

# Information Technology Integration of Three Local School Corporations Investigations and Recommendations for Key Issues, Factors, and Challenges

Prepared and Submitted by Steven M. Hare

April 15, 2006

Revised July 30, 2006 (Added IT Integration Estimation Section)

This study was requested late in 2005 by Dr. Ed Eiler, Superintendent, Lafayette School Corporation for the purpose of investigating the issues associated with IT integration of three local Lafayette school corporations: Lafayette School Corporation, Tippecanoe School Corporation, and West Lafayette Community School Corporation.

## Overview

This report consists of several sections: this Overview, an Executive Summary, a section on the Current IT Environments – Similarities & Differences, the main body of the report describing Analysis & Recommendations, and a Bibliography.

Within the Executive Summary, the report's recommendations and issues are shown in bulleted format to simply provide a shortened list of those IT integration factors and ideas that increase the probability of timely success. Additional information is provided within the Analysis & Recommendations section for reference, greater description, and rationale.

The Analysis & Recommendations is divided into two parts: one for a discussion of the important business aspects of any IT integration (Key Business Drivers) and the other an analysis of the key technical issues associated with an IT integration of the three school corporations (Key Technical Drivers). Losing sight of the former to focus only on technical issues ignores many of the determining factors for success of such an undertaking. "The most difficult aspect of merging various IT systems was not a technical issue but a business one" is a quote from the CTO of a national automotive reseller which recently acquired several new companies<sup>4</sup>.

In a study conducted by Accenture, they estimate that IT integration is a key enabling factor to the success of any business or corporate merger in 60% of the cases they have studied. In fact, this same study shows that surveyed senior executives chose IT integration as the most critical factor in any business or corporate consolidation. Surprisingly, it was chosen over leadership and management as the number one issue. According to this same study, the two most important functions for a successful IT integration are "IT operations and applications delivery" and "program management"<sup>2</sup>.

By way of definition, *integration* suggests using the infrastructure and personnel assets (hardware, software, networking, IT personnel, etc.) of multiple organizations to create a single organization using these combined assets. Merging the IT assets of the Lafayette School Corporation, the Tippecanoe School Corporation, and the West Lafayette Community School Corporation would be an *integration* of IT assets and infrastructure.

**Consolidation** refers to the reduction of IT assets to improve management and decrease infrastructure and support costs. An example would be merging or combining multiple database systems into a single system to reduce the database support costs as well as possibly the hardware needed and hardware maintenance costs. If the IT assets and infrastructures of the three school corporations were *integrated*, one potential way to realize cost savings would be the *consolidation* of the resultant combined IT assets where possible.

As a preface to all that follows, one of the most important questions to be considered by the three school corporation boards and their constituents is “What are the main reasons and drivers for considering an integrated IT environment?” There can be many listed, such as potential cost savings, common student information data structures and access, additional shared services, data, and resources, as well as others.

Throughout this investigation, it has been the intent to describe the key benefits and pitfalls of a potential IT integration of the three Lafayette area school corporations. The analysis attempts to do so by examining existing IT capabilities at each school corporation, reviewing the IT integration literature and publications for best practices, and describing the key business and technical factors that would most influence an IT integration effort for these three school corporations.

## Executive Summary

The following list of business and technical recommendations highlights key factors for success if an IT integration of the Lafayette School Corporation, Tippecanoe School Corporation, and the West Lafayette Community School Corporation is part of a comprehensive school corporation consolidation. It is by no means exhaustive, but represents important elements from IT best practice, current IT capabilities of each school corporation, many years of IT experience, and IT integration case study outcomes. The details and rationale for each of these key factors are contained in the main body of this report, Analysis & Recommendations.

### Key Business Issues & Factors

- Create a leadership team for the strategic IT integration steering committee
- Create functional IT integration teams
- Make certain that IT staff do not feel threatened by the IT integration
- Recognize cultural differences within the pre-integrated IT environments
- Communicate the strategic and functional IT integration plans frequently and openly with all constituents, customers, and stakeholders
- Either integrate IT or don't – partial IT integration is not strategic
- Choose the best services from those used by the three school corporations
- Perform a gap analysis for services across the three school corporations
- Create an IT integration plan with sufficient granularity
- Define IT integration metrics that show success of the overall consolidation plan
- Don't implement new services for the IT integration plan

- Integrate as quickly as reasonably possible
- Minimize IT integration plan changes
- Remember that continuity of existing services must be maintained
- IT and security policies need to be reviewed and combined to create “best of breed” policies for the integrated IT environment
- Consultants can help facilitate, but senior administration and IT personnel “own” the integration plan

#### Key Technical Issues & Factors

- A greater level of data integration provides better operational, procedural, and informational economies of scale
- As input to the pre-planning process, a detailed inventory of IT assets needs to be compiled.
- The integrated IT network backbone should support Gigabit Ethernet if possible
- Services that need to be consolidated – shared file services, data warehouses, electronic mail, student records management systems, help desk and customer service, authentication and authorization services, disaster recovery and business continuity services, core security services, web services, and district level applications
- While attempting to reduce desktop application variety, balance the tradeoff between licensing and support cost reduction and customer satisfaction
- Desktops are currently “locked-down” for security and policy compliance – they need to remain so
- If legacy systems must be preserved, consider web services and service oriented architectures (SOA) to provide service continuation

#### IT Integration – Estimated Costs

- A customized IT integration, selecting “best of breed” applications and creating point-to-point application integration is estimated to cost in the range of two to four million dollars over an 18-24 month period
- An ERP implementation of the expected size and scope is estimated to cost in the range of five to seven million dollars over a two- to three-year period
- An SOA architecture utilizing an integration hub and middleware layer is estimated to cost in the range of three to five million dollars over an 18-24 month period

#### Current IT Environments – Similarities & Differences

Beginning with the attributes common to all three of the school corporations’ IT infrastructures and organizations, each has talented and effective IT leaders and staff, senior school corporation administrators who are very supportive of their IT personnel and services, robust infrastructures and networking to support timely and reliable service delivery, best practices for information security to protect their stakeholders sensitive data, necessary applications and services to conduct the business of each school corporation, and database systems to manage student records and other school corporation data.

Meetings were scheduled with all three of the school corporation IT directors, Mr. Kevin Little of Lafayette School Corporation (LSC), Ms. Joanne Troutner of Tippecanoe School Corporation (TSC), and Mr. Doug Obenchain of West Lafayette Community School Corporation (WLCSC). All three of them provided logical network diagrams of their environments for background information. As expected, each of the school corporations has a network infrastructure suitable for reliable service delivery from its central administrative IT core systems to all of the remote schools and sites within that school corporation.

Most of the network hardware used in all three school corporations is from Cisco Systems, Inc., a leader in network hardware, software, and security devices. Network feeds to the remote locations range from 1.5 Mbits/sec (T1 link) to GigE over fiber connections providing necessary bandwidth for customer requirements and all three school corporations use Wintek, Inc. as their internet service provider. Almost all of the desktop connections are 100 Mbits/sec and each site has appropriate physical data backups, as well as business continuity and disaster recovery plans.

On the applications and services side, TSC is primarily Novell-based for file services, while the other two school corporations use Microsoft-based file services. TSC does have four Microsoft-based file servers as well. WLCSC uses SASI for student records management, TSC uses CIMS, and LSC uses ??? Both WLCSC and LSC use Microsoft Exchange with the Outlook client for electronic mail, while TSC uses Lotus Notes with the Thunderbird client. All three school corporations provide Microsoft Office for their desktop productivity suite. Database products range from desktop products to db2 (TSC) and SQL 2000 for backend database servers at WLCSC and LSC.

Each of the school corporations has anti-virus software suites and an intrusion detection system to help secure their infrastructures. All of the school corporations use Cisco's PIX firewalls for additional security measures. WLCSC allows teachers to install their own programs while TSC and LSC IT staff manages this process for teachers.

Each of the school corporations certainly does have its own uniqueness, whether it is in service delivery, organization staffing, hardware and software infrastructure, or application choices. However, from an IT integration perspective, the differences have limited impact, i.e., each IT organization has similar missions and functional responsibilities within the same type of business and service deployment. They simply provide these services with different infrastructures and applications.

## Analysis & Recommendations

### Key Business and Technical Drivers

The questions typically first asked regarding a project of this scale and importance are ones such as "How much will this cost?", and "Will the resultant benefit be worth the cost to do this?" While it would be valuable and informative to have accurate estimates and answers for these types of questions, there are simply too many factors contributing to the success or failure of an IT integration effort to provide a reasonable estimate. Many of these factors lie

outside of the IT realm, and include tangible and intangible assets such as leadership, senior management commitment, similarity or difference between school corporation cultures, and others.

The simple answer to these questions is that it will always cost more to undertake a major IT integration initiative than to not do one. But, the operational costs of a completed, integrated environment are almost always less than those in the original non-integrated infrastructure. Key factors include strategically and transparently designing the integration plan, organizing the implementation and review management structure, creating the IT integration teams, and executing the plan in such a timely manner as to minimize cost, disruption, and resource diversion. Additionally, the IT integration plan must be aligned with the school corporation consolidated business model, such that it delivers the IT services that are necessary to meet all stakeholder and customer needs, now and into the future.

The more salient questions to be asked are really those such as “What factors will be most critical to the IT integration success”, and “What resources, what management structures, and what type of collaborative environment are necessary to implement an IT integration strategic plan successfully?” These questions are addressed within this section of the report by describing the key business and technical factors related to IT integration success.

### Key Business Drivers

#### **Create a leadership team for the strategic IT integration steering committee.**

Representatives on this committee need to include the IT leaders from each school corporation, as well as members of the senior school corporation administration responsible for the entire consolidation plan. This committee must be committed to the successful integration of IT infrastructure and services, have a complete understanding of the school corporations’ strategic plans and their business drivers, and knowledge of the overall consolidation plans. The need for joint senior administration and IT governance on this committee to ensure mutual understanding of issues and to create maximum synergy can’t be overstated. The chairperson of this committee, and possibly other IT leaders on this committee as well, should sit on the steering committee for the overall school corporation consolidation plan.

**Create functional IT integration teams.** Functional IT integration teams need to be formed based upon infrastructure, networking, services/applications, customer support, security, and instructional requirements. Other important functional area teams should be added as necessary. These teams should have a senior IT lead as chair, with each team having representation from the customers and stakeholders, as well as a representative with functional expertise in that particular area. Each team reports directly to the strategic IT integration steering committee, communicates their activities to this committee frequently, and receives management oversight and input from that committee. These teams are responsible for developing and implementing the actual IT integration plans for their respective functions and need to be skilled in building consensus and accepting compromise to reach their goals. Their plans should include clear goals and objectives, client expectations, metrics aligned with the business objectives of the school consolidation plan,

business and functional processes, cost drivers and estimates, resources needed, organizational structure and leadership, proposed staffing with roles and responsibilities, and identification of key issues and concerns.

For the number of functional IT integration teams necessary, the school corporation sizes, and the number of total IT staff in all school corporations, representation of at least 50% of IT employees should make up the functional IT integration teams. Encouraging participation of a higher percentage is more desirable to obtain additional talent and viewpoints, and to enhance buy-in to the overall strategic IT integration plan.

All IT employees should have the opportunity to review and comment on any and all of the functional IT integration plans. There should be a well-defined process in the strategic IT integration plan to describe how these reviews will take place. Figure 1 depicts a suggested organizational structure for an IT integration of this size and scope.

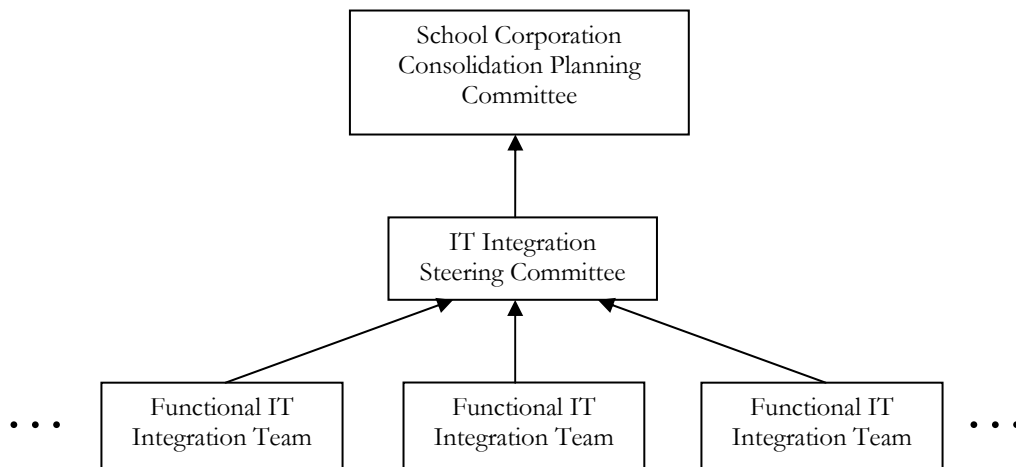


Figure 1

The functional IT integration teams submit their plans to the IT integration steering committee for approval and compilation by that committee into the overall IT integration and implementation plan. This helps to keep the process of IT integration plan creation streamlined and relatively simple.

**Make certain that IT staff do not feel threatened by the IT integration.** All too often, the first thought an employee has when faced with a major initiative involving significant change is whether or not his/her job is at risk. The senior administrators developing the school consolidation plans need to address any staffing plans and changes, including possible staff reductions as an outcome of IT integration, very explicitly and up front. A frequent practice for IT initiatives of this magnitude and scale is to provide opportunities for new responsibilities and training based upon the expected mix of IT skills necessary in the integrated environment.

**Recognize cultural differences within the pre-integrated IT environments.** Each of the existing IT organizations has their own ways of doing business, unique processes, known staff interactions, weaknesses and strengths. Assessing each of these IT organizations' cultural attributes and attitudes, and openly addressing how each of these will be preserved or changed in the integrated IT environment can make the transition easier, increase the likelihood of success, and reduce stress for all integration activities. In the Accenture study, cultural integration of IT was ranked second as the “greatest impediment to successful integration”<sup>2</sup>.

**Communicate the strategic and functional IT integration plans frequently and openly with all constituents, customers, and stakeholders.** Apart from confidential information, open, frequent, and factual communications should be made right from the pre-planning committee assignments to the successful IT integration completion. Develop an intranet website where all stakeholders can view the most current information, send brief and regular newsletters to inform and refer to the website, and create a forum on the website for these stakeholders to provide their input and ask questions. A member of the IT integration steering committee should be given the responsibility of an overall communications plan for the IT integration vision and expected outcomes. This communications plan should be a part of the school corporation consolidation plan.

**Either integrate IT or don't – partial IT integration is not strategic.** It is important to design, plan, and execute a complete IT integration for a variety of reasons. One is the customer's perspective; he/she expects to obtain services that are either the same or improved, but they don't expect to have multiple services for the same function, regardless of what the difference is based upon. Similarly, partial IT integration never fully realizes the expected efficiencies necessary to justify the IT integration initiative, and it serves to validate potential future non-integrated services.

**Choose the best services from those used by the three school corporations.** In defining “best” here, it is critical to have stakeholder and customer focus for these decisions, not what is “best” from an IT perspective. The IT perspective is one consideration in the decision making, but not the overriding factor. The service and product selected must be chosen based upon the customers' and stakeholders' needs as the primary objective, with product, service, and IT expertise lending support in the decision making process. Customer representation on each of the IT integration teams is a requirement.

By choosing the best of the existing services offered in the three school corporations, there is at least one IT organization familiar with all of the aspects and issues of deployment and support. Each service needs to be reviewed by the responsible IT integration team, with the three service offerings from each school corporation evaluated based upon a standard set of criteria and methodology defined and approved by the IT steering committee. This methodology should also include selection and recommendation of the best infrastructure and platforms to support the selected service. It is also important to make certain that the chosen services will scale appropriately to support the consolidated school corporation and expected future expansion.

**Perform a gap analysis for services across the three school corporations.** It is likely that there will be certain products and services provided in one school corporation, but not

the others. Decisions need to be made for such questions as how important are these services to existing customers, should the service be provided in the integrated environment, what is the cost to do so, and are there temporary ways to continue providing the service locally until post-integration? The fewer the number of gap services that need to be continued, the sooner the realization of IT integration synergies.

**Create an IT integration plan with sufficient granularity.** Greater detail for all of the project planning associated with the IT integration provides for better estimation of time and resources necessary for tasks within these projects. It also improves the teams' abilities to track and manage variations and delays, and it reduces the risk of not understanding specific requirements, resources and effort associated with those projects and tasks.

**Define IT integration metrics that show success of the overall consolidation plan.** The IT integration plan exists to enable the success of the overall school corporation consolidation. The metrics that are established within the IT integration plan need to demonstrate that success in terms of the business objectives for the overall consolidation, rather than only IT successes within the IT implementation plan. This is referred to as "strong IT-business alignment", and when this alignment exists between the IT organization and the business objectives, it results in 30-44% gains in productivity and value delivered when compared to weakly aligned companies<sup>2</sup>.

For example, it's not sufficient to measure the speed with which the chosen email system is up-and-running within the consolidated environment, but rather define measures of synergy and value realized by providing an integrated service to the consolidated population. Note too that cost savings are not the only or most important metric in many of these business objectives.

**Don't implement new services for the IT integration plan.** Many case studies suggest that trying to offer new or improved services during an IT integration project is a mistake<sup>1</sup>. Too much effort and time is spent evaluating and testing new products and services without a real understanding of the impact of such a decision nor the customer's response and acceptance to the change.

**Integrate as quickly as reasonably possible.** Establishing a realistic IT integration plan is a must, but the duration needs to be one that demonstrates commitment to accomplishing the integration in a reasonable timeframe. Once a decision is made to integrate, completion of all planning, management structure, and implementation should occur within 12-24 months, sooner if possible. This will help keep all of the teams engaged as well as limit the influence of cultural differences and tensions. It will also reduce the risk of certain plan components being delayed, incurring additional costs until completion.

**Minimize IT integration plan changes.** It should be understood and communicated that even with the best planning, events change and the strategic IT integration plan isn't a static document. There will be revisions and iterations made as necessary; however, it is critically important to reduce the impact of any changes whenever possible, and to ensure nearly all project completion goals are met within the time approved, barring major setbacks. These changes can be mitigated by acquiring new resources, revising scope of initial services

offered, or approving and communicating an acceptable short delay for one or two components of the plan.

**Remember that continuity of existing services must be maintained.** While all of the discussing, pre-planning, committee forming, plan writing, resource estimating, and timeline building is occurring, operations must continue to provide the existing services and infrastructure to conduct each of the school corporation's business. Existing IT staff will be asked and expected to do more since they are adding these new integration responsibilities to their current ones. It is also likely that each school corporation has existing IT initiatives that are being planned and implemented, and these will certainly be affected by the IT integration activities.

Throughout the IT integration planning processes, senior administrators must understand the current operational and management demands of their IT environments, plan for additional resources to support the IT integration efforts, work with their IT leaders to minimize operational requirements during the integration efforts, and scale back, delay, or eliminate planned and in-process IT initiatives once the integration work begins. The IT integration plan must be a strategic top priority, surpassed only by the need to maintain existing services throughout the various plan phases.

**IT and security policies need to be reviewed and combined to create “best of breed” policies for the integrated IT environment.**

Many IT policies currently exist within each school corporation's IT organization. These would include policies related to information security, acceptable use, privacy, email, equipment disposal, and many others. For the purposes of the newly consolidated school corporation, these policies need to be reviewed and integrated, selecting the best representation and presentation for each. There may be policies within a single school corporation that will need to be included in the consolidated school corporation to “bridge a gap” or address a requirement not previously addressed individually by the other school corporations.

**Consultants can help facilitate, but senior administration and IT personnel “own” the integration plan.** It is often valuable to acquire external expertise in IT integration to provide recommendations, help facilitate the planning and implementation, warn of pitfalls, and give validation to the overall efforts. However, it needs to be understood from the outset that the success of an IT integration plan hinges upon senior administration leadership, support, and commitment and with the entire IT staff efforts to develop and deploy a comprehensive IT integration plan.

### Key Technical Drivers

**A greater level of data integration provides better operational, procedural, and informational economies of scale.** Considering an Enterprise Resource Planning (ERP) approach to data integration requires a high level of design complexity, as well as resource and stakeholder commitment, but provides significant and substantial gains in process and operational efficiencies, data management, and information extraction. Data used in

financial, student and alumni, and human resources systems can be integrated into a common framework providing improved access, understanding, management, reporting for compliance with state and federal requirements, and translation into valuable information necessary for decision making. Attention paid to data integration from the customer viewpoint during this process can also reap additional benefits.

Purdue University is currently undergoing a major ERP integration effort, called OnePurdue, over the next several years, and already has significant expertise and information regarding lessons learned in the initial phases of their integration. One of the major goals of this massive project is to realize these types of economies of scale, as well as cost savings and other benefits long-term. As more school corporation data can be integrated into common data warehouses and data management systems, greater benefits and efficiencies can be realized.

**As input to the pre-planning process, a detailed inventory of IT assets needs to be compiled.** It is important to have a clear and accurate understanding of all IT assets at each school corporation prior to the IT integration plan development. This includes all infrastructure components, including networking connections and equipment, servers and desktops, services, applications as well as number of IT personnel and their support levels. By creating these comprehensive lists, assets are recognized and categorized providing valuable information as input to the IT integration plan development process. As an outcome of this process, it is also valuable to develop hardware and software post-integration standards to reduce customer service and maintenance support costs as well as identify potential hardware and software volume savings.

**The integrated IT network backbone should support Gigabit Ethernet if possible.** Fiber connections between each of the school corporation's core network services would be most effective. If this is infeasible due to high cost or telecom provider time constraints, copper wire or wireless systems capable of GigE speeds should be considered. This would enable shared resources throughout the newly integrated infrastructure, and enable service and hardware consolidation as appropriate for cost savings.

**Services that need to be consolidated – shared file services, data warehouses, electronic mail, student records management systems, help desk and customer service, authentication and authorization services, disaster recovery and business continuity services, core security services, web services, and district level applications.** Akin to the business driver “Either integrate IT or don't”, it doesn't make sense to prepare for, plan and execute an IT integration of the three school corporations without a commitment to creating common services for those listed above. These services become metrics for business success and effectiveness, and choosing to not integrate them creates an inefficient and distributed IT infrastructure which is difficult to maintain and sustain.

**While attempting to reduce desktop application variety, balance the tradeoff between licensing and support cost reduction and customer satisfaction.** The number and variety of desktop applications that the integrated environment supports is highly dependent on the requirements of the customers and the administration's willingness to fund and support those applications. While it may not make sense financially to support three

different applications that provide the same basic functionality, there may be other reasons to do this for customer satisfaction and managing change throughout the IT integration process. That being said, desktop applications and email are generally the easiest to standardize allowing effective communications, simplified training, and common customer support issues within the newly integrated unit. Effective desktop collaboration tools used within one school corporation should be considered for use within the integrated IT environment.

**Desktops are currently “locked-down” for security and policy compliance – they need to remain so.** To comply with acceptable use policies, computer use policies, and to protect systems from security threats, end-user desktop systems should remain administratively “locked-down” to prevent inadvertent, inappropriate, or malicious software installations. This protects both the systems and the individuals responsible for those systems.

From the collection of desktop applications within the three school corporations, a baseline configuration should be created and consideration given to a centralized configuration management capability. This would provide the additional benefit of reduced desktop support and rapid reproducibility of the baseline configuration.

**If legacy systems must be preserved, consider web services and service oriented architectures (SOA) to provide service continuation.** Reusable code made possible through web services interfaces or SOA can reduce the cost for continuation of legacy systems. That being said, this type of development and deployment creates an additional level of complexity and cost, such as a middleware layer development needed during the IT integration effort. It requires senior administration and IT staff expertise and support, and likely training in the use of new technologies by the IT staff involved in the IT integration projects.

### IT Integration Estimation

Meaningful estimates for any IT integration plan are difficult to develop accurately and need to be reviewed regularly once an integration project is underway. The reasons for uncertainty in these estimates are numerous. One is the variability due to the different approaches that can be taken. Methods of integration can include a customized consolidation of existing applications and services and all that entails, or selection of an Enterprise Resource Planning (ERP) application such as Oracle or SAP to create a common architecture for financials, human resources, and student data management. Another approach includes adopting a service-oriented architecture (SOA) to provide common and reusable middleware for the necessary applications and services. SOA is an architectural style which often makes use of web services and an integration hub for connecting applications. Each of these has numerous project phases with different levels of complexity and cost. For example, purchase of an ERP package most likely has significantly higher costs up front, but lower maintenance and modification costs post-implementation.

Another reason that estimation is very complex is the vast number of qualitative factors and variables that can impact each approach and each phase of the planning, design and

implementation processes. Many of these were outlined in this document's earlier sections, and can include leadership skills, cultural and organizational change acceptance, technical and business drivers, resource allocation and commitment, etc. Another reason is that even though many of the factors are measurable and quantitative, they can depend on other subjective and qualitative variables which may change. Assumptions need to be fully understood and generally realized for the estimations to be reasonably accurate.

The attempt to provide estimates here for the LSC IT integration planners is to briefly describe the three most likely approaches, recognizing that these estimates contain many assumptions which need to be addressed and modified per the school corporations' specific situations and needs. However, these various approaches should provide aggregate estimates of what efforts and costs are entailed. The three general approaches to a large-scale IT integration noted above include: 1) self-directed, custom design and management of an IT integration plan using primarily in-house resources, 2) selection, preparation and deployment of an enterprise resource planning (ERP) initiative using in-house and external consultants, and 3) adoption of a service-oriented architecture (SOA) for the IT integration. Each of these scenarios is described generally below attempting to provide aggregate estimates for resources, costs, and time to completion.

Within this estimation attempt, numerous assumptions, both explicit and implicit are made. In each of these scenarios, invalid assumptions and estimates should be replaced with those that are more likely and the corresponding changes in value and cost should be decided upon. What follows is a list of the basic assumptions, the major cost categories, and estimates for those categories. As each of these approaches is considered, these assumptions and cost estimates should be validated with actual data to the best extent possible during the project planning phase. Jeff Whitten, Purdue's Chief Architect for the OnePurdue ERP initiative notes that "the numbers can triple if you violate the assumptions", and this would hold true for any of these approaches, so it is critical to spend time developing assumptions carefully, validating these assumptions regularly, and obtaining the most detailed and accurate cost estimates possible.

## **Assumptions**

For the purposes of the following scenario descriptions, it is assumed that IT staff members from each of the current school corporations are selected as part of the IT integration team. Based upon expected size and scope, and given that external consulting will be obtained for each scenario, an estimate of ten (10) IT professionals would commit 50% or more of their time and effort to the IT integration plan for the duration of the initiative. All of the IT professionals selected have the requisite skills and experience necessary to perform their roles, but some training is expected during the integration planning. Consulting labor rates for this level of expertise are likely to range from \$150 - \$200 per hour. For each of the software products and licenses needed, it is expected that some price negotiation will occur and that academic pricing for products is applied.

Consulting costs include real costs associated with the fees to hire external expertise. Personnel costs include existing costs of staff members selected for this project, the real costs associated with staff expansion to acquire additional expertise, and any temporary support required to provide continuous levels of IT service. Training and support include

materials such as web-based courses and on- and off-site training to acquire the necessary staff expertise. Administrative costs include consulting space, equipment, and miscellaneous project requirements. The contingency fund allows some expansion due to cost overruns in each of the various categories.

**Scenario 1 – Local Selection of Preferred Products, In-House Development of IT Integration Plan, and Primary Use of In-House Resources**

This approach on the surface generally appears to be the most appealing because of the lower initial costs, greater use of existing resources, and typically lower consultant fees. However, this quick comparison often doesn't tell the entire story. Maintenance costs for an in-house developed IT integration plan are generally much higher than either of the other two approaches. Opportunity costs often are great due to reallocation of resources, internal service delivery can easily be compromised and diminished during the project, and almost all new and existing initiatives are cancelled.

**Estimated Costs**

Hardware/Infrastructure requirements: Equipment, servers and networking needed to support the increase “best of breed” application and database capacity	\$ 200,000
Software: License additions for “best of breed” application choices, new software products, and infrastructure software	\$ 400,000
Consulting Services: External consultants to assist with all phases of the integration plan and application support; primarily for oversight, review, project management, etc. This includes programming and development resources beyond LSC resources used	\$1,000,000
Personnel: Includes LSC IT professional staff time and new hires	\$1,000,000
Training and Support: application, programming, help desk, change management, etc.	\$ 200,000
Administrative Support: Space for consultants, new staff, laptops, telephones, etc.	\$ 200,000
Contingency Fund: Estimated at 10% of all other categories	\$ 300,000

Based on the basic assumptions described, requirements categories listed above, and expected size, scope, and outcomes of an LSC project, an estimated range of **two to four million dollars over an 18-24 month period** would likely be required for such an initiative.

**Scenario 2 – Development and Deployment of an Enterprise Resource Planning (ERP) Initiative**

Benefits of an ERP implementation are numerous. By design, a much higher level of application integration can occur with functional modules tied together using a shared

interface design, data, and reports. Case studies show reduced support and maintenance costs when compared to non-ERP “best of breed” solutions. And significant local ERP expertise and lessons learned now exists through the OnePurdue initiative at Purdue University. Likely companies for an ERP product used within a consolidated school corporation would include Jenzabar, Sungard, and Datatel. This approach is not without its disadvantages, the prime example being significantly increased up-front costs.

### Estimated Costs

Hardware/Infrastructure requirements: Equipment, servers and networking needed to support the ERP implementation (testbed, QA, production environments)	\$ 250,000
Software: Application software (ERP package and bolt-ons) and Infrastructure software (support software, e.g., terminal services, imaging, testing products, network management, data analysis, production scheduling, etc.)	\$ 750,000
Consulting Services: pre-ERP design to post-implementation	\$2,500,000
Personnel: Includes LSC IT professional staff time and new hires	\$1,000,000
Training and Support: application, internals, help desk, change management, etc.	\$1,000,000
Administrative Support: Space for consultants, new staff, laptops, telephones, etc.	\$ 500,000
Contingency Fund: Estimated at 10% of all other categories	\$ 600,000

Based on the requirements categories listed above, expected size and scope of an LSC project, and comparison to other known ERP project costs and outcomes, an estimated range of **five to seven million dollars over a two to three-year period** would likely be required for such an initiative.

### Scenario 3 – An IT Integration Plan Using a Service-Oriented Architecture (SOA)

This approach would more tightly integrate applications and databases used in the customized approach of Scenario 1. It would do so by providing a middleware component known as an Enterprise Service Bus (ESB) that serves as an integration hub for all applications. The ESB can host many connection types including off-the-shelf adapters that hasten the effort and time to integrate applications. The ESB also provides an important layer of abstraction between applications allowing them to be updated without fear of breaking other applications when contrasted to point-to-point mechanisms as in Scenario 1. Composite applications can also be constructed using web services that allow processes to be described as chains of application or database transactions. A portal is routinely used as the hosting mechanism for these newly created composite applications.

Much of the SOA and web services work can be accomplished with open source products as contrasted to the ERP approach. Commercial products such as IBM WebSphere Message Broker are very prevalent and many companies provide off the shelf adapters for integration.

However, consultant costs to design and implement an initiative of this type would still remain very high, much like an ERP initiative. While this approach is the newest in terms of technology and numbers of implementations, it shows the greatest promise for reduced maintenance and future change costs when compared to custom solutions. This, and the rapid growth of these technologies, makes SOA and web services an approach worth considering if a custom integration, such as Scenario 1, is contemplated.

### Estimated Costs

Hardware/Infrastructure requirements: Equipment, servers and networking needed to support an SOA and web services architecture	\$ 200,000
Software: License additions for “best of breed” choices, commercial web services tools, and infrastructure software (support software, e.g., terminal services, imaging, testing products, network management, data analysis, production scheduling, etc.	\$ 750,000
Consulting Services: External consultants to assist with all phases of the web services development, programming, and integration support	\$1,500,000
Personnel: Includes LSC IT professional staff time and new hires	\$1,000,000
Training and Support: application, programming, help desk, change management, etc.	\$ 500,000
Administrative Support: Space for consultants, new staff, laptops, telephones	\$ 200,000
Contingency Fund: Estimated at 10% of all other categories	\$ 400,000

Based on the basic assumptions described, requirements categories listed above, and expected size, scope, and outcomes of an LSC project, an estimated range of **three to five million dollars over an 18-24 month period** would likely be required for such an initiative.

### Scenario Comparison

Developing and implementing a custom integration plan, has as its primary benefit, a lower initial cost through the implementation phase of the project. However, as the integrated organization grows and evolves, the cost of maintenance and future software changes will always remain high, due to the custom programming and integration work that must be done for each redesign.

By taking the approach of an ERP implementation (Scenario 2), integration costs are traditionally much higher than a customized integration plan (Scenario 1) for the software, hardware, and consulting components through the implementation phase, but the cost curves invert as these two approaches transition into the maintenance and future changes phases. The customized integration plan always remains just that, a customized plan, so any future changes or maintenance requires significant support to accomplish. ERP initiatives capture processes that are expected to remain the same or very similar, so future changes, customizations, and maintenance costs are less.

The SOA approach (Scenario 3) is designed to reduce long-term maintenance and future change costs of a customized approach (Scenario 1). It does so by creating a reusable, standards-based middleware layer of software that is easily expanded to new applications and services. While generally more expensive than a point-to-point, customized approach (Scenario 1), an SOA architecture using an Enterprise Service Bus (Scenario 3) is frequently much less expensive than an ERP solution (Scenario 2), and provides greater future flexibility.

## Conclusion

At least one reason this IT review was requested was to address two underlying, fundamental, and difficult questions; “Will an integration of the three school corporation IT infrastructures result in greater efficiencies”, and “Will it be cost effective to do this IT integration?” As an outcome of this investigation and research, the best answer from this IT consultant’s perspective to the first question is yes, it would provide a more efficient service delivery environment **\*\*IF\*\*** all or most of the key factors analyzed were addressed, agreed upon, planned, and executed satisfactorily in the expected timeframe. That is by no means an easy task, and yet is one that has been accomplished by many corporations that merge and acquire IT assets of other businesses. It requires leadership, commitment, tough decision-making, buy-in, communications, stakeholder support, and numerous other factors listed in this report.

However, possibly the most important factor is outside of the scope of this report; if the three school corporation boards and the school corporations’ constituents share a common vision for an integrated school corporation, including an integrated IT environment, then everyone’s top priority becomes sharing and communicating that vision until it becomes a reality. It is critical to remember that any successful IT integration initiative needs to derive from a positive vision of the future, strategic direction, business need and value, as well as stakeholder commitment rather than an assumed requirement to integrate because some believe that it is the “right thing to do”.

As to the second question, a great deal of IT integration planning needs to be completed before any cost reductions can be accurately estimated. It is certainly reasonable to expect that after some period of time, efficiencies and cost savings would outweigh actual IT integration costs, but this is highly dependent on the level of success in addressing the key factors described in this report as well as the actual outcomes of the implementation efforts.

## Bibliography

- 1) Åberg, Lisa. “Taming Postmerger IT Integration.” The McKinsey Quarterly. McKinsey & Co. January 18, 2005
- 2) Curtis, Gary A., Chanmugam, Ravi. “Reconcilable Differences: IT and Post-merger Integration.” Outlook. Accenture. June 2005.
- 3) “IT Integration: Making Connections for Efficiency and Advantage – Executive Summary.” CIO Focus. 2003.
- 4) Petrone, John. “Managing IT Integration.” IT Business Edge. January 5, 2006.

- 5) Schmelzer, Ronald. "Understanding the Real Costs of Integration." ZapThink. 2006.  
<http://www.zapthink.com>
- 6) "Yale University IT Integration." [Online]  
<http://www.yale.edu/itintegration/process/index.html>. June 14, 2005.