data)
    - Student
    - Staff
    - Parent
    - Person
7. Favorites (User ability to store and manage reports)

The screen shot below provides a visual for how this works:

Each Report is built as a stand-alone report. When the report is called by the user, the web control renders the report within the specific web page for display to the user. Most reports will contain graphs, charts or tables, have sorting capability and make use of parameters. Some reports will also have drill through capability for the navigation to more detailed information.

All reports are rendered in real time and there is no planned batch process or distribution of reports. Thus there is no archiving of “old” reports and no need to navigate to those “old” reports.

All reports can be exported to Excel or PDF format by the user. Users can also view definitions of the report and of the attributes within the report.

Agency of Administration Information Technology Server Optimization Plan

In reviewing how this project fits with the Agency of Administration ITOP strategy, the following analysis is provided:

Is the proposed architecture/technology appropriate to support the solution?

1. *Yes, the solution uses technology as described in this section, and is appropriate to support a web-based solution running from an AWS hosted environment serving clients running on PCs with current browsers in remote (off site) locations.*

Is it in alignment with State of Vermont CIO's Strategic Plan, in a document titled "State of Vermont Strategic Plan 2014 – 2019", by addressing the 5 major goals and 6 key principles?

Goals:

1. to modernize critical technologies
2. to ensure sustainability of the state's information services
3. to operate IT effectively and efficiently
4. to use IT to improve the productivity of all state services
5. Create new solutions partnering with State Agencies

Principles:

1. Leverage successes of others, learning best practices from outside Vermont.
2. Leverage shared services and cloud-based IT, taking advantage of IT economies of scale.
3. Adapt the Vermont workforce to the evolving needs of state government.
4. Leverage modern IT delivery frameworks and enterprise architectures.
5. Couple IT with business process optimization, to improve overall productivity and customer service, not just IT itself.
6. Optimize IT investments via Enterprise Architecture and Project Management methodologies.

The following describes how this project exploits these principles:

1. *Leverage successes of others, learning best practices from outside Vermont.*
    a. *The proposed solution by Choice Solutions has been implemented in various iterations by many States and in its current technology architecture by Utah, Hawaii, and New York State.*

2. *Leverage shared services and cloud-based IT, taking advantage of IT economies of scale.*

   a. *The proposed solution contemplates using Amazon Web Services hosting, the specific offering is still yet to be determined (public cloud, GovCloud).*

3. *Adapt the Vermont workforce to the evolving needs of state government.*
   a. *The proposed solution will support employees of State of Vermont and of School Districts to no longer collect and cleanse data manually, as the project is to deliver improved data collection and cleansing processes, removing the manual work from the equation, freeing up this work force to perform more value-added services.*

4. *Leverage modern IT delivery frameworks and enterprise architectures.*
   a. *This project leverages modern IT delivery frameworks and enterprise architectures based on the underlying technology contemplated in this section as well as the AWS hosting solution that houses the application.*

5. *Couple IT with business process optimization, to improve overall productivity and customer service, not just IT itself.*
   a. *This project will deliver on the promise of technology supporting the needs of the business vs. being the center of the business problem or solution, by enabling stakeholders to focus on analyzing data vs. having to collect and clean data.*

6. *Optimize IT investments via Enterprise Architecture and Project Management methodologies.*
   a. *While not SOV Enterprise Architecture, AWS is considered Enterprise Architecture, and is contemplated as a solution partner in this project. Further, the project is expected to utilize professional Project Management services throughout the implementation phase.*

ABILITY OF THE TECHNOLOGY TO SUPPORT BUSINESS NEEDS

Based on the requirements identified by Vermont in the RFP, and the vendor's RFP response, vendor has demonstrated that they will be able to configure the software to meet Vermont's needs.

ABILITY OF THE USER AND OPERATIONAL STAFF TO INTEGRATE SOLUTION INTO THEIR WORK

This is expected to be a moderate change in how AOE perform their daily operations, but the stakeholders appear committed to making this happen and have adequate time to devote to this project.

SUMMARY

The technology proposed is consistent with the Enterprise systems strategic options supported by the State of Vermont.

See ***Appendix 6*** which describes the solution architecture.

Finally, SOV is staffed adequately for this project at present, but staff being pulled onto other projects is a concern.

ASSESSMENT OF IMPLEMENTATION PLAN/IMPLEMENTATION RISK ANALYSIS

THE REALITY OF THE TIMETABLE

The **27 month** schedule is feasible, based on the scope and breadth of operational changes expected.

A significant downside to extending the timeline is the *potential* for additional costs associated with associated labor.

TRAINING OF USERS IN PREPARATION FOR IMPLEMENTATION

It is expected that SOV will embrace the approach suggested by HMH, which is a combination of Vendor-provided hands-on and "Train the Trainer", starting one month before deployment, through deployment, and follow up post-deployment.

The chart below outlines the approach:

Training Delivery Methods	
Train-the-Trainer Live Session	HMH will coordinate and conduct a face-to-face training session at a central location for representatives from selected Vermont sources. The face-to-face session will be followed up with a webinar. This accumulative 4–6 hours of training will supply a thorough overview of the Vermont VADR ODS, Data Marts, and Reporting System Implementation and provide hands-on experience for each attendee. Supplemental materials and documentation will be provided in hard copy and electronically. The intent here is to seed the Vermont community with highly trained personnel who can train and coach others.
Train-the-Trainer Webinars	In addition to the face-to-face session, a series of up to six stakeholder webinars will be held. All stakeholders will be notified of the schedule and encouraged to send at least one representative user to at least one webinar. Sessions will be up to two hours long and will equip each stakeholder representative to train other personnel in his or her stakeholders. Supplemental materials and documentation will be provided electronically. At least one webinar will be recorded and made available for playback over the web.

Ongoing Webinars	For ongoing education and to provide training on updates, additional webinars will be designed and conducted primarily for stakeholders, although other constituents might occasionally attend, as Vermont prefers.

The chart below outlines the schedule:

VADR ODS, Data Marts, and Reporting System Development Plan		
Month	**Activity**	**Responsibilities**
1 month before deployment	Finalize training materials	Putting together the creative Solutions Approval—VT AOE
1 month before deployment	Train-the-trainer	Putting together the creative materials, knowledge transfer, and distribution of materials
Upon deployment with 6 pilot sites	Co-hosted training of school/District/SU level end users using both on- site and online training environments	Obtaining on-site venues—VT AOE and HMH Online training venue Training
Upon deployment	Training of school/District/SU level end users on-site and online	Obtaining on-site venues—VT AOE and HMH Online training venue Training
Upon deployment	Training of AOE and school/District/SU Pilot Team personnel on functionality, deployment, maintenance, and troubleshooting of proposed solution	Training (AOE and school/District/SU Pilot Team trainees will be in attendance to learn first-hand solution components to enhance information learned at train-the-trainer and enhance knowledge transfer to end users)
Post-deployment	On-line modules and online instructor-led training will be available to end users	Training Modules On-line instructor-led

READINESS TO PARTICIPATE

The Implementation Team is comprised of staff from AOE, contract Project Management/Technical Leadership from Agilis Technology, and Project Management from HMH Staff. The Vermont project team's time allocation to this project MAY BE impacted by competing projects and/or priorities.

ADEQUACY OF DESIGN, CONVERSION, AND IMPLEMENTATION PLANS

The Design, Conversion, and Implementation Plans appear sound.

However, the approach to these items changed much during the contracting discussion. This is actually good news for SOV, in that, there is a clear path between tasks → deliverables → payment for said deliverables.

What is not clear is whether HMH can adjust their normal work processes to fit this model.

See **Appendix 4** for detail on project plan.

The following describes HMH's Implementation Process methodology:

The SLDS implementation process utilizes two primary management tools: the Microsoft Project Plan (Project Implementation Plan: Microsoft Project) and the Implementation Process Workbook. The implementation development process is governed with a rigorous software development lifecycle (SDLC) process suite. The roadmap toward accurate time/resource allocation planning includes adapting our thoroughly vetted implementation plan to the Vermont SLDS specific requirements by designing, developing and/or identifying:

1. Measurable, mutually determined project objectives.
2. The inter-/intra-team communication protocol, plan, frequency (many times includes daily 30 minute status calls) and methods. ("Project Workbook")
3. Detailed Project Risk and Issues Management. ("Issues," "Issues Example," "Risk," and "Risk Example")
4. Specific functional strategies and Project Team membership.
5. Role(s) for each Project Team member and delineating their responsibilities and interdependencies. ("Project Workbook")
6. Detailed specific decision making policies and procedures.
7. A project plan including a detailed Work Breakdown Structure (WBS).
8. A security program plan
9. A training and knowledge transfer program implementation plan.
10. An operational day-to-day implementation management detailed workbook
11. A source data conversion plan. ("Data Conversion Plan")
12. A source data quality plan. ("Data Quality Plan")
13. A source data profiling analysis report. ("Data Profile Report")
14. A key mapping set of artifacts including CEDS alignment. ("Data Mapping" and "Data Mapping Example")

15. Data cleansing procedures. (“Technical Design Document - ETL”)
16. Data conversion procedures. (“Data Conversion Plan” and “Data Conversion Plan Example”)
17. Data validation processes. (“Data Conversion Plan”)
18. Logical Data Models. (“Technical Design Document - ETL”)
19. Physical Data Models. (“Technical Design Document - ETL”)
20. Operational Considerations. (“System Design”)
21. System Design. (“System Design”)

ADEQUACY OF SUPPORT FOR DESIGN, CONVERSION AND IMPLEMENTATION ACTIVITIES

Adequacy of Support for Conversion and Implementation Plans appears sound as currently proposed with AOE staffing plans. Again, there is concern should staff be pulled off this project.

ADEQUACY OF PLANNED TESTING PROCEDURES

Adequacy of Planned Testing Procedures appears sound.

HMH Quality Management System and Testing Plan are components of the overall testing umbrella.

Quality Management System:

- Appropriate software engineering methods and tools are integrated into the project’s defined software process.
- The software requirements are developed, maintained, documented, and verified by systematically analyzing the allocated requirements according to the project’s defined software process.
- The software design is developed, maintained, documented, and verified, according to the project’s defined software process, to accommodate the software requirements and to form the framework for coding.
- The software code is developed, maintained, documented, and verified, according to the project’s defined software process, to implement the software requirements and software design.
- Software testing is performed according to the project’s defined software process.
- System and acceptance testing of the software are planned and performed to demonstrate that the software satisfies its requirements.
- The documentation that will be used to operate and maintain the software is developed and maintained according to the project’s defined software process.
- Data on defects identified in peer reviews and testing are collected and analyzed according to the project’s defined software process.

- Consistency is maintained across software work products, including the software plans, process descriptions, allocated requirements, software requirements, software design, code, test plans, and test procedures.

Choice Solutions is a certified ISO 9001:2000 organization. The ISO 9001:2000 processes stresses the importance for an organization to identify, implement, manage and continually improve the effectiveness of the processes that are necessary for the quality management system, and to manage the interactions of these processes in order to achieve the organization's objectives.

Testing Plan:
Testing Objectives include:

- Verify software requirements are complete and accurate
- Perform detailed test planning
- Identify testing standards and procedures that will be used on the project
- Prepare and document test scenarios and test cases
- Regression testing to validate that unchanged functionality has not been affected by changes
- Manage defect tracking process
- Provide test metrics/testing summary reports
- Ensure the application is certified for release into the University of Minnesota production environment
- Schedule Go/No Go meeting
- Require sign-offs from all stakeholders

The Testing Methodology includes:

- System Test Entrance Criteria
- System Test Exit Criteria
- Test Execution including:
    - Unit Testing
    - System Testing
        - Functional (or GUI) Testing
        - Usability Testing
        - Data Upload Testing
        - Transactional Database Testing
        - Browser Compatibility Testing
        - Performance Testing
        - User acceptance testing (UAT)
- Test Case/Script Development
- Tools used include: a variety of system, load and regression testing tools based on existing software licenses of the client, NEOLoad and Visual Studio Test Professional. Additionally for all system deployments they run a third party vulnerability scanner to determine potential security flaws in the system. Acunetix Vulnerability Scanner; analyze the results and supporting documentation and create a remediation plan to address those potential security threats within the prescribed timeline after implementation. Additional review of the site periodically is done as part of the ongoing support and maintenance period.

ADEQUACY OF DEPARTMENT AND PARTNER STAFF TO PROVIDE PROJECT MANAGEMENT

See ***Appendix 5*** for details on Project Team.

The HMH Project Manager is Shadd Schutte.

The AOE Project Management/Technical Leadership is contracted to Agilis Technology and Lisa Gauvin.

The DII Project Management Oversight is provided by Barbara Cormier.

Project Management skill sets to be applied to this project appears strong given prior experience with projects of similar size and scope.

IMPLEMENTATION RISK ANALYSIS

See ***Appendix 1*** which details the Risk Register and ***Appendix 2*** which details the Risk Analysis Score.

SUMMARY

Regarding the feasibility of the Implementation Plan and Project Timeline, both appear to be feasible, based on Vendor experience with projects of similar scope.

The Vendor's experience with projects of similar size and scope were ascertained through a Q&A session with the vendor. The following questions are relevant extracts from that conversation:

1. **What projects have you completed that are similar in scope, cost, and time to this Vermont project?**
    a. Washington State Office of State Public Instruction (SLDS) – Not data collection as that was done, but everything else is similar (reporting, dashboards, edFacts, cubes, data analysis); Had contingency funding for Change Orders
        i. Had knowledgeable staff
    b. Utah K-12 SLDS (partnered with Pearson, who did SIF/data collection)
    c. VT will be first K-12 data collection with SIF3.0

2. **What is different about this project in VT than other similar projects Choice has completed**
    a. Biggest difference is SIF collection

b. VT first to use edFusion 7.1; Not a complete change, but more cutting edge (NY State is using 7.0, but VT will use 7.1); Much more module-based vs. domain driven; now taking data into Integration Module, and other modules already tied to Integration module; Hope to improve project timeline
    i. Some underlying tech changes (product team); Gone away from coding business rules now use **InRule (3rd party product- Business Rules for .NET platform – www.inrule.com)**, using DLLs to place rules into ; **SmartReports (in house developed feature set)** is other change (use templates and say which data goes into the report)
    ii. WA State also had contracted Project Manager

Regarding an overall Project Risk, see ***Appendix 1 and 2***.

COST/BENEFIT RECOMMENDATION

METHOD

See ***Appendix 7*** which contains details regarding the assumptions, methods used, and underlying data used for this analysis.

COSTS

The 10 year TOTAL COST of this project is **$7.36M** as detailed in ***Appendix 3 and Appendix 7***.

The 10 year TOTAL INCREMENTAL COST of this project is **$4.83M**, which is derived by taking the current 10 year costs and subtracting those from the 10 year cost of the proposed solution ($7.36M less $2.52M). (NOTE: This **$4.83M** cost is covered by the SLDS grant of **$4.94M**.)

Note: There is a **net operating cost to AOE of $0**, given the Grant funding source and given the net change in Operating costs.

BENEFITS

The monetary quantifiable benefits for AOE are: **$3.39M**.
The monetary quantifiable benefits for schools are: **$2.65M**.
The total monetary benefits are: **$6.04M**.

There are other non-monetary benefits outlined in the Cost/Benefit analysis in ***Appendix 7***.

SUMMARY

There is a **Total Project Benefits realization** of **$1.21M** ($6.04M BENEFIT less $4.83M INCREMENTAL COST over a 10 year period). See the full Cost/Benefit chart found in ***Appendix 7***.

RECOMMENDATION

Based on the positive Benefits Realization of $1.21M, it is recommended that AOE proceed with this project.

APPENDIX 1 – PROJECT RISK REGISTER

Risk Assessment Methodology:

1. Project Risks are summarized into PMI Knowledge Areas:
    a. Integration Management
    b. Scope Management
    c. Time Management
    d. Cost Management
    e. Quality Management
    f. HR Management
    g. Communications Management
    h. Risk Management
    i. Procurement Management

2. The following categories are also assessed for risk:
    a. Technology/Tools used
    b. Infrastructure (Also see Procurement Management)
    c. Vendor

3. Specific analysis was conducted to assess risk in each of the Project Activities listed in **Chart A** below. Using DII's suggested Risk Rating template, risk is measured for **Impact** (High, Medium, Low) and **Probability** (High, Medium, Low). Colors are used to show where risk exists if either measure (Impact or Probability). For a measure of "HIGH", RED is used, otherwise, YELLOW is used.

4. Finally, using DII's Risk Rating Chart, we provide details for each identified Risk. See **Chart B**.

Chart A: Project Risk By Process Group and Knowledge Area

(Red = High Risk or Probability; Yellow = Medium or Low Risk or Probability)

Process Group: 42 TOTAL Knowledge Area:	**Initiating (2)**	**Planning (20)**	**Executing (8)**	**Monitoring and Controlling (10)**	**Closing (2)**
Integration Management	• Develop Project Charter	• Develop Project Plan	• Direct and Manage Project Execution	• M&C Project • Perform Integ Change Mgt	• Close Project
Scope Management	•	• Define Requirements • Define Scope • Create WBS	•	• Verify Scope • Control Scope	•
Time Management	•	• Define Activities • Sequence Activities • Estimate Act Resources • Est Activity Durations • Develop Schedule	•	• Control Schedule	•
Cost Management	•	• Estimate Costs • Determine Budget	•	• Control Costs	•
Quality Management	•	• Plan Quality	• Perform QA	• Perform Quality Control	•
HR Management	•	• Develop HR Plan	• Acquire Team • Develop Team • Manage Team	•	•
Communications Management	• Identify Stakeholders	• Plan Communications	• Distribute Information • Manage Stakeholders Expectations	• Report Performance	•
Risk Management	•	• Plan Risk Mgt • Identify Risks • Perform Qual Risk Analysis • Perform Quan Risk Analysis • Plan Risk Responses	•	• Control Risk	•
Procurement Management	•	• Plan Procurements	• Conduct Procurements	• Administer Procurements	• Close Procurements

Other Risks:

1. Technology
2. Vendor

Chart B: Risk Rating

The Risk Rating charts on the ensuing pages use the following Data Elements to describe Risk and Risk Mitigation.

Data Element	Description
Risk #	This is a sequential number assigned to each risk to be used when referring to the risk.
Finding Reference	This is a cross-reference to the Finding from which the Risk was determined.
Risk Impact / Probability	This is a two-value indicator of the potential impact of the Risk if it were to occur, along with an indicator of the probability of the risk occurring. Values: Impact (High, Medium, Low); Probability (High, Medium, Low).
Recommended Risk Response Timing	This is value used to indicate whether the Risk is likely to occur Prior to contract execution or Subsequent to contract execution (e.g. the DDI phase). Values: Prior / Subsequent
Risk Description	This is a brief narrative description of the identified Risk.
Risk Impact Description	This is a narrative description of the potential impact of the risk.
Risk Response Recommendation	This field includes Vendor's recommendation on how the State should address the risk.
Risk Mitigation Plan	This field includes the results of discussions between State staff and Vendor regarding how the State plans to address the risk. This includes the State staff person responsible for managing the risk, the action plan to mitigate the risk and the timing of the action plan.

RISK REGISTER:

INTEGRATION MANAGEMENT:

Risk #: SM-1	**Finding Reference:** N/A	**Risk Impact/Probability:** HIGH/MEDIUM	**Recommended Risk Response Timing:** Prior to Contract Execution

Risk Description: DIRECT AND MANAGE PROJECT EXECUTION. There are potential issues with Data, specifically, data quality, data availability and data definition. Specific risks are as follows:

1. Quality
    a. Every state thinks their data is good, and when you try and take it from the native environment it often times veers away from good warehousing practices. When you try and do SLDS, those issues come to light immediately, and project recipient says "We knew about that and need to account for these exceptions." Often times, this acknowledgement comes after the project is scoped/budgeted, and this also results in project timeline and budget expansion.
    b. How this risk impacts likelihood of success: Given normal staff turnover, where is VT in their retention of institutional knowledge? Does much of that data knowledge remain in place? If so, VT is in a good place, otherwise, if the knowledge has "left the building", VT would be in a less than ideal position.
    c. Per Choice, given their experience to date with other projects, and given their experience with VT thus far, in terms of questions VT has asked and answers VT has provided, Choice indicates VT scores an 8 on a 1-10 scale, 10 being the best.
2. Availability
    a. Does VT possess the required data to support the underlying data marts or their subsequent reporting components? Without the proper data, Choice will be unable to effectively complete either of those components, as there can often be a gap between what is expected and the reality.
    b. While LEAs (Local Education Agencies, such as schools) are required to submit data to AOE, they are not required to submit the data electronically. This has been an issue in the past and this project does not provide incentive for schools to change their methods or practices: the SLDS grant monies cannot be used for new School Information Systems (SIS). The funds *may* be used to improve processes, but that would also require the SIS vendor to participate in those improvements and there may not be enough funding or incentive for SIS vendors to do so. In summary, the SIS' may not have ways to submit the data in the expected format on the expected schedule.
3. Usage Definition
    a. Having a clear objective as it relates to a particular data mart or reporting component requires either a clear business case or access to business stakeholders. A common understanding of the data dictionary, source of data, and how the data is used and what the data means if critical to users' understanding of the data.
    b. It is not clear yet what engagement and collaboration will exist between AOE and key data stakeholders.

4. Future Migration
    a. SIF (V3.0 = CEDS on the wire) and CEDS 3.0 standards continue to move, and it is unclear how well supported existing standards are in subsequent standards. Are there clear migration paths or are there rewrites needed/data migration/data conversions needed between standards versions?

Risk Impact Description: This project is primarily about data: Data collection, data reporting, and data analytics. If the data is not good, be it inaccurate, incomplete, undefined, and/or untimely, the foundation of this project is at risk.

Risk Response Recommendation: Much work has been done to ensure the target data set is defined, specifically to meet CEDS 3.0 and SIF 3.0. What is yet unknown is the gap between that data set and the ability of the data collections from LEAs to meet that target, specifically the data quality, data availability, and data definition. It is recommended that this gap get quantified/identified BEFORE the project starts, if AOE feels that this there is significant data risk, or AFTER the project starts, if AOE feels that this risk is manageable and can be addressed through the course of the project and not impact BUDGET, SCOPE and TIMELINE.

Risk Mitigation Plan: AOE mitigation plan is included below.

Regarding quality:

- AOE has a track record in rigorous business rules and data validation for incoming data. When building the EDW – on the first attempt at loading data – AOE data had a .08% error rate. At the time Tetra Data said the norm error rate was @ 20% error rate. As a result –we feel the load of data housed in current AOE systems will be acceptable. These mature data sets are the foundational data sets for the SLDS implementation.
- AOE acknowledges the risk related to poor data quality in school district systems. To mitigate this – part of the HMH deliverables is to develop not just the SIF and flat file specification for the school districts to use in contractual agreements with local SIS vendors – but also include required business rules that will ensure the validity of data within local systems. Because this is provided as a contract language that can be used for districts – there is a plan to ensure accountability of the SIS vendor for ensuring high quality data. For data checks that can only be run at state level – once all the data is in – the system will include the same validity checks that are being used today. The school districts are accustomed to correcting data for these types of edits as we already incorporate this back and forth into current collections. All data collections that are being replaced during implementation of the vertical reporting tool are well established and the schools are used to the business rules.
- Related to risks regarding staff turnover, AOE acknowledges the exit of our Data Management Team Director last year. We are pleased to say that the processes that were in place to document our data collections, business rules, edit checks and integrity of our identity management system have ensured that our knowledge of our data collections and reporting requirements did not walk out the door with her. In addition, the implementation includes the replacement of the ETL and data marts included in our existing EDW – but these were also well documented when building our EDW – and the ETL contains calculations for indicator collections. New indicators will be developed using expertise from analysts on the program teams - so we don't see a big impact on this project.

Regarding availability:

- AOE will have the data to implement the data marts because this is part of how the scope of the project is defined. AOE will have the opportunity to add an additional 15 data sources with up to 20 data elements each to cover any "gaps" in data. These "gaps" are defined as the additional elements/indicators that stakeholders deem necessary in order to achieve project deliverables. The vendor is not liable to calculate indicators based on missing data. With the wealth of information – and the defined scope – we feel that this risk has already been mitigated. The leadership is clear that to be successful – we had to have a defined – and limited scope. We will adhere to this.
- The requirement to store and report data electronically was added to the State Board of Education approved School Register and to education statute in 2013. This is a change from prior years that reflects the reality that nearly all schools have implemented Student Information Systems and that those that do not have packaged SIS's have developed electronic records systems that they already use for state reporting. Each school is now statutorily required to store and report data electronically. The SLDS will simply ease their reporting burden through the automation of reporting processes. The contract is being written to ensure that all schools are able to participate in this system, whether through the automated utilization of SIF or flat-file transfers following AOE file layouts/specifications. The grant was written to allow for sub-granting money ($600k statewide) to schools to pay for any needed customizations/configurations to their local systems to make this happen.

Regarding Usage:

- We have defined scope based on the uses of the existing data warehouse, our required federal reporting, our required state reporting, and information about what can be served up by existing dashboards within Ed-Fi. We plan on replacing what we have and our new data marts will be limited to new indicators (that must be calculated by data within the system) and growth model (that must also be calculated by data in system or included as part of gap data uploads). We feel the scope we have places sufficient limits on our own agency – to protect the project from risk of scope creep.
- As far as stakeholder engagement, we have our existing governance committee – which is made up of stakeholders – as well as the stakeholder groups already routinely engaged by our programmatic teams that can and have provided input. Through the governance committee, we will be forming working groups to address various aspects of this project. We are lining up pilot schools/districts that will help inform the implementations at remaining schools/districts.

Regarding Future Migration:

- One of the major reasons Choice/HMH was selected was their direct involvement in SIF/CEDS efforts. Choice's Chief Technology Officer (who will be assuming a similar role as Vice President at HMH), Alex Jackl, is a nationally recognized expert who has been at the table for these data standard initiatives for years. He is currently co-chair of SIF's technical board for that very reason. Choice's data model is not merely *aligned* to SIF/CEDS… it *is* the SIF/CEDS data model (including the potential future expansion to early-education and postsecondary/workforce domains). Frankly, there is no better way of mitigating the effects of future SIF/CEDS versions than to work with HMH and their staff. DISAGREE: There is no guarantee that there is a seamless future migration path from Version 3.0 to Version 3.x or beyond; For example, recent upgrades from V2.x to V3.x had no backwards compatibility and different logical data model that did not have 1:1 data mapping.
- AOE is also well positioned to remain aware of the potential effects of these new versions. The Project Director, Brian Townsend, is both a

member of the NCES' National Forum for Education Statistics and a member of the SIF Association's North American Management Board. AOE's deep involvement with SIF/CEDS will help mitigate any risks that aligning to these standards might pose.

TIME MANAGEMENT:

Risk #: TM-1	**Finding Reference:** N/A	**Risk Impact/Probability:** HIGH/MEDIUM	**Recommended Risk Response Timing:** Prior to Contract Execution

Risk Description: DEVELOP SCHEDULE. Project participants seem to have a very different understanding of how long this project should take, ranging from 11 months to 27 months.

Risk Impact Description: HMH originally proposed a schedule that was to take 11 months. AOE originally contemplated vendor activity to be 18 months. The schedule now under consideration is 27 months. As a point of reference, a similar project in Maine took 48 months. This appears to be a risk of any of the following: Scope not being understood; Effort not being understood (how long it takes to do something); Level of complexity not understood.

Risk Response Recommendation: Continue having AOE Project Manager and HMH define deliverables and effort. This may impact cost, both in terms of total implementation cost as well as costs for maintaining current solution longer than originally expected.

Risk Mitigation Plan: AOE risk mitigation response is included below.

The differences in project timelines are easily explained. The overriding constraint has always been the pre-defined grant implementation period. That federally defined period runs from July, 2012 to June, 2015 with a no-questions-asked one-year, no cost extension automatically available to each grantee state. AOE's original project plan was designed with industry vendor input – based on similar projects done in other states – assuming the grant awards would have been announced in February, 2012 (as was originally planned by US DOE) and normal procurement timelines.

Instead, US DOE announced the grant awards in June, 2012, less than a month before the implementation period started. This caused an immediate delay in the preparation of RFPs. After a lengthy RFP approval process due to DII workload conflicts (resources were working on the healthcare system at the same time), we reviewed proposals and selected a vendor that we wanted to work with as our technical lead/project manager. However, when we contacted that vendor they withdrew due to new conflicts with their proposed technical lead/PM resource. This necessitated a second RFP process for this key contractor resource. We were fortunate to find Agilis Technology and Lisa Gauvin who brought with her knowledge of Vermont's educational environment and experience of what SLDS projects take to be successful. Delays in the contract approval process for the Agilis contract further constrained the time left in the grant implementation period.

We asked vendors to propose reasonable and realistic timelines in RFP responses to the Vertical Reporting and Operational Data Store and Data Marts RFPs. Each vendor proposed timelines that would have all work completed before June, 2015, we believe, because they did not want to be excluded from consideration for not meeting the initial federal grant implementation period deadline. After selecting Choice/HMH on the merits of their proposal as the vendor best suited to deliver the SLDS that Vermont needs, Agilis Technology and AOE have been working with them to elaborate on a much more detailed project plan that allows for sufficient time for this project to be successfully completed. This timeline includes reasonable estimates and buffer points

where time savings may be achieved.

One other point to consider is the comparison to Maine. It is important to note that Maine's SLDS projects were in response to very different SLDS grant opportunities. Those grant opportunities allowed for longer timelines and we expect they designed their project plans accordingly to utilize the time afforded to them.

BUDGET (COST) MANAGEMENT:

Risk #: BM-1	**Finding Reference:** N/A	**Risk Impact/Probability:** HIGH/MEDIUM	**Recommended Risk Response Timing:** Prior to Contract Execution

Risk Description: DETERMINE BUDGET.
Funding Source: This project is expected to have one funding sources: SLDS Grant. The total grant dollar amount, terms, conditions and timeline need to be understood.

Hosting Costs: Hosting costs assume AWS Public Cloud. AWS GovCloud may be required, and pricing has not yet been provided.

Agilis Technology Contract: Agilis Technology contract is fixed price, but there is no provision for schedule extension without an associated cost increase. Specifically, the contract indicates that any extension past 8/30/2016 invokes an automatic Scope Change and assumes a cost increase. Thus, there is a perceived disincentive in Agilis meeting the timeline, as Agilis would be paid more to NOT meet the timeline.

Risk Impact Description: A lack of adequate funding could terminate this project. A lack of knowledge of project budget could lead to unwittingly having costs exceed funding levels. A lack of fixed pricing for fixed deliverables could lead to cost overruns.

Risk Response Recommendation: Ensure all budget items are understood, and that contract represents a fixed price for fixed deliverables. Further, it is suggested to build in bonuses for coming in sooner than the timeline, and penalties for not meeting the timeline, if those options are available within SOV.

Risk Mitigation Plan: AOE mitigation plan is included below.

AOE's existing contract with Agilis Technology was limited in scope, at the recommendation of the CIO and DII, to run through RFP creation, technical vendor selection, and contracting. A new contract is being generated for the remainder of the SLDS implementation and will be aligned to the deliverables included in the HMH/Choice contract. Agilis Technology has verbally agreed that we will revise language to clarify that changes to the timeline that might cause an extension of the project work past 8/30/2016 will not result in additional cost (except for true changes of scope that may be requested by the State).

AOE and Agilis Technology are working with Choice to include a clear cost breakdown for software, implementation, maintenance/support, and hosting to be included in the final contract. Choice has provided a fixed cost proposal, using perpetual licensing that will limit ongoing costs. The prices proposed are in line with expected costs as included in Vermont's successful SLDS grant proposal. Clear cost breakdowns will be included in the final Choice/HMH contract.

HR MANAGEMENT:

Risk #: HR-1	**Finding Reference:** N/A	**Risk Impact/Probability:** HIGH/MEDIUM	**Recommended Risk Response Timing:** Prior to Contract Execution

Risk Description: ACQUIRE TEAM. Does the Project Director (Brian Townsend) have authority to direct resources onto this project as needed? Specifically, are the required users, data stewards, and stakeholders available to help develop and review the reporting or data mart specifications at that particular time in the project lifecycle or will other projects compete for these resources? Not all people assigned to this project are Mr. Townsend's direct report.

Risk Impact Description: The impact this risk creates is the potential for insufficient human resources allocated to complete the tasks on time and with the expected level of knowledge and quality.

Risk Response Recommendation: Develop an HR Plan prior to contract execution, and get key decision-makers (Secretary, Assistance Secretary, and Department Heads) to agree to the staffing resource schedule.

Risk Mitigation Plan: AOE's risk mitigation plan is below.

A detailed draft of a staffing plan was included in the approved grant proposal. This plan drills down to detailed roles and responsibilities with measures of successful execution of those responsibilities. The project director and Agilis have met with programmatic leadership to ensure that they are aware of the necessary resources for this project. The final version of this staffing plan entails identifying staff persons for each activity prior to contract execution and confirming the support of programmatic leadership for their involvement. This plan is part of a key risk mitigation related to organizational readiness. In addition to securing resources, we want all staff to understand their role in the implementation and execution. In addition, the contract includes mentoring activities for these identified staff members throughout the course of the implementation. This is key for successful change management and also to ensure the organization is prepared to maintain and expand the system after initial implementation.

Additionally, AOE's new Secretary has expressed her desire to use data-driven, evidenced based information in all of the work that we do. The SLDS will be a key resource for all AOE staff in meeting this goal. This overarching mantra will help ensure that staff is made available where necessary throughout this project. This does not address the concern stated that Mr. Townsend does not have the authority to direct resources onto this project, or more likely, prevent resources assigned to this project from being assigned to other projects.

Risk #: HR-2	**Finding Reference:** N/A	**Risk Impact/Probability:** MEDIUM/MEDIUM	**Recommended Risk Response Timing:** Prior to Contract Execution

Risk Description: MANAGE TEAM (Vendors). There is resource allocation concerns for each vendor:

1. CHOICE: Staff originally proposed by Choice may now be allocated elsewhere, given Choice was just awarded Puerto Rico contract.
2. AGILIS TECHNOLOGIES: Given Ms. Gauvin's prior experience with DOE and her expertise, combined with the issues identified in HR-1 above, more work than contracted for may be placed on Ms. Gauvin's to-do list. A simple example is the potential for Ms. Gauvin to be asked to report to US DOE on the project status. Her current role indicates she is to "assist" with reporting to US DOE on project status of the project. Additionally, she is essentially a sole proprietor, so asking her to do more may be not yield the desired result, as she has no staff to assign additional work to.

Risk Impact Description: The impact this risk creates is the potential for insufficient vendor human resources allocated to complete the tasks on time and with the expected level of knowledge and quality. Further impact may be no oversight with of AOE activities by somebody other than the contract Project Manager.

Risk Response Recommendation: Clearly define roles and responsibilities of vendor resources, and manage to those expectations, budget and timeline.

Risk Mitigation Plan: AOE's mitigation plan is below.

The scrutiny and attention to the details in developing the detailed scope of work and implementation plan for the contract is intended to mitigate this risk. During the contract review, you shall see that the details surrounding the deliverables, the prerequisites required of the state to support the vendor in meeting the deliverables, and clearly defined acceptance criteria all work to mitigate the risk because details are already being flushed out at this stage. In addition, Ms Gauvin's scope of work for the contract that will cover this implementation have been tailored to align with and complement the Choice implementation. Additional required services were identified during the evaluation period and these are being rolled into the scope of work and scrutinized to ensure these additions are realistic. In any contract, there is a risk of unanticipated needs – but we feel we have done due diligence and this effort has reduced this risk.

PROCUREMENT MANAGEMENT:

Risk #: PM-1	**Finding Reference:** N/A	**Risk Impact/Probability:** HIGH/LOW	**Recommended Risk Response Timing:** Prior to Contract Execution

Risk Description: ADMINISTER PROCUREMENTS. While it is *expected* that AOE will not directly administer procurement of hosting providers and will contract directly through Choice to secure Amazon Web Services (AWS) to host the application, the actual AWS Service and technology has not yet been provided by Choice. Nor has the Choice contract with AWS been defined (not clear whether GovCloud or Public Cloud is being proposed, as the contract has not been presented). Further, it is not clear whether AWS is FERPA-compliant.

Mr. Morey in DII is in the process of developing minimum performance standards to be placed on cloud hosting infrastructure, but these are not yet fully defined. Mr. Waringa of DII is in the process of developing minimum security standards to be placed on applications, but these are not yet fully defined.

As the contract is expected to be with Choice vs. AWS, Choice owns the responsibility of meeting those standards when defined.

See http://aws.amazon.com/agreement/ for an understanding of the standard agreement AWS has with its customers.

Of negative note, AWS offers no data backup service and can terminate without cause with 30 days notice. The backup process will need to be carried out by Choice as part of the contract. The termination clause is cause for concern, but it is unlikely this will happen without cause.

In summary, the risks include not yet knowing WHICH AWS service is being contracted for, AWS terminating service without cause and the chance that the hosting and security standards to be defined are not met.

Risk Impact Description: The risk impact is high until we know which AWS service is being contracted, and whether that service is FERPA compliant. The risk impact of termination is negligible when considering the likelihood of occurrence.

Risk Response Recommendation: Determine actual AWS solution being proposed and FERPA-compliance prior to contract execution. Perform an annual or semi-annual assessment of actual performance vs. standards, and determine if better solutions exist in the marketplace.

Risk Mitigation Plan: AOE's mitigation plan is below.

Unlike HIPAA, FERPA has no language that outlines standards for data centers/hosting cloud services. AOE is focused on identifying contract language that can specify the types of protections and policies that must be in place to meet not only FERPA requirements – but HIPAA requirements as well. We have reached out to DII for assistance in this matter but assume full schedules are preventing a response. We are utilizing what resources we have available to us including the Privacy Technical Assistance Center at the US DOE as we draft this contract language – and will seek DII input via the contracting process.

TECHNOLOGY:

Risk #: TT-1	**Finding Reference:** N/A	**Risk Impact/Probability:** HIGH/LOW	**Recommended Risk Response Timing:** Prior to Contract Execution.

Risk Description: TECHNOLOGY. This is a standard Risk assessment item for every project. In this case, the risk of the proposed underlying technology failing to perform or deliver the expected solution is very low, due to the fact that MUCH OF the proposed solution operates in several client sites.

Again, it is not yet clear WHICH AWS service is being proposed (i.e. Elastic Block Store (EBS), Elastic Compute Cloud (EC2) = Elastic Compute Cloud).

How the underlying technology performs relative to security and protection of personally identifiable information is unknown.
In summary, the risks include the use of obsolete technology and/or technology or implementation that is not secure.

Risk Impact Description: The risk impact is that the solution does not perform as expected and/or uses obsolete and/or unsecure technology. In this case, this risk is unknown.

Risk Response Recommendation: AOE may want to consider contracting for a Security Assessment by an independent 3rd party provider, to assess not only assess the underlying technology, but also business processes, Choice development and QA processes, and user experience/user processes.

Risk Mitigation Plan: AOE's mitigation plan is below.

To address these concerns, the following clauses (among others) have already been included in Appendix E of the draft contract:

1. Contractor shall ensure that a third-party security assessment is conducted on all internet accessible systems housing Student Data on an annual basis. Evidence of the security assessment and mitigation of any vulnerability must be provided to the State in the form of a letter from a third-party security consultant. In this letter, the consultant must attest that the minimum security assessment was performed, and all identified vulnerabilities were mitigated. The security assessment must include testing of the following vulnerabilities:
    i. Blind SQL Injection
    ii. Cross Site Scripting
    iii. Cross Site Scripting in Parameter Name
    iv. HTTP Response Splitting
    v. SQL Injection
    vi. HTTP Referrer Header SQL Injection
    vii. HTTP User-Agent Header SQL Injection
    viii. Login Error Messages Credential Enumeration

ix. External Session Identifiers Enforcement
x. Directory Listing
xi. Directory Listing Pattern Found
xii. Trace/Track
xiii. Temporary File Download
xiv. Unencrypted Sensitive Data
xv. Unencrypted Login Request
xvi. Phishing through URL Redirection
xvii. Weak Session Cookie

2. Contractor shall notify the State immediately upon becoming aware of any unauthorized disclosure of Student Data. Contractor shall work to promptly remedy the data breach, and shall notify the State of its response plan for preventing future similar occurrences. Contractor shall abide by the State's Incident Response Policy (available at: http://dii.vermont.gov/sites/dii/files/pdfs/Incident-Response-Policy.pdf) and any other State policies and procedures relating to any and all data breaches that may occur.

3. The State shall have the right to periodically conduct audits or other monitoring activities of Contractor's policies, procedures and systems pertaining to the protection the Student Data disclosed pursuant to this agreement.

VENDOR:

Risk #: VN-1	**Finding Reference:** N/A	**Risk Impact/Probability:** MEDIUM/LOW	**Recommended Risk Response Timing:** Prior to Contract Execution

Risk Description: VENDOR. Assessing Vendor is a standard Risk assessment item for every project.

Vendor Technology and Experience with Proposed Solution:

1. VT will be first implementation by Choice with edFusion V7.1 and SIF V3.0. V7.x is not a complete change, but more module-based vs. domain driven; For example, now taking data into Integration Module, and as other modules are already tied to Integration module, it is hoped that the project timeline will improve (NY State is using 7.0, but VT will use 7.1)
2. Other changes in V7.x: Some underlying technology changes: Moved away from coding business rules and now use InRule (3rd party product- Business Rules for .NET platform – www.inrule.com); SmartReports (in house developed feature set) is other major change (use templates and say which data goes into the report, and those templates are used to present the data)
3. Like VT, Washington State also used a contract Project Manager

Risk Impact Description: The potential impact of this risk is that the vendor is implementing a solution that will be the first of its kind. One could argue that similar solutions have been implemented, and while true, this will be the first using V7.1, SIF 3.0, and new technology features (business rules, reporting engine).

Risk Response Recommendation: VT could "fall back" to V7.0 if need be during implementation, and implement V7.1 when it is ready, should VT run into scheduling or budget impacts. The impact of not implementing SIF3.0 is greater however, as that is the standard VT desires, and the future direction for Choice product set. Negotiating with the vendor to contractually remove this risk is recommended.

Risk Mitigation Plan: AOE's mitigation plan is below.

VT is will not be the first on edFusion 7.1 and SIF 3.0. The NY Department of Education is currently in final stages of implementation of the product. The NY project started on SIF 3.0 (a pre-release) and version 7.0 – and required fixes/adjustments which required them to move onto 7.1. Vermont will benefit from not going first on these technologies while still implementing SIF standard and product versions that will position us well for future expansion. Note: As of this writing, NY does not yet have the solution implemented.

Risk #: VN-2	**Finding Reference:** N/A	**Risk Impact/Probability:** HIGH/MEDIUM	**Recommended Risk Response Timing:** Prior to Contract Execution

Risk Description: VENDOR. Assessing Vendor is a standard Risk assessment item for every project.

1. Acquisition of Choice by HMH
    a. Any acquisition carries certain risk. Is the acquiring company buying out competitive market share? Is the product purchased in order to eliminate it? Is the underlying technology being shuttered? Is the focus on R&D the same as it was? Is the new culture such that people who built Choice are not interested in the new culture?
    b. Per Choice PM when asked "what is different":
        i. Operationally, not a lot has changed; Reporting structure is the same. Choice is operating as a department within HMH; PMs will go into Professional Services Dept. in the future.
        ii. Biggest benefit: Immediate access to resources needed (had to do admin-type functions in the past); Streamlined internal processes; No longer need to enter PM hours for everybody else on the team is one good example.
    c. HMH filed Chapter 11 bankruptcy in May, 2012 and emerged one month later with debt reduced from $3.1B to $250M. More than 70 percent of its creditors agreed to exchange their debt for equity. HMH continues to lose money, and some financial experts feel that it will be hard for them to be nimble enough to compete at a high level. HMH financials have not been reviewed as part of this review, nor has the Chapter 11 exit strategy been reviewed. See this article for more information: http://online.wsj.com/news/articles/SB10001424052702304527504579172031193421794
    HMH revenue history is: 2009: $1.56B; 2010: $1.50B; 2011: $1.29B; 2012: $1.3B
    Choice revenue history is: 2009: not avail; 2010: < $3.5M; 2011: < $5M; 2012: < $7M
2. Representation:
    a. Page 60 of proposal, has Choice's Accounting firm indicating Choice incorporated (C-Corp) in February, 2000, yet other parts of proposal indicate February, 2001 (see Page 19); Which is correct?
3. Growth
    a. Per financial statements, Choice had 50% revenue growth between 2012 and 2013 ($6.8M -> $10M) and the same from 2011 to 2012 ($4.4 -> $6.8M). The company supported that growth through significant hiring and identifying and implementing new technology (using InRule for business rules engine) and developing SmartReports feature set.
    b. Choice Solutions LTD – This organization is contracted by Choice Solutions, Inc. to complete all development, and is run by the brother of Choice Solutions Inc. owner (Srinivas Kallakurchi); LTD went from 75 to 150 development staff over the past year or so.
4. Off Shore Outsourcing
    a. Choice Inc. contracts with Choice LTD for all development. The Offshore Outsourcing Questionnaire indicates that <10% will be done in India (configuration and testing), but as Choice LTD does all development there, it seems that allocating < 10% to India is not an accurate assessment. 100% of the software pricing should also be allocated to Offshore Outsourcing resources.

Risk Impact Description: The potential impact of this risk is Choice is no longer in control of its own destiny, the motives of the acquiring company are not clear, and whatever benefit the LTD relationship was to Choice is at least partly due to the principals being brothers, and now that Inc. is no longer controlled by one brother, is the relationship between those two organizations impacted.

Risk Response Recommendation: AOE should STRONGLY consider reviewing other vendors for this project, for the following reasons: 1. More than 50% of the time, a company being acquired becomes different than they were, and when asked, customers prefer the old company. AOE has direct experience with this given their current data warehouse software vendor (TetraData being acquired by Follet Software). 2. Managing the growth that Choice experienced year over year is difficult at best to manage and maintain. 3. Development staff being in another country in a different time zone is difficult to manage. 4. Considering differences in organization size (annual revenues) between HMH and Choice, Choice would easily be "consumed" into HMH, and the edFusion product may get consumed/lost/shelved/orphaned/sold, etc.

Risk Mitigation Plan: AOE's mitigation response is below.

AOE has spent considerable time analyzing the Choice acquisition by HMH – and also comparing this situation to the Tetra acquisition by Follet. The following is a recap of a meeting (written by Lisa Gauvin and sent to bid evaluation team) held with HMH /Choice executives and AOE conclusions:

"I just wanted to give you an update on the meeting with Choice and HMH. We met with Andrew Matorin (VP of Acquisitions), Zach Tussing – and Srinivas Kallakurchi (President of Choice Sol – now head of "Choice division).
Overall – I would assess the meeting as productive –and reassuring. We spoke about our concerns that the product would be discontinued (or state clients dropped), the stability of the Choice team – and about the longer term vision for how Choice fits in the HMH plan.
We were assured that there is no plan to discontinue the product line – in fact, one of the reasons HMH was interested in acquiring Choice is that the EdFusion product can serve as the portal that ties other product and tools together for HMH. The Choice team did not feel this situation was comparable to the Follett Tetradata scenario. Tetradata's main product was a school district warehouse - -and had created a "one off" version for states that never really took off – so they abandoned to go back to their base clients – the school districts. Choice's core clients are the states.
As far as stability of the staff – HMH stressed that they see Choice as being unique and valuable because of its staff and their subject matter expertise. The senior team – and the staff we would be working with were all provided incentives to stay –which mature in three years. The senior staff will now be members of the HMH executive team. Srinivas will continue to run the division. Choice came on HMH radar because they had collaborated on a different project – and they had worked so well together. Srinivas spoke about other attempts to buy Choice in the past –and why he decided to agree to this particular acquisition. He spoke about building the company –and how it evolved over time. He said other opportunities to sell were not appealing – as he did not feel it would serve Choice or its customers in the long term. He said Pearson did try to purchase them – but he felt they would get lost in such a large company. He said he liked the culture and direction that HMH was taking. He said the current leadership was brought in to address the debt problem and turn the company around. He said before this – HMH was buying and selling companies for short term gains – which didn't turn out well for the company.

He said the investors brought on the new leader to turn things around by crafting and executing a strategic path that could bring the company into a profitable future. This CEO (Linda Zecher) has an impressive background. She was "employee number 7" at PeopleSoft – and came to HMH from a VP position at Microsoft. She brought in other former Microsoft execs. These are people with technical backgrounds that are steadily moving the company towards digital delivery of content –and understand the need to measure the outcomes of content and practices. Choice fills the gap they had in integration and the business intelligence component. HMH has no other product lines in this area. In addition, Srinivas said that the reason he finally decided to sell Choice to HMH was their commitment to R&D dollars that were well beyond anything they could finance. They are looking forward to the development of a cloud based version of EdFusion. HMH also plans on merging the support function of the Choice product with existing support – with the intent to address an acknowledged weakness of Choice in this area. A knowledge transfer plan has also been established so Choice team members can mentor/train/provide knowledge transfer to HMH support staff. In the past, PMs and BAs were drawn into support ticket resolution. This plan will allow the support team to provide tier 1 support to clients.
With any vendor - -particularly – a technical vendor – there is a risk of acquisition. The difference with this situation is we know who the players are – and we feel that this will actually strengthen the product and the services that we will receive. What they told us – is supported by the information we found online. After the meeting, Denise, Bill and I debriefed and we all felt they were sincere and their response to our concerns were reasonable – and believable. As a result, we all felt the best path forward was to pursue a contract with Choice as recommended by the evaluation committee."

Any vendor in this line of work is susceptible to acquisition. AOE feels strongly that knowing about this acquisition going into contracting is a *benefit* rather than an added risk as it has allowed us to do our due diligence in gauging how we feel this acquisition could affect the project and products we are seeking to implement. AOE feels that Choice/HMH represents the *lowest* amount of risk when compared to other potential solutions namely because 1) the solution is clearly the most refined (whereas other solutions would entail massive customization/configuration) and 2) the potential for acquisition of other bidders is just as real but not known.

AOE has worked with the parent HMH company on one other project, ironically after their merger with Riverdeep. HMH replaced the online instructional resource and collaboration site that had been developed for us (and later abandoned by) IBM with Riverdeep's Learning Village product. HMH was very responsive to our requests in supporting that product and bid on the RFP to establish the successor system. HMH was a finalist but AOE ultimately went with a lower cost option because the evaluation committee felt that that product would best position us for the anticipated move to the Common Core State Standards. Our experience with HMH has been positive and AOE feels that there may be other areas on the future where this relationship may be expanded to address other education-related initiatives.

Regarding HMH's bankruptcy, this was a structured bankruptcy to eliminate debt and position the company to move forward so that it *could* compete. The acquisition of Choice is a move that demonstrates a well thought out desire to move into the state-level SLDS and business intelligence market that will allow them to compete in this area. Choice's experience in this area and HMH's retention (and inclusion as senior leadership) of key Choice staff shows the intent behind this acquisition.

Further, in analyzing this particular acquisition, it is important to realize that not all acquisitions are equal. Here are types of acquisitions and a statement

of how the Choice acquisition compares. These acquisition types were found at the following site: http://www.mckinsey.com/insights/corporate_finance/the_five_types_of_successful_acquisitions

The first five were classified as "winning strategies".

1. Improve the target company's performance

Comparison: Choice was not acquired by a private equity firm. This is a plus – as these acquisitions tend to reduce costs within the acquired company – and seek to increase revenue in order for the company to be appealing to other buyers – so the private equity company can "flip" it for a profit. Choice was acquired by HMH – a company whose focus since its founding in 1833 was publishing. HMH is reinventing itself as a purveyor of digital content and electronic educational services. Note: The point on private equity firms is not accurate. Paulson & Co. owns a large stake, and an IPO was issued in November, 2013, and Paulson & Co. benefitted directly from that IPO.

2. Consolidate to remove excess capacity from industry

Comparison: There have been a significant number of these types of acquisitions within the education software community. Sometimes it's more efficient to buy out competition in order to increase market share. This is not the case with this Choice acquisition. HMH has no competing software. The Choice edFusion software will allow them to create a single portal for all their digital content. They did not have this capability. The edFusion BI will allow them to add business intelligence capacity to support their assessment offerings and will allow them to create reports measuring the impact of their content. They did not have this capacity before – and have stated this was behind this purchase.

3. Accelerate market access for the target's (or buyer's) products

Comparison: This could work both ways for HMH. Having a portal makes it easier for existing Choice clients to include access to HMH content. HMH clients could also choose to implement edFusion to create a single entry way to all education content. Note: Perhaps, but nowhere on the HMH site will you find Choice products or services listed.

4. Get skills or technologies faster or at lower cost than they can be built

Comparison: This was a benefit of the HMH acquisition of Choice.

5. Pick winners early and help them develop their businesses

Comparison: We do not believe this was the case with this acquisition. It was more about allowing HMH to catch up to the rest of the pack.

These next strategies were described as more challenging "harder strategies"

6. Roll-up strategy

Comparison: This strategy involves purchasing entities to create a larger service organization in a highly fragmented market. The example given was the buy up of funeral homes and merger into single entity. This is N/A to this situation.

7. Consolidate to improve competitive behavior

Comparison: This is when a company buys up companies in a sector that is highly competitive with hopes the reduced competition will drive up prices and result in a higher return on investment. N/A for this situation.

8. Enter into a transformational merger

Comparison: N/A. This is more a description of early phases when Houghton Mifflin, a purveyor of text books, was acquired by Riverdeep. It was the goal of Riverdeep to turn HM into a digital content provider that would complement its curriculum management tools. The acquisition of Choice is more about securing components that all enable HMH to build a portfolio of tools needed to achieve strategic goals.

9. Buy cheap

Comparison: There is no indication that this was a driving factor.

Finally, regarding Representation related to the incorporation date, we believe that this is likely an error (perhaps typographical?) on the accountant's part as the months all refer to February and the reference to incorporation in all portions of the proposal that were actually prepared by Choice indicate the correct date as 2001. We have no reason to believe this was an intentional misrepresentation.

APPENDIX 2 – RISK ANALYSIS SCORE

The worksheet on the following pages provides a "RISK SCORE" to Business and Project-related aspects of this project.

Interpret the results using the following guide: The higher the score, the more risky the project.

An answer of "YES" means (Low risk); Score:	**1**
An answer of "LARGELY" means (Medium Low Risk); Score:	**2**
An answer of "TO SOME EXTENT" means (Medium Risk); Score:	**3**
An answer of "PARTIALLY" means (Medium High Risk); Score:	**4**
An answer of "NO" means (High risk); Score:	**5**

The risks are divided into:

Inherent risks, i.e. Risks that relate to the organization itself.

Acquired risks, i.e. Risks that arise as a consequence of doing the project.

Inherent risks are further divided into:

1. Business vision
2. Business process
3. Business environment and constraints

Acquired risks are divided into:

1. Scope of project or procurement
2. Project organization and control
3. Team capability, experience and support

Risk Summary Graph:

The higher the score, the higher the risk

As detailed in the chart on the following pages:

The **Inherent Risk** is: **3.32**, which is considered to be MEDIUM RISK.

The **Acquired Risk** is: **2.98**, which is considered to be MEDIUM RISK.

The **Overall Project Risk** is: **3.15**, which is considered to be MEDIUM RISK.

Risk Analysis Score Worksheet:

Key to scoring system

An answer of "YES" means (Low risk); Score: **1**
An answer of "LARGELY" means (Medium Low Risk); Score: **2**
An answer of "TO SOME EXTENT" means (Medium Risk); Score: **3**
An answer of "PARTIALLY" means (Medium High Risk); Score: **4**
An answer of "NO" means (High risk); Score: **5**

Inherent Risk: Corporate risks (external to the project)		Risk assessment
A	**Business vision**	
A.1	Are the business needs, assumptions and outcomes clearly understood?	4
A.2	Is the impact of business change small?	5
A.3	Has the organization delivered comparable change before?	3
A.4	Is it clearly stated how the changes will affect the business?	3
A.5	Is the requirement clearly defined and related to business objectives?	3
A.6	Do those affected by the change know how they will be affected and why?	4
A.7	Is the delivery team able to translate the business requirement into a detailed specification?	3
A.8	Is it clear how the new program or project fits with existing business and any conflicting priorities resolved?	4
A.9	Is it clear why the change needs to be made?	1
		3.33 Medium Risk
B	**Business process**	
B.1	Is it clear how existing business processes will be affected by the change?	4
B.2	Will critical business processes be unaffected?	4
B.3	Will existing ways of working remain unchanged?	4
B.4	Is the likely impact of other change on this minimal?	3
B.5	Are the people who will work in new ways all in one place?	5
B.6	Is the business process that underpins the change already in place?	4
B.7	Are existing communication lines between programs/projects and stakeholders adequate?	3
B.8	Does the organization learn from relevant experience?	2
		3.63 Medium High Risk

C	**Business environment & constraints**	
C.1	Does the organization understand the current state of its infrastructure?	2
C.2	Are the proposed changes to the technical environment straightforward?	2
C.3	Is the impact on the existing technical environment (including facilities and services) well understood?	4
C.4	Is the business familiar with any proposed technology and does it have available the core skills and competencies to exploit it?	3
C.5	Are the technical components of the change basic 'off-the-shelf' items and / or compliant with relevant industry standards?	2
C.6	Has the entire life-cycle of the project been adequately considered in terms of cost/budget and flexibility?	3
C.7	Has the need for modular/incremental delivery been addressed, where appropriate?	2
C.8	Are customers likely to be confident about the reliability of the existing technical infrastructure and quality of existing services?	4
C.9	Will the implementation of the change be straightforward?	4
C.10	Does the organization have (or can readily obtain) the necessary capability and capacity to own and manage the business change?	4
C.11	Do the senior managers responsible for delivery of this program acknowledge and accept their responsibilities?	3
	Risk assessment answer:	3.00 Medium Risk
	An answer of "YES" means (Low risk); Score: **1**	
	An answer of "LARGELY" means (Medium Low Risk); Score: **2**	
	An answer of "TO SOME EXTENT" means (Medium Risk); Score: **3**	
	An answer of "PARTIALLY" means (Medium High Risk); Score: **4**	
	An answer of "NO" means (High risk); Score: **5**	
	TOTAL Inherent Risk: Corporate risks (external to the project)	***3.32*** Medium Risk

Acquired Risk: Project-specific risks

		Risk assessment	
D	**Scope of project or procurement**		
D.1	Is the 'project' scope well defined and agreed in terms of what the project should deliver?	3	
D.2	Is the 'project' well defined and understood by the project team and all stakeholders?	3	
D.3	Does the scope of the 'project' include all of the business areas affected?	3	
D.4	Does the scope of the 'project' address modular and/or incremental delivery, each with clear business scope and business case, where appropriate?	4	
D.5	If the project fails to deliver the expected outcome, will the business be able to continue?	3	
D.6	Does the 'project' have some flexibility on delivery dates?	4	
D.7	Are the business processes being supported or enabled by the technical infrastructure (solution) well understood, well defined and formally documented by the project team?	2	
D.8	Do all the people who have a stake in the project agree on what the project should deliver and how it will benefit the business?	3	
D.9	Is there a business case that clearly states why the changes are needed, what the changes are, how the business will benefit and how benefits will be measured?	1	
D.10	Has the necessary funding been approved and allocated, with budget holders identified?	2	
D.11	Have you considered how changes will be dealt with in the future?	3	
		2.82	Medium Risk
E	**'Project' organization and control**		
E.1	Are the stakeholders committed in their support of the 'project' and its objectives?	3	
E.2	Are customers and/or users able to commit sufficient time to the 'project'?	4	
E.3	Is the 'project' plan complete and considered to be achievable?	2	
E.4	Are good relationships established between the project team, customers and suppliers?	3	
E.5	Are the project management approach and milestones approach understood by all parties?	2	
E.6	Is there adequate budget provision (risk allowance) for contingency actions?	3	
E.7	Are the project interfaces defined and being managed effectively?	4	
E.8	Is the project fully under control, in terms of progress against milestones, budget and deliverables?	3	
E.9	Are there appropriate processes for managing change to requirements?	3	
E.10	Are there established and effective communications between the project and all stakeholders?	3	
E.11	Are the project dependencies clearly identified and being managed effectively?	2	
		2.91	Medium Risk
F	**Team capability, experience and support**		
F.1	Are the necessary project skills available within the project team?	2	
F.2	Are team members able to commit sufficient time to the project?	4	
F.3	Is there sufficient fall back for critical resources?	4	
F.4	Has the team access to the specialist expertise needed, when required?	4	
F.5	Is the team adequately supported in terms of accommodation, administrative support and tools?	1	

F.6	Is there enough time and resource within the schedule for necessary information gathering?	4		
F.7	Has the team access to people who understand the business domain and the business needs?	3		
F.8	Is there a good mix of leadership and other key attributes within the project team?	3		
F.9	Are roles and responsibilities clearly defined both within the team and third party interfaces?	3		
F.10	Are the customer and/or user roles clearly defined and understood?	4		
	Risk assessment answer:		3.20	Medium Risk
	An answer of "YES" means (Low risk); Score:	**1**		
	An answer of "LARGELY" means (Medium Low Risk); Score:	**2**		
	An answer of "TO SOME EXTENT" means (Medium Risk); Score:	**3**		
	An answer of "PARTIALLY" means (Medium High Risk); Score:	**4**		
	An answer of "NO" means (High risk); Score:	**5**		
	TOTAL Acquired Risk: Project-specific risks		***2.98***	Medium Risk
	OVERALL RISK		***3.15***	Medium Risk

APPENDIX 3 – PROJECT FUNDING SOURCES AND USES, CASH FLOW, AND NET CHANGE IN OPERATING COSTS

The 10 year cost of this project is **$7.36M**.

SUMMARY:

USE: Total Project Cost Over 10 Years:	**$7,362,649**
SOURCE:	
Total SLDS Grant Funding:	$4,947,260
Total AOE Funding:	$2,415,389

USE BY COST TYPE:

Software:	$880,000
Services: -HMH: $1,288,000 -Agilis: $794,400	$2,082,400
Maintenance and Support:	$1,385,782
Application Hosting:	$1,926,069
SUB-TOTAL (Vendor Fees): **-HMH: $5,479,850** **-Agilis: $794,400**	**$6,274,250**
PLUS AOE Incremental Costs: Travel, SIS Updates, Indirects, Contingency	$873,952
PLUS DII Project Management Oversight and Enterprise Architecture Fee (3%)	$214,446
TOTAL USE:	**$7,362,649**

DETAILED FUNDING SOURCES/USES, CASH FLOW, NET CHANGE IN OPERATING COSTS:
See attached:

1. FINAL-REVIEW-SOW-DII-AOE-Vermont_Automated_Data_Reporting-IR-STS_Project-Cost-Detail.xlsx.

NOTE: The HMH software and services ($1,288,000 plus $880,000) cost groupings in the worksheet named 'Source-Use-Cash Flow-Op Cost' within in the spreadsheet are based on the HMH proposal. See Appendix 4 for a "conversion" of the pricing to the now contemplated deliverables. The pricing remains the same, but again, the prices are now tied to deliverables.

The following provides a "cross-walk" between the original proposal pricing and the deliverables-based pricing and was provided by HMH:

1 to 1 Matches

- Project Planning and Initiation Phase
- Software Delivery
- Services Infrastructure

Near Matches

We have the data marts broken out into unique deliverables, wherein the contract deliverables milestones have them aligned to build Phase. Within the "build Phase" we have these alignments:

- Edfacts and Project Management
- Ed-Fi and Project Management
- RePortal and Project Management
- Growth Model and Project Management

Some Alignment

Analysis and Design Phase: Within the "contract Deliverable milestones" the existing EDW's work as well as the additional indicators definition has been called out specifically in the build, we typically have that in our analysis and design phase. We have reallocated $139,000 from $398,000 to $259,000 to address a majority of that work.

Rules Definition has been removed from our pricing proposal and that budget has been distributed across the EDW build components as various rules will be defined for Contract Deliverables Milestones.

Training and Deployment

In our cost proposal we have outlined $100,000 for deployment and $145,000 for training (VR and ODS combined) in our contract deliverables it is broken into $70,000 for UAT, $60,000 Prep for Pilot, $60,000 Pilot State and $60,000 General Role out. As training is part of the deployment process in our contract document we have. The remaining $5,000 we have allocated in the training and deployment is redistributed to address PowerUser documentation and training as part of the design phase, outlined in mentoring.

Deployment and training have been reallocated among the more granular approach taking by AOE which calls our specific components of the deployment lifecycle (UAT, prep for pilot, pilot and general rollout).

PowerUser training includes integrated mentoring and side by side work with our implementation teams. As deliverables, we will conduct a final training in the deployment phase as well as the release of final administrator documentation during the General Rollout.

Stakeholder and General User Training is attached to the pilot deployment as well as the beta versions of the training materials and guides. Those guides will be finalized prior to the general rollout and will be delivered as part of the general roll out.

APPENDIX 4 – PROJECT PHASES, MILESTONES and SCHEDULE

The following chart summarizes the key Milestones of this project and associated costs for HMH as of 1/30/2014.

Project Planning and Initiation Phase				
Deliverable #	Deliverable Name	Amount	Est. Delivery Date	
1	List of Required Project Artifacts	25,000.00	3/28/2014	
2	Kick off Meeting	15,000.00	3/28/2014	
3	Final SOW and Project Plan and Project Management for this Phase	40,000.00	3/28/2014	
	Section Total			**$80,000.00**
Software Delivery Phase				
Deliverable #	Deliverable Name	Amount	Est. Delivery Date	
4	Design and Detailed Specifications for Hosted Environments and Installation of edFusion	880,000.00	4/25/2014	
5	Project Management for this Phase	30,000.00	4/25/2014	
	Section Total			**$910,000.00**
Analysis and Design Phase				
Deliverable #	Deliverable Name	Amount	Est. Delivery Date	
6	Documentation of Current State of Systems and Data Collections	90,000.00	11/18/2014	
7	Detailed Implementation Plan	129,000.00	11/18/2014	
8	Project Management for this Phase	40,000.00	11/18/2014	
	Section Total			**$259,000.00**
Services Infrastructure Phase				
Deliverable #	Deliverable Name	amount	Est. Delivery Date	
9	Documentation of Services Infrastructure	25,000.00	3/5/2014	
10	Project Management for this Phase	20,000.00	3/5/2014	
	Section Total			**$45,000.00**
Build Phase				
Deliverable #	Deliverable Name	Amount	Est. Delivery Date	
11	EdFacts Data Mart: Revisit Requirements and Build	105,000.00	6/11/2015	
12	Project Management for EdFacts	25,000.00	6/11/2015	
13	ED-FI Data Mart: Revisit Requirements and Build	25,000.00	6/11/2015	
14	Project Management for ED-FI	10,000.00	6/11/2015	
15	Reportal Data Mart: Revisit Requirements and Build	50,000.00	6/11/2015	
16	Project Management for Reportal	40,000.00	6/11/2015	
17	EDW Data Mart(s): Revisit Requirements and Build	100,000.00	6/11/2015	
18	Project Management for EDW	15,000.00	6/11/2015	
19	EDW Data Migration: Revisit Requirements and Build	55,000.00	6/11/2015	
20	Project Management for EDW Data Migration	20,000.00	6/11/2015	
21	Additional Indicators Data Mart(s): Revisit Requirements and Build	40,000.00	6/11/2015	
22	Project Management for Additional Indicators	10,000.00	6/11/2015	
23	Growth Model Tool and Data Mart(s): Revisit Requirements and Build	110,000.00	6/11/2015	

24	Project Management for Growth Model Tools and Data Mart	15,000.00	6/11/2015	
	Section Total			**$620,000.00**
Final UAT				
Deliverable #	Deliverable Name	Amount	Est. Delivery Date	
25	Services Provided for Final UAT	60,000.00	9/14/2015	
26	Project Management for Final UAT	14,000.00	9/14/2015	
	Section Total			**$74,000.00**
Prep for Pilot				
Deliverable #	Deliverable Name	Amount	Est. Delivery Date	
27	Selection of Pilot Districts and Development of Preparation Materials for Onboarding Districts	50,000.00	2/18/2015	
28	Project Management for pilot prep	10,000.00	2/18/2015	
	Section Total			**$60,000.00**
Pilot Stage				
Deliverable #	Deliverable Name	Amount	Est. Delivery Date	
29	Pilot Phase Services	50,000.00	12/7/2015	
30	Project Management for Pilot	10,000.00	12/7/2015	
	Section Total			**$60,000.00**
General Rollout				
Deliverable #	Deliverable Name	Amount	Est. Delivery Date	
31	General Rollout Services	50,000.00	4/6/2016	
32	Project Management for General Rollout	10,000.00	4/6/2016	
	Section Total			**$60,000.00**
	HMH Total			**$2,168,000.00**

APPENDIX 5 – PROJECT STAFFING

The following highlights the roles of the people assigned to the project:

State of VT Team:

State Executive Stakeholder: Rebecca Holcombe (AOE)
State Key / Executive Stakeholder: Richard Boes (DII)
State Project Sponsor: Bill Tabott (AOE)
State Oversight Project Manager: Barbara Cormier (DII)
State Agency Project Director: Brian Townsend (AOE)
State Project Manager/Technical Leader: Lisa Gauvin (Agilis Technology - see below)
State ODS/VR Implementation Lead: Denise Sanders (AOE)
State EDFacts Lead: Lila Denton (AOE)
Program Data Owners: Jen Perry, Mike Bailey, Glenn Bailey, David Kelley (AOE)
EDW/ETL Lead: Bill Schwartz (AOE)

Agilis Technology Team:

Project Manager/Technical Leader: Lisa Gauvin

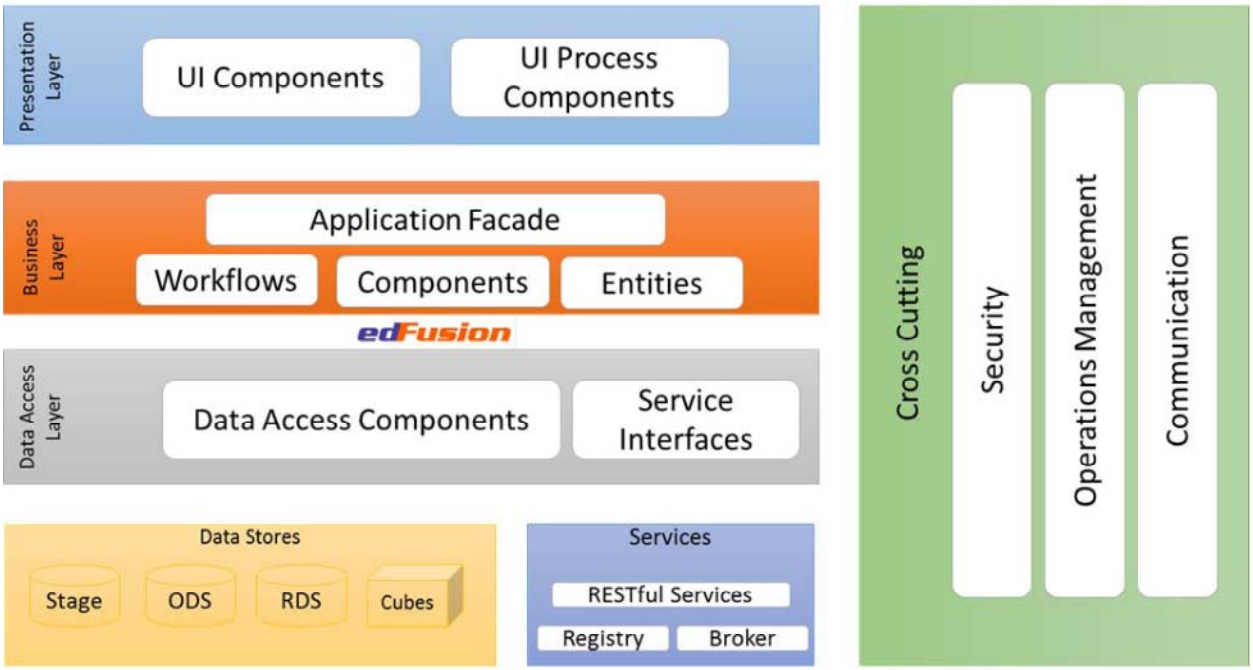
HMH Team:

1. Project Sponsor (Escalation): Zachary Tussing
2. Project Manager: Shadd Schutte
3. Project Coordinator: Cynthia Goodwin
4. Implementation Lead: Aaron Harte
5. Technical Lead: Pavan Chilukuri
6. Senior Business Analyst: Manos Stefanakos
7. Implementation Developer: Jeff Alderson
8. Subject Matter Expert: Alexander Jackl
9. Technical Writer: Adrienne Taylor
10. Business Analyst: April Jackson
11. Data Mapper: Mentoria Fife

APPENDIX 6 – SYSTEM ARCHITECTURE

The proposed edFusion architecture can be described as a combination of architectural styles delivering a successful, scalable and extensible platform and a suite of public facing web applications. The three architectural styles in play are Layered, 3-Tier, Object Oriented and Services-Oriented Architectures.

The following describes the solution architecture of the proposed application:

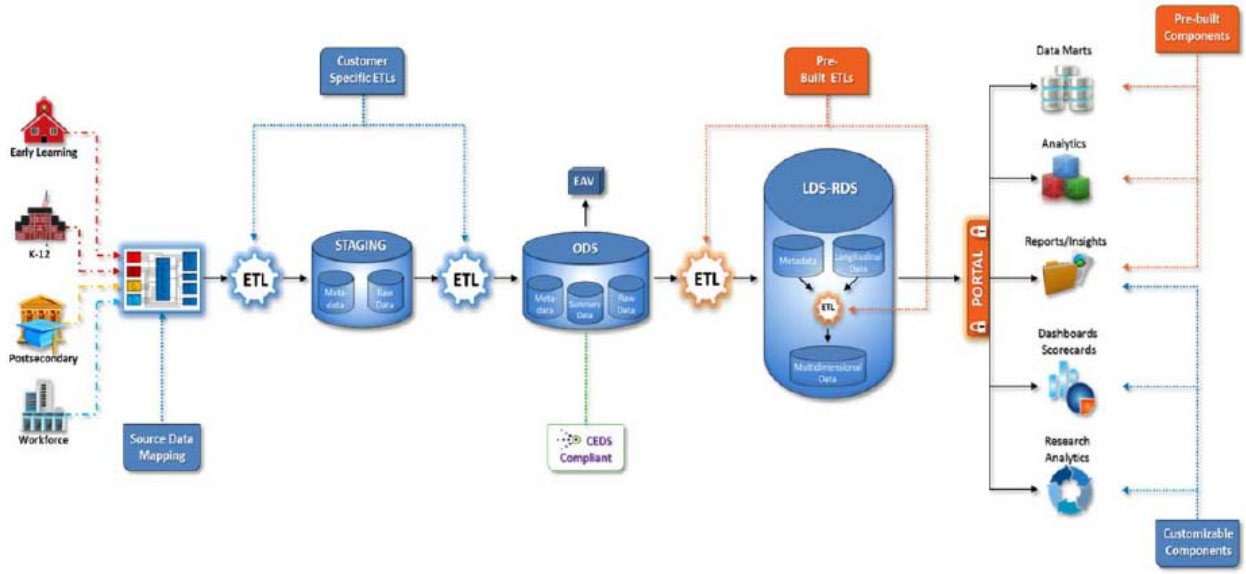


Operating Systems by Tier: Microsoft Server 2012

Application/web server(s): IIS and .NET framework

Database: Microsoft SQL Server 2012

Other software required: Other component software utilized to address rules manage (.NET based rules engine) and AdHoc Analysis (SyncFusion) but those software are integrated into the product with no external requirements on clients.



Functional Architecture of the edFusion Solution for the VADR Operational Data Store and Supporting Data Marts and System Implementation

1. edFusion **Foundation** for Data Integrity and Quality Management: Data quality, validation, and movement are integral to SLDS deployments. The edFusion Foundation was designed to efficiently manage these processes.

2. edFusion **SLDS (ODS)**: The data warehouse is a cutting-edge Online Analytical Processing (OLAP) system designed around education data expressed in a Star Schema. It leverages cube-based analytic services for accurate, high-performance data retrieval.

3. edFusion **Identify**: Central to the solution is robust directory and identity management developed specifically for the U.S. education market. Unlike typical business-oriented computer security systems that assume all relationships are hierarchical, the edFusion Identify specifically represent the complex collaborative relationships typical in education.

4. edFusion **Insight**: The reports outlined by Vermont RFP will be developed and delivered using the edFusion Insight reporting framework.

5. edFusion **Integrate**: edFusion Integrate brings users, resources, and applications together into an easy-to-use and accessible gateway. Any web-accessible application can be integrated into the edFusion portal.

Summary of Virtual Environment:

1. Virtual Machines: 20
2. CPUs (~2.5GHz): 38
3. Memory (GB): 200
4. Disk Space (GB): 10,080
5. Windows 2012R2 SQL Server Enterprise CPUs: 28
6. Windows 2012R2 Enterprise: 15
7. Windows 2012R2 Standard: 3
8. SharePoint Server Enterprise: 4
9. Visual Studio: 1
10. Team Foundation Server 2010: 1

Host	Purpose	# Virtual Servers Needed	Software	vCPU Count (~2.5 GHz)	Memory (GB)	Disk Space (GB)	2012R2 SQL Server Enterprise vCPUs	Windows Server 2012 R2 Ent	Windows Server 2012 R2 Std	SharePoint Server 2010 Enterprise Servers	Visual Studio 2010	Team Foundation Server 2010
Development Environment: Used to allow developers to develop and test their individual code before promoting it to the Test environment												
	Developer Machine	1	Visual Studio SQL Server - SSMS and BIDS MS Office	1	8	500	0	0	1	0	1	0
	Web Server	1	SharePoint	1	8	160	0	1	0	1	0	1
	ODS - RDS Server	1	Database	2	8	500	2	1	0	0	0	0
	Analysis Server	1	SSAS (SQL Server Analysis Services) SQL Server - BIDS	2	8	512	2	1	0	0	0	0
Test Environment: Used to allow developers and test users to test all the newly promoted code and functions of the SLDS environment before promoting to the Pre-Production environment												
	Web Server	1	SharePoint	1	8	160	0	1	0	1	0	0
	ODS Server	1	Database	2	8	400	2	1	0	0	0	0
	RDS Server	1	Database	2	8	300	2	1	0	0	0	0
	Analysis Server	1	SSAS	2	8	512	2	1	0	0	0	0

Host	Purpose	# Virtual Servers Needed	Software	vCPU Count (~2.5 GHz)	Memory (GB)	Disk Space (GB)	2012R2 SQL Server Enterprise vCPUs	Windows Server 2012 R2 Ent	Windows Server 2012 R2 Std	SharePoint Server 2010 Enterprise Servers	Visual Studio 2010	Team Foundation Server 2010
Pre-Production Environment: Used to load test and do final testing before promoting code to the Production environment.												
	Web Server	1	SharePoint	2	16	160	0	1	0	1	0	0
	ODS Server	1	Database	3	16	800	3	1	0	0	0	0
	RDS Server	1	Database	3	16	600	3	1	0	0	0	0
	Analysis Server	1	SSAS	3	16	1024	3	1	0	0	0	0
	Domain Controller	1	Active Directory	1	4	160	0	0	1	0	0	0
	SFTP	1		1	4	1024	0	0	0	0	0	0
Production Environment: This is "live" environment that the users of the system access												
	Web Server	1	SharePoint	2	16	160	0	1	0	1	0	0
	ODS Server	1	Database	3	16	800	3	1	0	0	0	0
	RDS Server	1	Database	3	16	600	3	1	0	0	0	0
	Analysis Server	1	SSAS	3	16	1024	3	1	0	0	0	0
	Domain Controller	1	Active Directory	1	4	160	0	0	1	0	0	0
	SFTP	1		1	4	1024	0	0	0	0	0	0
Total		**20**		**38**	**200**	**10080**	**28**	**15**	**3**	**4**	**1**	**1**

APPENDIX 7 – COST/BENEFIT ANALYSIS

The following outlines the cost/benefit analysis developed as part of this Independent Review.

METHOD

The method used for this cost/benefit analysis is:

1. Develop underlying assumptions
2. Calculate monetary quantifiable benefits of using the proposed solution
3. Calculate monetary non-quantifiable benefits of using the proposed solution
4. Identify non-monetary benefits of using the proposed solution
5. Calculate the ***TOTAL*** 10 year cost of the proposed solution
    a. Considering that ***AOE's Costs*** are equal to their current operating costs (no operating cost increase), we did not ALSO calculate JUST AOE's project costs, as they are a wash when compared to current costs
6. Calculate the ***TOTAL*** 10 year cost of maintaining the existing applications
7. Subtract the existing application cost from the proposed solution cost to arrive at ***TOTAL INCREMENTAL*** costs for the entire project
8. Subtract ***BENEFIT*** dollars from the ***TOTAL INCREMENTAL COST*** dollars to arrive at *TOTAL NET* project (Cost)/Benefit

Assumptions:

1. Time/cost savings are considered REAL savings in that, the time people save through this solution is then allocated to other tasks, preventing the need to hire additional staff.
2. There are no expected staff reductions that will allow for actual realization of these cost recaptures. Staff will be reallocated to fill backlog of data analysis and reporting capabilities, as well as the advancement of other value-added priorities, that the AOE has not had time to fulfill due to time spent developing/managing existing data collection operations.
3. Time savings are annual and for the life of the project.
4. AOE does not know if the School cost savings will be realized in part or as a whole as local budgets are defined and approved by superintendents and school boards at the local level. What AOE has heard from schools is that staff that have been required to spend time reporting data to AOE are being pulled away from providing direct instructional or support benefit to students. Since the required data reporting activity is hindering their ability to provide other backlogged services, AOE suspects that schools likely will reallocate these resources to add additional educational benefit rather than reduce staff. One area where AOE suspects cost savings may be realized is where certain staff may have been paid overtime to respond to the SECT collection over the summer months. Some staff that was working on this was hourly and may have received overtime and others may have been salary and just expected to dedicate time over their summer vacations. AOE does not have an estimate of what these costs were/are nor do I have an estimate of to what extent or how schools might choose to realize these savings.

BENEFITS

AOE MONETARY QUANTIFIABLE BENEFITS OF USING NEW SYSTEM (from Business Case)						
Role Allocated to Data Warehouse and Reporting Solution	**Salary Savings**	**Salary Before**	**Salary After**	**FTE Savings**	**FTE Before**	**FTE After**
DBA Salaries	$120,028	$240,850	$120,822	1.1	2.6	1.5
Data Administration Salaries	$81,660	$265,395	$183,735	1.2	3.9	2.7
Data Warehousing Salaries	$62,225	$62,225	$0	0.65	0.65	0
Federal Reporting Salaries	$75,774	$80,231	$4,457	0.85	0.9	0.05
TOTAL:	**$339,687**	**$648,701**	**$309,014**	**3.8**	**8.05**	**4.25**
TOTAL AOE QUANTIFIABLE MONETARY BENEFITS - ANNUAL	**$339,687**					
AOE TOTAL QUANTIFIABLE MONETARY BENEFITS - PROJECT LIFETIME (10 YEARS)	**$3,396,870**					
SCHOOL/SU MONETARY NON-QUANTIFIABLE BENEFITS OF USING NEW SYSTEM (from Business Case)	**Salary Savings**					
Student Census Data Gathering by Schools	$70,000					
Educator Census Data Gathering by Schools	$35,000					
Student Educator Course Transcript Data Gathering by Schools	$160,000					
TOTAL:	**$265,000**					
TOTAL SCHOOL MONETARY NON-QUANTIFIABLE BENEFITS - ANNUAL	**$265,000**					
SCHOOL/SU TOTAL MONETARY NON-QUANTIFIABLE BENEFITS - PROJECT LIFETIME (10 YEARS)	**$2,650,000**					

Non-Monetary Benefits include:

1. Better access to data through the portal, as stakeholders can get their own data now vs. asking AOE for data.
2. Better data analytics, as the data is now accessible using vastly improved reporting tools.
3. All teachers across the state will have access to student level data in their classrooms that is updated nightly and accessible via classroom dashboards. They will have access to class room information using indicators – including actionable early warning indicators for students that are based on the same measures are program teams are using to address performance issues for schools. (The EDW updates just weren't timely enough to be truly actionable.)
4. The AOE program teams, school/district level staff, school board members, legislators, and other members of the administration all will have access to real time data at the schools so the interventions that are planned at identified schools are timely – and not based on data

that was "real" two years ago. There are some school districts that have local systems that serve up performance indicators "real time" – but not all are scientifically based indicators --- and they certainly are not aligned with each other.

5. This K-12 SLDS is also going to be expanded with the RTTT-ELC grant money to establish linkages to early education data. Future linkages to postsecondary and workforce data will provide a true longitudinal picture to stakeholders to see what programs are working as people move through the various education domains. For that to happen though, this K-12 system needs to be implemented and needs to be extensible to incorporate those linkages

To address a couple of additional points, AOE believes the opportunity cost of NOT moving forward with this project should be factored in. By not moving forward with this project, Vermont is liable to lose the following monies that have been awarded/distributed to the state:

1. $4,947,261 in FY12 SLDS grant money specifically granted to Vermont to implement this Statewide Longitudinal Data System via the Vermont Automated Data Reporting project. The VADR project has been vetted and approved by the US DOE after a stringent review process whereby a panel of national experts rated Vermont's proposal the highest in the country. If Vermont does not move forward with the VADR project, Vermont will be forced to forfeit this grant money and this action will be considered and will be counted as a negative factor against the state's proposal whenever Vermont may decide to apply for any future US DOE funding opportunities.
2. $36,931,076 in FY13 Race To The Top – Early Learning Challenge grant money awarded to Vermont to improve early education. A component of this grant, and a number of corresponding deliverables, relies on expanding the SLDS to include early education data. Five early education data sources were included in the proposal as candidate data sources that will be imported into and reported out of the SLDS. This assumes that the VADR project – i.e. standing up the initial K-12 foundation of the SLDS – has completed on time and has been established by June, 2016. Failure to move forward with the VADR project puts RTTT-ELC grant success at risk because Vermont would not be able to complete required deliverables. Failure to achieve RTTT-ELC deliverables will also be considered and will be counted as a negative factor against the state's proposal whenever Vermont may decide to apply for any future USDOE and federal Health and Human Services funding opportunities in the future.
3. Vermont was awarded $77,150,071 in federal State Fiscal Stabilization Funds to allocate to school districts over fiscal years 2010 and 2011. The VADR project ensures that Vermont is in compliance with SFSF assurances, specifically Assurance (b): Improving Collection and Use of Data which states "A State must collect and publicly report information on the elements of its statewide longitudinal data system, on whether teachers receive data on student growth in a manner that is timely and informs instructional programs, and on whether the State provides teachers with reports of individual teacher impact on student achievement" and is further defined by Indicator (b)(1) which requires the state to "Indicate which of the 12 elements described in section 6401(e)(2)(D) of the America COMPETES Act are included in the State's statewide longitudinal data system." The VADR project ensures that the state complies with this relevant America COMPETES Act requirement and SFSF assurance. Failure to move forward and successfully complete the VADR project could put Vermont at risk of having to return some or all of the SFSF money that have already been distributed to and spent by school districts.

There are also political and other intangible repercussions of not moving forward. It is difficult to define dollar amounts to some of these but they should be weighed when considering whether or not to proceed with this project:

1. The Governor has included the SLDS to be delivered by the VADR project as a specific goal in his statewide strategic plan. Specifically, "Goal 4.7: Implement a coherent longitudinal data system across the learning spectrum." Where this is a specific, concrete goal that would clearly not be achieved should we not move forward with this project, many of the Governor's other goals - e.g. reducing recidivism by decreasing the number of high school dropouts, improving early education through the RTTT-ELC, etc. – depend on the SLDS as a resource that will allow stakeholders to make policy/programmatic decisions by the actionable data that will be served up via the SLDS. It is difficult to measure the political fallout or to put a dollar figure on the decision to not move forward and complete this project but there are far reaching repercussions.
2. It may be impossible to put a dollar figure on the societal benefit achieved when stakeholders and educators are able to evaluate timely, actionable data related to education program effectiveness. Dropouts may be reduced which may in turn reduce crime rates and recidivism. Student achievement may improve in turn delivering better educated resources into the state workforce. Wages for these educated resources may increase causing cascading effects by both boosting the bottom lines of businesses receiving more money from these workers and state coffers receiving more taxes through higher income tax receipts and sales tax revenue. Ultimately, this is a project that should be viewed as an investment. One that is both aligned to state strategic plans as well as sound in scope and implementation planning. The AOE has done their due diligence in trying to move this work forward and deliver on this project but we do need to move forward lest this opportunity pass us by.

COSTS

TOTAL PROJECT COSTS

TOTAL COSTS		
Costs to implement new system:		
Software	$880,000	
Implementation Services	$2,082,400	
Software Maintenance and Support	$1,385,782	
Software Hosting (not yet firm pricing)	$1,926,069	
SUB-TOTAL (Vendor Fees):	**$6,274,251**	
HMH: $5,479,850		
Agilis: $794,400		
PLUS AOE Incremental Costs: Travel, SIS Updates, Indirects, Contingency	$873,952	
PLUS DII Project Management Oversight and Enterprise Architecture Fee (3%)	$214,446	
TOTAL 10 YEAR COSTS TO IMPLEMENT NEW SOLUTION:		**$7,362,649**
Less:		
Current Costs to maintain systems:	**Annual**	**10 Year Cost**
Current EDW Server hosting cost elimination ($41,821)	$41,821	
EDW annual license fees cost elimination ($211,000)	$211,000	
TOTAL 10 YEAR COSTS TO MAINTAIN CURRENT SOLUTION:	**$252,821**	**$2,528,210**
TOTAL INCREMENTAL COST TO IMPLEMENT NEW SOLUTION:		**$4,834,439**
Less:		
AOE MONETARY QUANTIFIABLE BENEFITS		**$3,396,870**
SCHOOL MONETARY NON-QUANTIFIABLE BENEFITS		**$2,650,000**
NET COST/(BENEFIT) TO IMPLEMENT NEW SOLUTION:		**-$1,212,431**

The analysis shows a Net Benefit of **$1.21M** to pursue this project:

Cost to Implement	$7.36M
Less Cost to Maintain Current Solution	$2.52M
NET INCREMENTAL COST to IMPLEMENT	$4.83M
Less Monetary Benefits	$6.04M
NET COST/(BENEFIT)	**($1.21M)**

APPENDIX 8 – PROCUREMENT ADVISORY SERVICES

There is one primary STANDARD CONTRACT contemplated with HMH in draft form (*version 11 is the version in the works at the time of this report*), which also contains several Attachments, including:

1. Attachment A – Specifications of Work to be Performed
2. Attachment B – Payment Provisions
3. Attachment C – Standard State Contract Provisions
4. Attachment D – Customary Contract Provisions of the Agency of Education
5. Attachment E – Authorized Use of Student Data
6. Attachment F - License Agreement
7. Attachment G – Support and Maintenance Agreement
8. Attachment H – Project Staffing

The order of precedence is the Standard Contract, followed by Attachments C, D, A, B, E, F, G, and H.

The Standard Contract and Attachments have been reviewed and comments submitted to Ms. Gauvin. There is expected to be additional reviews and revisions to the Standard Contract and Attachments in the intervening time prior to contract signing.

Additionally, we have reviewed HMH's license agreement and have no exceptions to that agreement.

We have reviewed the Agilis original proposal, the Agilis contract for Phases 1 and 2, and the proposed contract for Phases 3-7. The only exception we have to this agreement is the clause indicating a change of scope if the project extends beyond 8/30/2016. It is suggested that be extended 2 additional months.

Finally, there is nothing other than a standard public cloud agreement with Amazon Web Services (AWS). We suggest AOE consider requiring HMH to have an AWS GovCloud services contract. Again, pricing for hosting services is not yet firm.

AOE Vertical Data Reporting Project

STATEMENT OF: Use of Funds (Expenses), Source of Funds (Revenue), Cash Flow, and Change in Net Operating Cost

KEY:

Cells with red background require attention

Need to confirm the Grant funding of $4.9M is eligible to cover those items called for in this analysis

SUMMARY:

Total Project Cost Over 10 Years: $7,362,649

Total SLDS Grant Funding: $4,947,260

Total AOE Funding: $2,415,389

Funding Excess/(Shortage): $0

NET DECREASE/(INCREASE) IN OP. COSTS: ($4,834,439)

CASH FLOW ANALYSIS: Click Here

USE OF FUNDS

Description	Billing Milestone	Unit Price	# of Units	Total	AOE Funded	SLDS Funded	Year 1 - Through 6/30/2014	Year 2 (FY15)	Year 3 (FY16)	Year 4 (FY17)	Year 5 (FY18)	Year 6 (FY19)	Year 7 (FY20)	Year 8 (FY21)	Year 9 (FY22)	Year 10 (FY23)	TOTAL	
SOFTWARE AND SERVICES																		
edFusion SOFTWARE				**$880,000**														
Software Installation	Develop test and dev env.	$880,000	1	$880,000	0%	100%	$880,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$880,000	
SOFTWARE TOTAL				**$880,000**			**$880,000**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$880,000**	
SERVICES																		
OPERATIONAL DATA STORE AND SUPPORTING DATA MARTS AND IMPLEMENTATION SERVICES																		
edFUSION SOFTWARE INSTALLATION				**$20,000**														
Project Management	Project Management	$20,000	1	$20,000	0%	100%	$20,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$20,000	$20,000
PROJECT PLANNING AND INITIATION				**$50,000**														
Project Kick Off	Project Initiation	$20,000	1	$20,000	0%	100%	$20,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$20,000	$20,000
Project Initiation Deliverables	Final SOW	$15,000	1	$15,000	0%	100%	$15,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$15,000	$15,000
Project Management	Project Management	$15,000	1	$15,000	0%	100%	$15,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$15,000	$15,000
ANALYSIS AND DESIGN				**$284,000**														
Report Design	Requirements Document, Report Design	$55,000	1	$55,000	0%	100%	$0	$55,000	$0	$0	$0	$0	$0	$0	$0	$0	$55,000	$55,000
Portal Design	Dashboard Design, Cube Requirements	$25,000	1	$25,000	0%	100%	$0	$25,000	$0	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000
ODS and Data Model Extensions	Configuration of edFusion ODS and Data Marts	$39,000	1	$39,000	0%	100%	$0	$39,000	$0	$0	$0	$0	$0	$0	$0	$0	$39,000	$39,000
ETL Design	ETL Design Document	$145,000	1	$145,000	0%	100%	$0	$145,000	$0	$0	$0	$0	$0	$0	$0	$0	$145,000	$145,000
Project Management	Project Management	$20,000	1	$20,000	0%	100%	$0	$20,000	$0	$0	$0	$0	$0	$0	$0	$0	$20,000	$20,000
EDFACTS DATA MART				**$130,000**														
EdFacts Design	EdFacts Design Document	$105,000	1	$105,000	0%	100%	$0	$105,000	$0	$0	$0	$0	$0	$0	$0	$0	$105,000	$105,000
Project Management		$25,000	1	$25,000	0%	100%	$0	$25,000	$0	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000
ED-FI DATA MART				**$35,000**														
ED-FI Design	ED-FI Specification	$25,000	1	$25,000	0%	100%	$0	$25,000	$0	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000
Project Management	Project Management	$10,000	1	$10,000	0%	100%	$0	$10,000	$0	$0	$0	$0	$0	$0	$0	$0	$10,000	$10,000
DEVELOP GROWTH MODEL REPORTING TOOL				**$125,000**														
Implementation	Populate Growth Model Data Mart	$110,000	1	$110,000	0%	100%	$0	$110,000	$0	$0	$0	$0	$0	$0	$0	$0	$110,000	$110,000
Project Management	Project Management	$15,000	1	$15,000	0%	100%	$0	$15,000	$0	$0	$0	$0	$0	$0	$0	$0	$15,000	$15,000
REPORTAL DATA MART AND REPORTING				**$90,000**														
Implementation	Populate Reportal Data Mart	$50,000	1	$50,000	0%	100%	$0	$50,000	$0	$0	$0	$0	$0	$0	$0	$0	$50,000	$50,000
Project Management	Project Management	$40,000	1	$40,000	0%	100%	$0	$40,000	$0	$0	$0	$0	$0	$0	$0	$0	$40,000	$40,000
DEPLOYMENT				**$95,000**														
Development and Integration	Delivery of edFusion from Pre-Production	$50,000	1	$50,000	0%	100%	$0	$50,000	$0	$0	$0	$0	$0	$0	$0	$0	$50,000	$50,000
SLDS UAT	UAT Plan	$35,000	1	$35,000	0%	100%	$0	$35,000	$0	$0	$0	$0	$0	$0	$0	$0	$35,000	$35,000
Project Management	Project Management	$10,000	1	$10,000	0%	100%	$0	$10,000	$0	$0	$0	$0	$0	$0	$0	$0	$10,000	$10,000
TRAINING				**$90,000**														
Training Curriculum	User Guides, Training Materials	$20,000	1	$20,000	0%	100%	$0	$20,000	$0	$0	$0	$0	$0	$0	$0	$0	$20,000	$20,000
Training Delivery	Training Plan	$15,000	1	$15,000	0%	100%	$0	$15,000	$0	$0	$0	$0	$0	$0	$0	$0	$15,000	$15,000
Project Management	Project Management	$15,000	1	$15,000	0%	100%	$0	$15,000	$0	$0	$0	$0	$0	$0	$0	$0	$15,000	$15,000
Training Plan	Training Delivery	$40,000	1	$40,000	0%	100%	$0	$40,000	$0	$0	$0	$0	$0	$0	$0	$0	$40,000	$40,000
TOTAL: OPERATIONAL DATA STORE AND SUPPORTING DATA MARTS AND IMPLEMENTATION SERVICES				**$919,000**			**$70,000**	**$849,000**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$919,000**	
			ODS Bid:	$1,799,000														
VERTICAL REPORTING TOOL AND IMPLEMENTATION SERVICES																		

PROJECT PLANNING AND INITIATION				**$30,000**														
Project Kick Off	Project Initiation	$10,000	1	$10,000	0%	100%	$0	$10,000	$0	$0	$0	$0	$0	$0	$0	$0	$10,000	$10,000
Project Initiation Deliverables	Final SOW	$10,000	1	$10,000	0%	100%	$0	$10,000	$0	$0	$0	$0	$0	$0	$0	$0	$10,000	$10,000
Project Management	Project Management	$10,000	1	$10,000	0%	100%	$0	$10,000	$0	$0	$0	$0	$0	$0	$0	$0	$10,000	$10,000
edFUSION VR SOFTWARE DELIVERY				**$10,000**														
Project Management	Project Management	$10,000	1	$10,000	0%	100%	$0	$10,000	$0	$0	$0	$0	$0	$0	$0	$0	$10,000	$10,000
ANALYSIS AND DESIGN				**$114,000**														
Design	Requirements Document, Report Design	$25,000	1	$25,000	0%	100%	$0	$25,000	$0	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000
UI Design	Dashboard Design, Cube Requirements	$25,000	1	$25,000	0%	100%	$0	$25,000	$0	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000
Data Templates/Data Load Specs	Configuration of Integrate and Foundation to support collections	$19,000	1	$19,000	0%	100%	$0	$19,000	$0	$0	$0	$0	$0	$0	$0	$0	$19,000	$19,000
Load and Services Design	Transformation Design Document	$25,000	1	$25,000	0%	100%	$0	$25,000	$0	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000
Project Management	Project Management	$20,000	1	$20,000	0%	100%	$0	$20,000	$0	$0	$0	$0	$0	$0	$0	$0	$20,000	$20,000
RULES DEFINITION				**$55,000**														
Definition	Solution	$35,000	1	$35,000	0%	100%	$0	$35,000	$0	$0	$0	$0	$0	$0	$0	$0	$35,000	$35,000
Project Management	Project Management	$20,000	1	$20,000	0%	100%	$0	$20,000	$0	$0	$0	$0	$0	$0	$0	$0	$20,000	$20,000
SERVICES INFRASTRUCTURE				**$45,000**														
Definition	Solution	$25,000	1	$25,000	0%	100%	$0	$25,000	$0	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000
Project Management	Project Management	$20,000	1	$20,000	0%	100%	$0	$20,000	$0	$0	$0	$0	$0	$0	$0	$0	$20,000	$20,000
DEPLOYMENT				**$60,000**														
Development and Integration	Solution	$10,000	1	$10,000	0%	100%	$0	$10,000	$0	$0	$0	$0	$0	$0	$0	$0	$10,000	$10,000
SLDS UAT	UAT Plan Integration Testing	$35,000	1	$35,000	0%	100%	$0	$35,000	$0	$0	$0	$0	$0	$0	$0	$0	$35,000	$35,000
Project Management	Project Management	$15,000	1	$15,000	0%	100%	$0	$15,000	$0	$0	$0	$0	$0	$0	$0	$0	$15,000	$15,000
TRAINING				**$55,000**														
Training Curriculum	User Guides, Training Materials	$15,000	1	$15,000	0%	100%	$0	$15,000	$0	$0	$0	$0	$0	$0	$0	$0	$15,000	$15,000
Training Delivery	Training Plan	$10,000	1	$10,000	0%	100%	$0	$10,000	$0	$0	$0	$0	$0	$0	$0	$0	$10,000	$10,000
Project Management	Project Management	$10,000	1	$10,000	0%	100%	$0	$10,000	$0	$0	$0	$0	$0	$0	$0	$0	$10,000	$10,000
Training Plan	Training Delivery	$20,000	1	$20,000	0%	100%	$0	$20,000	$0	$0	$0	$0	$0	$0	$0	$0	$20,000	$20,000
TOTAL: VERTICAL REPORTING TOOL AND IMPLEMENTATION SERVICES				**$369,000**			**$0**	**$369,000**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$369,000**	
			VR Bid:	**$369,000**													$1,288,000	
			Total Choice Software:	**$880,000**														
			Total Choice Services:	**$1,288,000**														
TOTAL CHOICE BID (excluding Hosting, Support, Maintenance)				**$2,168,000**			**$950,000**	**$1,218,000**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$2,168,000**	Choice Software and Services
	Off Shore Services			$1,500,000	69%													

PROJECT MANAGEMENT/TECHNICAL LEADERSHIP																		
Phase 1: Project Definition		$60,000	1	$60,000	0%	100%	$60,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$60,000	$60,000
Phase 2: Vendor/Product Selection		$75,000	1	$75,000	0%	100%	$75,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$75,000	$75,000
Phase 3:System Implementation: Requirements Phase		$90,000	1	$90,000	0%	100%	$0	$90,000	$0	$0	$0	$0	$0	$0	$0	$0	$90,000	$90,000
Phase 4: System Implementation: Build Phase	Combined pricing with Phase 5	$0	1	$0	0%	100%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Phase 5:System Implementation: System Testing Phase		$315,000	1	$315,000	0%	100%	$0	$315,000	$0	$0	$0	$0	$0	$0	$0	$0	$315,000	$315,000
Phase 6: User Acceptance Testing		$150,000	1	$150,000	0%	100%	$0	$150,000	$0	$0	$0	$0	$0	$0	$0	$0	$150,000	$150,000
Phase 7: Go-Live		$90,000	1	$90,000	0%	100%	$0	$90,000	$0	$0	$0	$0	$0	$0	$0	$0	$90,000	$90,000
Conferences (8)		$14,400	1	$14,400	0%	100%	$0	$14,400	$0	$0	$0	$0	$0	$0	$0	$0	$14,400	$14,400
TOTAL PROJECT MANAGEMENT/TECHNICAL LEADERSHIP				**$794,400**			**$135,000**	**$659,400**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$794,400**	
SERVICES TOTAL							**$205,000**	**$1,877,400**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$2,082,400**	
SOFTWARE AND SERVICES TOTAL							**$1,085,000**	**$1,877,400**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$2,962,400**	$2,962,400 Software and Services total
MAINTENANCE AND SUPPORT: SOFTWARE AND HOSTING																		
Hosting Only OR					0%	100%	$0	$182,000	$189,280	$196,851	$204,725	$212,914	$221,431	$230,288	$239,500	$249,080	$1,926,069	
OPTION 2: Hosting and Software Maintenance	This option selected for now…$7K annually added to support testing environment				0%	100%	$0	$337,000	$344,000	$351,280	$358,851	$366,725	$375,086	$383,788	$392,846	$402,274	$3,311,850	$1,385,782 Software Maint and Support
MAINTENANCE and SUPPORT TOTAL							**$0**	**$337,000**	**$344,000**	**$351,280**	**$358,851**	**$366,725**	**$375,086**	**$383,788**	**$392,846**	**$402,274**	**$3,311,850**	$5,479,850 To Choice over 10 years
(Maintenance and Support only)								$155,000	$154,720	$154,429	$154,126	$153,811	$153,656	$153,500	$153,346	$153,194	$1,385,782	$794,400 To Agilis over 10 years
																		$6,274,250 Total vendor costs
																		$6,274,250 Reconciliation
AOE COSTS																		
Incremental Staffing Costs		$0	0	$0	0%	100%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
Laptops	None	$1,000	0	$0	0%	100%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
DII Project Management Oversight	Included in DII Fee Below	$0	1	$0	0%	100%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
External Project Management Services	Included above	$0	1	$0	0%	100%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
Independent Review		$13,890	1	$13,890	0%	100%	$13,890	$0	$0	$0	$0	$0	$0	$0	$0	$0	$13,890	
Security Assessment	Vendor providing this	$0	1	$0	0%	100%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
Travel		$8,000	1	$8,000	0%	100%	$8,000	$8,000	$8,000	$0	$0	$0	$0	$0	$0	$0	$24,000	
Other (SIS Updates, SIF extract)		$215,000	1	$215,000	0%	100%	$215,000	$215,000	$215,000	$0	$0	$0	$0	$0	$0	$0	$645,000	

Indirect Costs		$0	1	$0	0%	100%	$35,280	$26,640	$26,640	$0	$0	$0	$0	$0	$0	$0	$88,560		
Contingency		$102,315	1	$102,315	0%	100%	$102,502	$0	$0	$0	$0	$0	$0	$0	$0	$0	$102,502	$873,952	
AOE COSTS TOTAL							**$374,672**	**$249,640**	**$249,640**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$873,952**	$873,952	Internal AOE Costs
PROJECT SUB TOTAL COSTS							**$1,459,672**	**$2,464,040**	**$593,640**	**$351,280**	**$358,851**	**$366,725**	**$375,086**	**$383,788**	**$392,846**	**$402,274**	**$7,148,202**	$7,148,202	Project Sub-Total Costs
3% Charge for DII PMO/EA Services					0%	100%	**$43,790**	**$73,921**	**$17,809**	**$10,538**	**$10,766**	**$11,002**	**$11,253**	**$11,514**	**$11,785**	**$12,068**	**$214,446**	$214,446	DII Services
PROJECT TOTAL COSTS							**$1,503,462**	**$2,537,961**	**$611,449**	**$361,818**	**$369,617**	**$377,727**	**$386,339**	**$395,302**	**$404,631**	**$414,342**	**$7,362,649**	$7,362,649	Total Project Costs

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SOURCE OF FUNDS (PAYMENT SCHEDULE BASED ON DELIVERABLES)

Revenue Source:							**Year 1 - Through 6/30/2014**	**Year 2 (FY15)**	**Year 3 (FY16)**	**Year 4 (FY17)**	**Year 5 (FY18)**	**Year 6 (FY19)**	**Year 7 (FY20)**	**Year 8 (FY21)**	**Year 9 (FY22)**	**Year 10 (FY23)**	**TOTAL**		
SLDS Grant Funds	FY13 ($2,186,180); FY14 ($1,455,540); FY15 ($1,305,540)						$3,641,720	$1,305,540	$0	$0	$0	$0	$0	$0	$0	$0	$4,947,260		
AOE Carryover Funds							$140,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$140,000	$2,415,389	Total AOE Funding
AOE Funds	Current EDW Server hosting cost elimination ($41,821) and EDW annual license fees cost elimination ($211,000)						$0	$252,821	$252,821	$252,821	$252,821	$252,821	$252,821	$252,821	$252,821	$252,821	$2,275,389	$5,087,260	Incremental Cost
TOTAL:							**$3,781,720**	**$1,558,361**	**$252,821**	**$252,821**	**$252,821**	**$252,821**	**$252,821**	**$252,821**	**$252,821**	**$252,821**	**$7,362,649**		

CASH FLOW (BASED ON DELIVERABLES)

							Year 1 - Through 6/30/2014	**Year 2 (FY15)**	**Year 3 (FY16)**	**Year 4 (FY17)**	**Year 5 (FY18)**	**Year 6 (FY19)**	**Year 7 (FY20)**	**Year 8 (FY21)**	**Year 9 (FY22)**	**Year 10 (FY23)**	**TOTAL**
Use							$1,503,462	$2,537,961	$611,449	$361,818	$369,617	$377,727	$386,339	$395,302	$404,631	$414,342	$7,362,649
Source							$3,781,720	$1,558,361	$252,821	$252,821	$252,821	$252,821	$252,821	$252,821	$252,821	$252,821	$7,362,649
Net Cash by Fiscal Year:							$2,278,258	($979,600)	($358,628)	($108,997)	($116,796)	($124,906)	($133,518)	($142,481)	($151,810)	($161,521)	$0
Cash Flow:							**$2,278,258**	**$1,298,658**	**$940,029**	**$831,032**	**$714,237**	**$589,331**	**$455,813**	**$313,332**	**$161,522**	**$0**	**$0**

NET CHANGE IN OPERATING COSTS

Version 1: TOTAL PROJECT COST/Payment Schedule tied to Deliverables	**Year 1 - Through 6/30/2014**	**Year 2 (FY15)**	**Year 3 (FY16)**	**Year 4 (FY17)**	**Year 5 (FY18)**	**Year 6 (FY19)**	**Year 7 (FY20)**	**Year 8 (FY21)**	**Year 9 (FY22)**	**Year 10 (FY23)**	**TOTAL**
Proposed Operating Costs	$1,503,462	$2,537,961	$611,449	$361,818	$369,617	$377,727	$386,339	$395,302	$404,631	$414,342	**$7,362,649**
Current Operating Costs	$252,821	$252,821	$252,821	$252,821	$252,821	$252,821	$252,821	$252,821	$252,821	$252,821	$2,528,210
Net Operating Cost Decrease/(Increase)	**($1,250,641)**	**($2,285,140)**	**($358,628)**	**($108,997)**	**($116,796)**	**($124,906)**	**($133,518)**	**($142,481)**	**($151,810)**	**($161,521)**	**($4,834,439)**

Version 2: AOE PROJECT COST/Payment Schedule tied to Deliverables	**Year 1 - Through 6/30/2014**	**Year 2 (FY15)**	**Year 3 (FY16)**	**Year 4 (FY17)**	**Year 5 (FY18)**	**Year 6 (FY19)**	**Year 7 (FY20)**	**Year 8 (FY21)**	**Year 9 (FY22)**	**Year 10 (FY23)**	**TOTAL**
Proposed Operating Costs	($0)	$252,821	$252,821	$252,821	$252,821	$252,821	$252,821	$252,821	$252,821	$252,821	**$2,275,389**
Current Operating Costs	$0	$252,821	$252,821	$252,821	$252,821	$252,821	$252,821	$252,821	$252,821	$252,821	$2,275,389
Net Operating Cost Decrease/(Increase)	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Project Planning and Initiation Phase

Deliverable #	Deliverable Name	Amount	Est. Delivery Date	
1	List of Required Project Artifacts	25,000.00	3/28/2014	
2	Kick off Meeting	15,000.00	3/28/2014	
3	Final SOW and Project Plan and Project Management for this Phase	40,000.00	3/28/2014	
	Section Total			**$80,000.00**

Software Delivery Phase

Deliverable #	Deliverable Name	Amount	Est. Delivery Date	
4	Design and Detailed Specifications for Hosted Environments and Installation of edFusion	880,000.00	4/25/2014	
5	Project Management for this Phase	30,000.00	4/25/2014	
	Section Total			**$910,000.00**

Analysis and Design Phase

Deliverable #	Deliverable Name	Amount	Est. Delivery Date	
6	Documentation of Current State of Systems and Data Collections	90,000.00	11/18/2014	
7	Detailed Implementation Plan	129,000.00	11/18/2014	
8	Project Management for this Phase	40,000.00	11/18/2014	
	Section Total			**$259,000.00**

Services Infrastructure Phase

Deliverable #	Deliverable Name	amount	Est. Delivery Date	
9	Documentation of Services Infrastructure	25,000.00	3/5/2014	
10	Project Management for this Phase	20,000.00	3/5/2014	
	Section Total			**$45,000.00**

Build Phase

Deliverable #	Deliverable Name	Amount	Est. Delivery Date	
11	EdFacts Data Mart: Revisit Requirements and Build	105,000.00	6/11/2015	
12	Project Management for EdFacts	25,000.00	6/11/2015	
13	ED-FI Data Mart: Revisit Requirements and Build	25,000.00	6/11/2015	
14	Project Management for ED-FI	10,000.00	6/11/2015	
15	Reportal Data Mart: Revisit Requirements and Build	50,000.00	6/11/2015	
16	Project Management for Reportal	40,000.00	6/11/2015	
17	EDW Data Mart(s): Revisit Requirements and Build	100,000.00	6/11/2015	
18	Project Management for EDW	15,000.00	6/11/2015	
19	EDW Data Migration: Revisit Requirements and Build	55,000.00	6/11/2015	
20	Project Management for EDW Data Migration	20,000.00	6/11/2015	
21	Additional Indicators Data Mart(s): Revisit Requirements and Build	40,000.00	6/11/2015	
22	Project Management for Additional Indicators	10,000.00	6/11/2015	
23	Growth Model Tool and Data Mart(s): Revisit Requirements and Build	110,000.00	6/11/2015	
24	Project Management for Growth Model Tools and Data Mart	15,000.00	6/11/2015	
	Section Total			**$620,000.00**

Final UAT

Deliverable #	Deliverable Name	Amount	Est. Delivery Date	
25	Services Provided for Final UAT	60,000.00	9/14/2015	
26	Project Management for Final UAT	14,000.00	9/14/2015	
	Section Total			**$74,000.00**

Prep for Pilot

Deliverable #	Deliverable Name	Amount	Est. Delivery Date	
27	Selection of Pilot Districts and Development of Preparation Materials for Onboarding Districts	50,000.00	2/18/2015	
28	Project Management for pilot prep	10,000.00	2/18/2015	
	Section Total			**$60,000.00**

Pilot Stage

Deliverable #	Deliverable Name	Amount	Est. Delivery Date	
29	Pilot Phase Services	50,000.00	12/7/2015	
30	Project Management for Pilot	10,000.00	12/7/2015	
	Section Total			**$60,000.00**

General Rollout

Deliverable #	Deliverable Name	Amount	Est. Delivery Date	
31	General Rollout Services	50,000.00	4/6/2016	
32	Project Management for General Rollout	10,000.00	4/6/2016	
	Section Total			**$60,000.00**

	Project Total	**$2,168,000.00**

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