Data Warehouse/Business Intelligence Technical Assessment

Executive Summary

The Data Warehouse Technical Architecture Team evaluated 3 unique solution paths for implementing an Enterprise Data Warehouse/Business Intelligence system

- Custom built solution by LUC – using our own internal resources
- 'Hybrid' built solution using some LUC resources and tools but using the expertise of a firm that has already built higher-ed DW/BI solutions
- Off the shelf solution that is a turnkey DW/BI environment that is built with a specific purpose of working with distinct functional areas.

The evaluation methodology for determining the technology direction for the DW/BI solution paths involved a technical and functional analysis, cost analysis, architecture analysis, and scalability review (**See Chart #1**). As a result of this analysis, the Data Warehouse Technical Architecture Team is recommending that an RFP be directed to vendors who can provide a 'hybrid' solution path during the upcoming RFP process.

Enterprise Data Warehouse/Business Intelligence solutions not only take extended periods of time to implement due to complex underlying functionality and the effort required to interface with multiple data sources but also because of the amount of effort required to implement the technology in each identified functional area at the University. Due to the complexity and length of time required for installation, the Data Warehouse Program Office recommends performing a phased approach to implementing the DW/BI solution. The first phase would include creating the underlying data structure and identifying the proper data definitions for the University as a whole. The second phase would begin, and continue, by creating data extracts, reports, and delivering analytics for the identified functional areas. The Data Warehouse Technical Architecture Team evaluated the three proposed solutions comprehensively, reviewing the cost to implement the solution both in man hours and in actual cost, and the ability for the solution to scale to meet the need of the University upon initial implementation. The analysis using these scenarios clearly identified the 'hybrid' solution as the right fit for the LUC DW/BI solution. The 'hybrid' solution offers the best fit for LUC and can meet the most critical requirements, identified in the following analysis.

Recommendation

The recommendation from the Data Warehouse Program Team is to proceed with creating and issuing an RFP to vendors that can provide a 'Hybrid' solution. These vendors would include firms that can assist LUC in building the data warehouse using Loyola specific tools (**See Chart #2**). This information, when compared to the other "Hybrid" firms, will allow LUC to pick the solution that provides the best functionality, price, and shortest time for installation with a long term view towards expansion and innovation.

Analysis Summary

The Technology Assessment included 51 requirements, leveraging an existing evaluation template from the LUC Project Management Office. The requirements were broken up into 9 areas (**See Chart#3**) as follows: 11 architectural, 5 cost, 2 enterprise viability, 5 resources, 3 scalability, 11 software, 1 time to implement, 3 training/skills, and 11 use of LUC core products. The requirements were analyzed, updated, and changed over a period of a month, followed by a week of analysis by the DW/BI Technical Architecture Team and the StarSoft Consultant. The analysis of the requirements included scoring each solution on a scale of zero to three based on the solutions ability to meet a requirement. Requirements were individually scored by each team member and then averaged for analysis. Outliers were identified and discussed and corrected as necessary.

A consistent theme throughout the analysis was that the 'hybrid' solution scored consistently higher than all of the other solutions. Not only did it score higher overall, but all four members of the DW/BI Technical Architecture Team and the StarSoft Consultant individually scored the 'hybrid' solution higher than the other two. The analysis consistently ranked 'hybrid' build higher, custom LUC built solution in the middle, and the off the shelf purchased solution scored the least amount of points throughout all of the five analysis's. Reference calls were also made to other Universities (**See Chart #2**) and detailed question-and-answer sessions were held to gather tips on vendor selection, implementation, and timelines. Information from these conference calls solidified the recommendation to pursue a "Hybrid" solution.

Chart #1 Analysis Summary

	LUC Build	Hybrid Build	Off the Shelf
TOTAL	114.0	123.5	98.6
MAX	144	144	144
SCORE	79.1%	85.7%	68.5%
Out of 48 questions			

PROS	CONS
LUC Custom Build	
Uses LUC core enterprise database and business intelligence technologies	Time needed from internal resources to implement solution is high
Ease of upgrading or expanding solution without assistance from vendor	Elapsed time needed to implement the solution is high
Solution is built in alignment with LUC processes	LUC must provide their own data design – we lack the expertise
Likelihood of infrastructure changes is low	LUC must create all of their own scorecard, dashboard, provided reports, and analytics
'Hybrid' Build	
Vendor provides higher-ed expertise, data definitions, and a framework that has been successful at other institutions	Moderate time needed from internal resources to implement solution
Uses LUC core enterprise database and business intelligence technologies	Elapsed time needed to implement the solution is moderate
Ease of upgrading or expanding solution without assistance from vendor	Vendor may provide limited stock reports, analytics, etc. – LUC would need to create the rest
Solution is built in alignment with LUC processes	
Off the Shelf	
Speed of implementation for initial data mart	High upfront cost for data warehouse package and consulting services
Vendor provides a defined upgrade path	Higher-ed solutions are less mature than finance or retail products
Provides mature scorecard and dashboard reports	Built with a specific purpose or focus
Lower amount of operational support when compared to custom or hybrid solutions	Solution is a generic build requiring institution specific modifications

Chart #2 References

Institutions of a similar size and with a similar technology footprint were recommended by Institutional Research and the Office of the CIOand analyzed by the Data Warehouse Technical Architecture Team. The following information was determined:

Institution	Architecture	Resources	Scalability	Time to Implement	Comments
University of Delaware ***Hybrid***	System built using Phytorian: Oracle and Cognos	2 DW staff 2 year maintenance contract with Phytorian	Database and data dictionary provided by vendor	Built majority of the warehouse in 12 months	Decided against iStrategy – too limited.
Arizona State University ***Custom Build***	Early adopters of DW Custom built in the 90's Hyperion Brio used for BI	20 to 30 people dedicated to DW/BI		From mid 1990's until today	Custom DW solution is highly regarded, more so than PeopleSoft EPM Trying to get Phytorian in to do work on their DW
Arizona State University ***Off the Shelf***	Oracle EPM: "EPM is a starter kit" with 40-60% functionality	High ownership costs -- 4 to 6 full time employees	Added over 200 tables to the EPM because of lacking structure	Purchased for a "fast start" with their PeopleSoft implementation; 18 months to implement	Not impressed with iStrategy
George Washington University ***Custom Build***	Custom built: Oracle, Informatica, and Cognos	2 full-time FTE plus 40% of an IR resource	Started with student data mart and other functionality added over time	18 months	Did not review any vendor solutions before beginning to custom build the DW
Northwestern University ***Hybrid*** ***Note: Using an off the shelf solution in a hybrid manner***	iStrategy base architecture and ETL tool. Using their own BI tool, Cognos, to deliver content Data is stored in disparate systems, no enterprise data repository	BI team consists of 3 to 4 full-time employees, both technical and functional	NWU is building out additional "data marts" using their existing Oracle infrastructure	6 months, not yet released to other areas at University	NWU purchased iStrategy for their ready-to-go Student system data mart. Although they still use the iStrategy components future data marts are being built in their existing Oracle infrastructure
Boise State University ***Off the Shelf***	iStrategy architecture: MS SQL for database and Sharepoint/Proclarity for BI.	1 individual working full time	No other data sources are being brought into iStrategy other than PeopleSoft student data	18 months and still in beta stage	Boise State is using iStrategy more of a reporting tool for their student system than as an enterprise data warehouse

Chart #3 Comparison Matrix

Item	Custom	Hybrid	Off the Shelf	Comments
Architecture	✓	✓		LUC architecture most likely would need to change for an off the shelf system.
Cost	✓	✓✓		Both the custom built and off the shelf solutions have higher costs, in resources and in initial purchase price.
Enterprise Viability	✓	✓		Off the shelf packages don't easily expand beyond their core focus or purpose.
Resources		✓	✓	A custom built solution would require extensive time from LUC resources.
Scalability	✓	✓		Off the shelf solutions are harder to scale due to the impact of custom development conflicting with future upgrades.
Software		✓		A custom solution would require LUC to define and build all reporting needs and an off the shelf solution would require all new software purchases and training.
Time to Implement		✓	✓✓	A custom solution would take an extended period of time to implement due to resource constraints and the amount of time required to design and validate the build of the data warehouse.
Training/Skills		✓	✓	LUC does not possess the necessary skills at this time to properly implement a custom built data warehouse.
Use of LUC Core Products	✓✓	✓✓	✓	The custom built and 'hybrid' solutions could utilize existing core LUC technology while an off the shelf solution would probably not use the WebFocus BI tool.
Total Solution Score		✓		The 'hybrid' build solution had the highest score from the analysis due to its ability to use existing core technology, the ability for the implementing vendor to provide support and guidance when building the data warehouse structure and in delivering reporting and analytics, and requiring moderate resources from Loyola to build the solution.

✓ - Meets Expectations ✓✓ - Exceeds Expectations  - Area of Concern