BIOGRAPHICAL INFORMATION

Thomas DeVany
Productivity Links, Inc.
Integration Architect for ChevronTexaco Pipeline Company

Specific Responsibilities

Data model maintenance is a primary focus. From the most recent effort to upgrade to PODS 3.2, to enhancement requests supporting reporting and/or other applications, our team is responsible for keeping the data model secure, viable, and up-to-date.

The other primary area of responsibility is application integration. With internal and external development, there are significant requirements that must be met in order to ensure all software interacts appropriately.

Underlying all the last few years has been work to improve the pipeline data. This has ranged from quality checking of conversion data, to improving the internal integrity and consistency of spatial and attribute data, to working with subject matter experts on data gap analysis.

Past Experience

Work in Houston has included Duke Energy projects for the migration of legacy data and the capture of field data into their GIS system. ChevronTexaco projects have included managing the conversion of legacy paper data into a standard data model, database migration and upgrades, and various software implementations.

Educational Information

Master's of Science, Civil Engineering, Iowa State University
Bachelor's of Science, Construction Engineering, Iowa State University

Professional Memberships

GITA

BIOGRAPHICAL INFORMATION

Pam West
Team Lead – CTPC IT Development and Support
ChevronTexaco Pipeline Company

Specific Responsibilities

Team Lead for development and support of Information Technology for the Pipeline Company with primary focus on Project Management and Business Analysis, Application Development and Support. The Team has numerous IT projects, including the implementation and support of GIS.

With over 20 years experience in the Oil and Gas industry, the primary focus over the past few years has been working with a team to deploy and leverage GIS within the Pipeline Company. Areas of expertise include Application Development and deployment in the fields of Land, managing GIS implementation focusing on data integrity and end user tools.

In 2001, Mrs. West was elected to the Board of Directors for the PODS Association. This past year Mrs. West also participated as Co-Chair of the ESRI Geodatabase Steering Committee (APDM).

Past Experience

Various Pipeline projects have included the integration of Alignment Sheet data with GIS technology to respond to government requests and reporting, the conversion of legacy data into a standard data model (PODS) and ROW implementation. Formerly managed the application and integration of Chevron's Land Information System with GIS and SAP.

Educational Information

Bachelor of Business Administration - Computer Information Systems, University of Houston-Downtown

Professional Memberships

GITA,
PODS Association

System Integration for Integrity Management Applications

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ABSTRACT

A standardized data model has allowed ChevronTexaco Pipeline to bolt on applications that meet the business requirements for integrity management. While not a painless process, we now have a working model, an active GIS and a user community that has come to recognize the benefits of an integrated environment. We will explain the approach CTPC has adopted for system integration and share the benefits realized through the challenge.

INTRODUCTION

It has been a year since we last communicated our vision and our direction as it pertains to GIS implementation and data integration. It has been an exciting year, a busy year and a challenging year. It has been amazing to us at ChevronTexaco the changes in the technology in one short year. It is obvious that there has been an incredible amount of work performed by the service providers to accommodate the changing business and technical requirements being driven by both customer needs and regulatory reporting needs. Like all other operators, ChevronTexaco has been challenged with responding to not only customer requests, but changes dictated by government regulations. These are just a couple of the industry drivers that have influenced our decisions and our strategy.

In the past year we have worked very closely with application developers, internal GIS consultants, with experts in both data base administration and SDE, and with internal Pipeline subject matter experts. With involvement from this wealth of knowledge, I am happy to say that we have been successful in our vision of realizing a multi-vendor environment. So much so that Chevron Nigeria Ltd. (CNL), with our Corporate GIS team, is leveraging Pipeline's implementation of the PODS data model and the idea of a 'multiple vendor' scenario to our overseas office. This is great validation of the effort put forth to accomplish such a feat. Now, I will say with certainty that some of the applications have integrated better than others and some have exceeded our expectations. ChevronTexaco Pipeline is looking forward to sharing our Lessons Learned and Best Practices around this effort.

We will discuss the benefits we have realized from integration on a standard model, and how we mitigate the impact of internal and external factors, as well as share with you along the way lessons learned from both the integration and the risk mitigation efforts.

INTEGRATION

One of the significant areas discussed in last year's paper was the yet-to-be-implemented multi-vendor environment. For this discussion, it might help to clarify what we mean by this. First, a multi-vendor editing environment does not mean more than one application editing the same table; we expect there to be exclusive control (ownership) of each table by a single application. Second, the interest is primarily with edit applications; read-only, reporting-type applications are less involved.

Many parties on both sides of the vendor/client fence often looked at solutions as being an either/or proposition; either you pick us, or you pick them. Consequences for software providers trying to address all possible needs of a client request were probably two-fold: first, providers may have tried to expand their services perhaps outside their comfort zone; and second, providers pursuing joint ventures with other software providers. Problems with the first were the potential for a lack of relevant experience, and for the second were non-disclosure agreements, resolution to overlapping capabilities—do we use our widget or your widget for this project, and the general desire to not share any more intellectual property than absolutely necessary.

Research had indicated it would be unlikely to find a single vendor that could provide all possible software solutions, and so the decision was made to pursue an environment with many vendors working together in their 'areas of expertise' as the next reasonable alternative. Experience has subsequently borne this decision out. Full-suite solutions are still hard to come by, and we have found the selection and implementation process for the more limited-scope solutions to typically be a much more effective process. We have spent a good bit of this past year getting this in place. Although we have software that is yet to be implemented—and even more on the horizon yet to be purchased—we have come up with some commentary to clarify and ease the integration process.

<u>First, some guidelines.</u>

The most basic—and this is really just a restatement of the PODS golden rule—is no reductions to the standard data model; 'approved' extensions, only, are allowed. We prefer solutions that make minimal, if any, modifications to the data model. However, some simply require more than others.

We request that any vendor modifications are done in a separate database schema within the production environment. From our standpoint, the benefit is that it makes it very easy to identify what parts a vendor has added. This is useful at times of upgrades to the database or the software, as well as times when an application needs to be removed; for both cases, everything relevant is clearly identified. Another benefit of this is on the vendor side. At various times, we are requested to provide an export of the database to a third-party entity. Vendor extensions in a separate schema are not included, whereas any extensions to the PODS schema are included in an export. In database terms, we export the PODS schema but none of the 'supporting' schemas. As with all rules that are good, but not quite golden, this one is not cut in stone. Small changes can be done directly in the PODS schema—and even larger ones if an application absolutely cannot handle a separate schema. Our preference for changes that are done directly in the PODS schema are for the additions to include a prefix for the vendor making the change—again, to assist us in identifying ownership of the modifications for troubleshooting or back-out purposes.

Documentation is required at the time of integration and implementation. This is to include a clear indication and explanation of all table, column, view, or procedure,

etc. changes to the data model, as well as a listing of the software title, or titles if more than one, that depend on these modifications. There is expected to be a clear demarcation of 'owned' tables—those that the software will be allowed to edit, as well as verification of understanding of the rules for editing shared tables. We also control this on our side by using database 'roles'. For example, any editors that create events in PODS—regardless of the other tables they may interact with—require the ability to insert and update records in the core tables: event range, station point, and location. We call this our "base-edit role", and it would be assigned to all editors. Further database rights are then assigned on an as-needed basis depending on the scope of the application. The role-based assignment of rights eases the maintenance requirements for the database administrator.

Although all applications are expected to 'play well together', to paraphrase the "possession is nine-tenths" adage: "existence in the database is nine-tenths of the law". That is, applications already in existence in the CT environment take precedence over new applications. Again, is this a hard and fast rule?—probably not. Something business-critical can always force a change in the rules.

Second, some issues.

There of course have been some issues with this strategy, but actually fewer than expected. The issue that potentially could have had the greatest impact on our effort was acceptance of the idea by the vendor community. A year ago, responses to the idea of a multi-vendor environment were along the lines of "we're not the only one here?" This year, though, responses from many of our vendors have been much more accepting—even expecting—of the idea that there is likely to be more than just one vendor in the environment. In our minds, uniformity of processes and transactions can only benefit from this interaction.

Perhaps the biggest implementation issue has been the integration of ID generation. On the surface, this may seem like a fairly benign issue. The reality, though, is that it impacts every editor application used by a client, potentially causing issues even with more than one application from the same vendor. As a brief explanation of the issue, one common method to get a new unique identifier (Event_ID, for example) is for the database engine to auto-generate the next ID on request. Typically this is just the next number in a sequence, so an application would subsequently query the affected table for the maximum ID and that would be the newly generated number. (This 'after-the-fact' method was required because the number was not identifiable within the generate-ID command.) For situations with more than one editor this causes problems because there is no way to certify, via the maximum number, if the first or the second application generated that particular ID. While discussions included the addition of columns—presumably for each unique ID—which would allow for a unique flag to be introduced that an application could key off of, modifications of this extent to the PODS model were a significant detraction. Resolution has been to use database constructs (found in both SQL and Oracle) that uniquely identify the row for the inserted ID *within* the flow of the command, prior to

completion. This was deemed most acceptable because it required no PODS additions and would be a generic solution for all vendors.

A third area that is probably more of an issue with client end-users is to limit the replacement cycle-time for existing software solutions. Depending on the number of different titles involved in an implementation, review of an application's compliance and capability should be done no more often than once a year. This is to keep at a minimum the 'revolving-door' syndrome, of: demo time for new vendors, user ramp-up time on new software, and implementation/integration time for new applications.

And finally, some benefits.

The assumed benefit of the multi-vendor environment at the beginning of this effort was the ability to select ‘best of breed’ software. Each vendor may do one thing well, in particular, and so this methodology would allow us to pick and choose what would best meet our needs, instead of picking a suite with a lowest-common-denominator of potential issues based on one title that is needed. To date, this has been a successful assumption. This has been most obvious when selecting PODS-compliant vendors. Integration efforts are significantly more streamlined in these cases than for those vendors that aren't PODS vendors or are just getting started with that data model. This is primarily measured in speed of implementation—vendor's that are not strongly PODS-compliant are taking appreciably more time for implementation than those that are more compliant.

Another positive aspect is the ability to cross-check results using different applications. The use of a single company's tools likely means an homogeneous analysis methodology. For example, let's say a vendor provides a suite that includes a "35-inch yardstick". Since each part of the suite uses the same yardstick, all answers will correlate with each other. However, if two other vendors have provided "36-inch yardsticks", results won't cross-correlate and data or software discrepancies are much more likely to be identified and resolved.

MITIGATING RISK

We realized early on that once we started bolting on applications to our data model, complexity would increase. Enough so, in fact, that we had to develop some targeted mitigation plans in order to minimize the risk associated with information protection, information integrity and application integration issues.

One of the biggest unknowns we faced at the onset of this project was (and still is) the external and internal factors that impact our system. By system, I mean the entire technical architecture and application and customer interaction (specifically the network, server, database, SDE, the GIS tools, end user applications, and both IT and customer resources). If you dive into what all that means collectively, the entire picture can be a bit overwhelming. In order to mitigate some of the risk exposed we had to understand the contributing factors and plan accordingly. As I move through some of the examples of internal and external factors, see if you spot common threads.

Internal Factors.

While internal factors can be a bit more controlled, there are times when the application/ database and GIS support folks are driven by factors that pop up and require unscheduled time and money. When this happens it affects every resource required to support and/or primary customer contact for this application.

1) Data model upgrade/migration – these have so far been annual events. It is a massive undertaking and the impact is far reaching—an upgrade can affect every application that updates or reports from the database. Without a plan, team effort, tight controls and effective communication, an upgrade could have a significantly negative impact on daily business operations. An example of this would be a table name change. This change, while perhaps not significant on the database side, can require a code change from the vendor or customer application. This action alone begs the questions…Are there other applications reading this data? Is there a view used for reporting? Is the SDE layer being updated? If so, is the database trigger firing?
2) Changes due to business requirements – planned releases are always preferable; unfortunately this luxury is not always available. Changes driven by the business drives what we do. There are times these change requests are presented to a support group with little lead time and less implementation time. The exposed risk under these circumstances can be far reaching and as fundamental as data display, to application programming that impacts the way data is derived and reported. Unfortunately, we all know that business and safety decisions are made on the data. It is imperative it is correct.
3) Collaboration – while this is not a high risk to data itself, it is to data integration and to application integration efforts. Software should not dictate changes to business practices. Sitting in an integrators chair, how many of you have had to force fit or create complicated interfaces because a well meaning customer was approached by a service provider with the “perfect solution” to their problem that you now have to implement?
4) SDE data requirements – there are certain features in our data model that are spatialized and stored in SDE to enable access by other GIS tools. These features must be identified so the appropriate SDE layers can be created or modified to reflect the data change. Let’s say a valve is moved on the centerline. If a trigger or stored procedure does not exist on that table that recognizes the change, notifies the appropriate application and accomplishes the SDE update, the valve will not display properly through the GIS tools.
5) Oracle upgrades – the changes are recommended and driven by our Database Administration group. The upgrades are planned events, and are tightly controlled and managed by the Database Administration group. The risk is minimal, but again time is needed to ensure a successful upgrade.

See any common threads yet? (No, there isn't a written test afterwards.) Let’s continue with a look at the external factors that impact us.

External Factors.

External factors, by definition are more difficult to control. What is meant by control is balancing the requirements with the lead time required to respond in a manner that is responsive to the customer and does not risk the other data or applications. Some of these examples are:

1) Vendor application upgrades – a scheduled application upgrade or annual release is one that is generally a planned event that has processes and procedures around it. The emphasis here is “planned”. Obviously when something is planned there is comfort in executing established methodologies which ensure a successful upgrade. However, depending on application function, if the upgrade is an unscheduled "emergency" event, it could very well disrupt daily business activities.
2) Government Regulations – one factor near and dear to all of us these days. Government regulations such as the Gas and Liquids rules can also dictate changes to the database and application(s). An audit could also spur unexpected changes to accommodate data deficiencies or gaps. Depending on the time needed to respond to the regulations, that implementation-comfort-zone may or may not exist.

Common threads for both internal and external factors in my mind are resource limitations (both time and people—which seems to be one of the perennial issues), and communications issues as illustrated by, among other things, short-timeline applications and unspoken requirements and expectations.

The Pipeline Company recognizes the criticality of data and application management as it pertains to Integrity Management and its impact to the entire organization. So much so, that a team has been formed to solve the application and data issues as they pertain to Strategic Compliance Information. We are also in the process of creating a new group in the organization to support Data, Documents and GIS initiatives. Stay tuned…

CONCLUSIONS

Another year has passed. Our goal—past and present—has been to have an IT environment such that off-the-shelf software can be purchased solely on business drivers, and with confidence that solutions already in place will not be impacted. While there is still much work to be done for that goal to be realized, we are much closer this year than last.

A multi-vendor integrated IT environment is doable. As always, risks are involved. To minimize internal risks an operator should proceed with dedicated cross-participation of their own internal departments, and to reduce external risk operators should become involved with a data model organization (through the board or technical committee) and with regulator groups. “Plug-n-Play” it is not, but as more operators demand this sort of interoperability, more vendors will step up to the plate.

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