Which Comes First, Data Maintenance Processes or Data Conversion?

Abstract

Streamlined and efficient data maintenance processes are crucial to maintaining a GIS. Re-engineering of existing business processes in advance of data conversion is at the heart of ensuring that data is effectively maintained during and after conversion. Charlotte-Mecklenburg Utilities, (Utilities) has initiated a GIS Foundation project to convert its water and sewer system data into a GIS. The project involves the establishment of a GIS data repository, suitable data standards, and re-engineered business processes to maintain the data. The subject of the paper is to illustrate the significance, benefit and challenge of retooling business practices on the front end of the project so that upon delivery, data can be maintained without delay or interruption. The paper will explore the relationship between business process re-engineering and data conversion during GIS implementation.

Background and History

Since 1992, Charlotte-Mecklenburg Utilities (Utilities) has used GIS technology on a limited basis to support basic map production and analysis functions. Unfortunately, Utilities has not tapped into the full potential of GIS for a variety of reasons, chief among them being the absence of a comprehensive strategy to water and wastewater data management, resulting in a fragmentation of data that is incompatible with the GIS.

In response to the growing need for comprehensive water and wastewater system data, Utilities launched the GIS Foundation Project. The project forms the framework, or foundation, upon which to build a comprehensive data repository from which users can quickly obtain current and reliable system data. The GIS Foundation will open the door to the development of a whole new generation of business tools that will lead to improved customer service, operational efficiency, planning, communications, and encourage proactive asset management allowing Utilities to meet the demands of the future.

Project Goal

The project is to deliver a GIS with the data that represents key system components of the water and wastewater system along with the tools to create, store, view and maintain the data from both a report and geographic perspectives. The purpose for the GIS Foundation Project is to provide the Utilities with two key components of GIS: data and

maintenance processes. Recognizing that maintenance of the data is the key to the successful use of GIS, the GIS Foundation Project will provide for the conversion of water and wastewater system data into a GIS format and establish processes for active maintenance. Only after this foundation is in place can the Department begin to realize the full potential of its GIS investment.

To focus the efforts of the project, and to ensure that it meets the expectations of the client, the following goal was developed.

> Establish GIS as a Department asset comprised of water and wastewater system data that is accurate, complete, actively maintained, supported by standards, and accessible as required.

Point of Decision

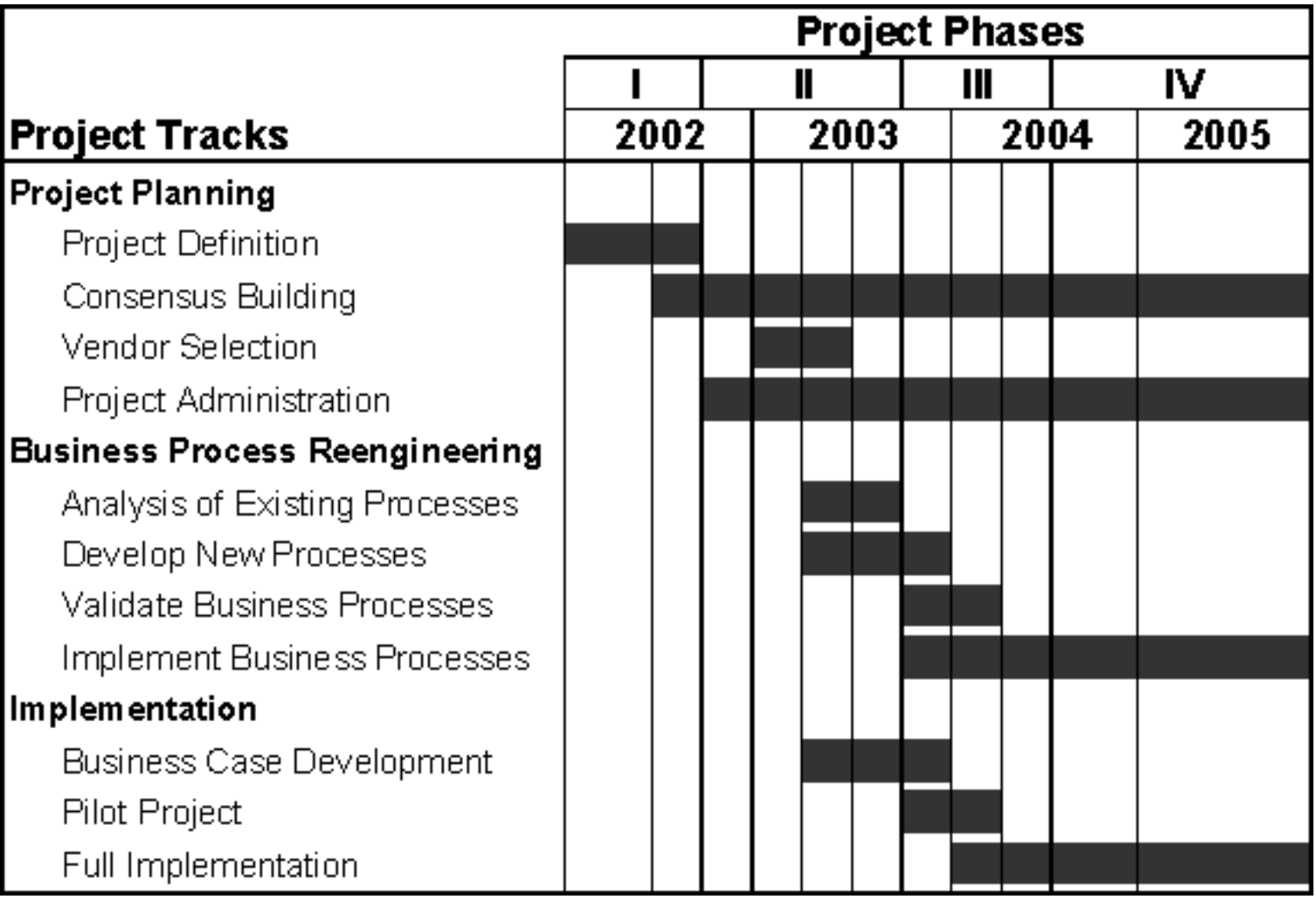
Once project goals and objectives are determined, discussions routinely gravitate toward data conversion, the issues related to the quality of the source data, the magnitude of effort required to achieve such a conversion, and the time required to accomplish the task. In fact, data conversion is fundamental to the GIS.

However, from a user perspective, long-term success of the GIS is related to the ability to maintain the data. Thoughtful consideration of the business processes feeding the GIS become very significant to those who input new data into the GIS and for those who depend on continually updated data. This fact should lead those considering such a project to a point of decision. Is it sufficient to convert the data, deliver the project, only then to figure out how to maintain it? Are existing business processes in place, or too cumbersome to ensure a continuous and streamlined flow of data coming into the GIS? Resolving these data maintenance issues in advance of data delivery can be a major factor in the overall success of the project, and ultimately the satisfaction of the users.

Foundation Project Approach

With finding resolution to the above questions in mind, the project approach may be developed. Utilities project was divided into four distinct phases. Each phase defined the start or conclusion of key tasks and contained distinct milestones or decision points.

The project approach also defined groupings of related activities known as tracks, spanning multiple phases of the project. Each track: Project Planning, Business Process Improvements, and Implementation, is dependent upon the others, and is directly linked to project goals and objectives. The project structure is summarized in the following diagram.



Business Process Re-engineering

Specific to the subject of this paper is Business Process Re-engineering. For the purpose of this discussion, Business Processes are those points through which asset data pass until it is input into the GIS. Since the transfer of system data from the source document (AutoCAD drawings, field data, work order systems) into the GIS is critical to the accuracy, timeliness and accessibility of the GIS, we must look carefully at the processes related to maintaining the data.

Utilities Business Process Re-engineering track is divided into two phases. The first phase involves a thorough mapping and presentation of the existing business

processes. Phase 2 involves mapping of the proposed business processes, and a gap analysis that includes recommendations for change to existing processes in order to support GIS maintenance.

Current Environment Assessment

In this phase, the vendor is directed to conduct a thorough assessment of the current Utility business processes where GIS data is created, edited, or maintained. GIS data is defined as data planned for capture and storage in the data model. The assessment concludes with a presentation of an As-is process model, documenting the current environment.

Future Environment Recommendations

Phase 2 begins with the findings of the current environment assessment. In this phase, the vendor provides recommendations for modifications to existing business processes and/or proposes new business processes based on a review of the prototype data model, which is concurrently being developed by in-house staff. The vendor must determine the impacts to proposed business processes based on a review of anticipated GIS applications and their accompanying data requirements. The vendor also provides recommendations for changes to the prototype data model to better support GIS activities. Deliverables for this phase include a proposed business process model, a detailed work plan to implement the proposed processes and recommendations for modifications to the prototype data model.

Pilot Area Testing

At this stage, the Utility delivers a prototype data model to vendor(s) specifically responsible for Business Process Re-engineering and Data Conversion for the purpose of stress testing the re-engineered business processes and the prototype data model in selected pilot areas. The goal of this activity is to confirm the performance of the proposed business processes, make refinements where appropriate, and confirm whether the prototype data model captures all the intended system features, attributes domains and values.

As mentioned early in the document, there is an important relationship between the business process re-engineering and the data conversion. Success of the full data conversion project is greatly influenced by the melding of the business process and data model activities. Pilot testing is a critical component designed to identify refinements, and/or adjustments needed in the business processes and data model components to

ensure the successful maintenance of the converted GIS data.

With this information in hand, the business process and data conversion vendors present a business case for full data conversion with detailed cost estimates, based on the known quantity, quality of data sources for proposed features and attributes in the GIS.

Full Implementation

The implementation track is comprised of activities specific to data compilation, data conversion, data maintenance tool deployment, and integration of all activities across project tracks to achieve project delivery.

Based on the outcome of the pilot area stress test, refinements to the data model and/or the proposed business processes are recommended and implemented. The scope of work includes ongoing involvement by the business process re-engineering vendor to oversee the implementation of new business processes uniformly across the Utility, manage frozen documents during the conversion process, deploy editing tools and collaborate on multi-agency application development.

Data Compilation

During full implementation, procedures used and refined during the pilot area project to support data preparation and compilation will be implemented and used until all data has been compiled. Field data capture and data acceptance testing will continue forward with any refinements as identified during the pilot project.

Full Deployment of GIS Data Editing Tool

A GIS data editing tool will be deployed to users across the Utility to all staff who will support the GIS. A data freeze log will provide users an opportunity to utilize the editing tool to update and maintain real world data. A data freeze log captures changes to data sources that occur between the period when scrubbed data is provided to the conversion vendor to when the data is received back in a GIS format and accepted. Any necessary new hardware and software will also be procured as part of full implementation deployment.

Integration of Activities across All Project Tracks and with Enterprise GIS

Opportunities previously identified for collaboration with other City/County initiatives will also be realized during this phase. The Utility GIS Project Team will work with the City GIS Enterprise Team to align the Utility project with City enterprise GIS project in areas

such as application development, SDE database storage, digital submittals, cooperative data sharing, system integration, and address maintenance.

Conclusion

The key to a successfully maintained GIS is processes that support the transfer of data from field sources into the GIS. Following initial data conversion, one of the most troublesome issues has to do with the ineffective processes for the transfer of data from a variety of field sources into the GIS. A comprehensive assessment of existing business process, and the implementation of business process improvements early in the project can eliminate numerous debilitating issues that can result in significant limitations on functionality. Business process re-engineering optimizes the path of data transfer from field to GIS to ensure the long-term viability of the GIS. Resolution of maintenance issues on the front end of the project will result in significant savings of staff resources, operating expenditures, and lead to increased customer satisfaction.

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