SOX Auditing at Utilities –

Redundant-Data Tell-Tale is Both Opportunity and Mandate

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EXECUTIVE SUMMARY

It is suggested that utilities are differentiated from businesses in other sectors in three ways significant to SOX auditing: 1) the nature and effect of regulation that governs them, 2) the preponderance of unintegrated IT applications, and 3) the geographically distributed asset network that constitutes a Utility's plant.

Unintegrated IT applications within the utility environment are shown to have high overlap and data duplication across business process applications, and a representative model of these applications and their overlap is profiled.

It is argued that data redundancy among disparate databases is an audit opportunity, in that inconsistency and contradiction is a glaring tell-tale of inadequate controls and potential fraud, while reasonable agreement is confirmation that reporting data is accurate. It is also argued that the presence of this tell-tale is a mandate for usage, in that ignoring it puts both the audit and auditor at risk

The nature of a general purpose technology known as Enterprise Information Integration is outlined, and shown to support audit probes among disparate databases. An example that employs this technology in utility environments is outlined, and its obvious usage for asset-valuation verification is demonstrated.

Finally, it is emphasized that the unintegrated application databases typical in the utility environment are a powerful and defacto control mechanism that cannot be safely ignored by the audit function.

INTRODUCTION

Utilities – those regulated businesses that provide the public service infrastructure for gas, water, electricity, and telecommunications – share a common set of differences from most other industries that impacts the nature and risks of SOX compliance auditing. First, their prices and service qualities are heavily regulated. Second, their "plant" assets are scattered and highly distributed throughout a large geographic service region. Third, on average, they tend to have a fragmented and considerably below-par enterprise IT infrastructure.

On the one hand, utilities value and practice regulatory compliance as a necessary core competency, which could speed their SOX compliancy migration and reduce both initial and long term auditing misstatement risk, relative to other industries. On the other hand, compliance as a dominant business driver has devalued investments in best management practices and cost efficiencies relative to other industries, impacting the general nature of enterprise information technology and strategy.

Hidden in this last seemingly disparaging statement is both an auditor's opportunity and a mandate for auditor utilization. Unintegrated, department-specific, data systems have a considerable overlap of duplicate information. This overlap is an audit tell-tale that in a very positive sense can be viewed as a powerful control concept. Overlapping data is either reasonably consistent or unequivocally indicates a lack or failure of other controls.

HIGHLY DISTRIBUTED ASSETS

As noted earlier, utilities are also differentiated by the nature of their "plant". Utilities have significant assets distributed across broad geographical territory. These assets constitute the plant that creates deliverable customer value. Sampling is a standard way to arrive at some level of confidence that stated assets are in fact present. But there is some question about the applicability of standard sampling practices in highly distributed and relatively inaccessible utility plants. Some electric utilities, for instance, may have a good percentage of their assets in easily visible generation facilities and fuel inventories, others without generation will have a highly distributed asset base, and both types may have underground distribution lines, rural transmission lines, and remote substations that are not readily inspected for current value.

Notably, one of the utility's unintegrated databases is the operational handle on plant assets, the Geographical Information System (GIS), which keeps track of where the plant assets are and how they are configured and connected throughout the service area. It is an active working database relied upon for daily activities in engineering, maintenance, and repair. This system, in theory, should be able to tally field assets, their condition-based value, and their degree of compliance with regulatory requirements. Phantom assets won't be found here, nor will assets that are retired or dysfunctional, at least not if the GIS is adequate and the database is maintained properly. If not, that's another story, probably not of SOX concern.

Plant assets are what generate revenue: transmission lines convey billable power, substations convert billable power, meters record billable power. Many applications and their databases, in one way or another, are concerned with these assets and how they are and have functioned during a financial reporting period. Many non-asset

databases are equally redundant indicators of revenue, expense, asset valuation and compliance.

THE NATURE OF UTILITY COMPLIANCE EXPOSURE

Commission Imposes Highest Penalty Ever - The Washington Utilities and Transportation Commission (UTC) approved a settlement agreement imposing a $500,000 fine on Puget Sound Energy (PSE) and requiring the utility to carry out an extensive program to identify and replace any aging natural gas pipelines in the company's western area service territory... The penalty imposed actually is in the amount of $700,000, but with $200,000 suspended pending the company's compliance with settlement terms. [Utility Regulatory News**,** Public Utilities Reports, Inc., Letter # 3706, February 11, 2005]

PacifiCorp To Continue Customer Guarantees - The Idaho Public Utilities Commission (PUC) approved changes to customer guarantees and performance standards submitted by PacifiCorp...with customers receiving financial credits if certain guarantees are not met... It would keep: (1) improving SAIDI (system average sustained interruption duration index) results by six percent within the three years to achieve a target of SAIDI of no more than 206.3 minutes; (2) improving SAIFI (system average sustained interruption frequency index) results by six percent within the three years to achieve a target of SAIFI of no more than 2.34 events; (3) selecting five under-performing circuits in Idaho on an annual basis and undertaking corrective measures to reduce the CPI (circuit performance indicator) by 20 percent within two years; and (4) restoring power outages due to a loss of supply or damage to the company's distribution system on average to 80 percent of customers within three hours. [Utility Regulatory News**,** Public Utilities Reports, Inc., Letter # 3706, February 11, 2005]

COMPLIANCE AS AN AUDIT FACTOR

Speaking of compliance, AMR has this to say[1]: "... compliance has evolved from an isolated quality initiative within a department to an enterprise level challenge, based on passage of acts like 21 CFR part 11, Sarbanes-Oxley Act of 2002, and Tread Act. The shift requires new organizational models, new processes and controls, and a new approach to the technology support for the compliance effort. In the past, point systems were adequate to address isolated compliance efforts, but as the number and scope of compliance requirements grows isolated efforts become a business risk and increase costs. ... companies... in highly regulated industries like Energy, have started to invest in architecture that ... scales to support the compliance initiative of the day.

Utilities appealing to their regulatory commissions for price increases, investment funding, service changes, acquisitions, divestitures and virtually anything that requires approval are often saddled with new compliance requirements as quid pro quo. Independently, commissions will impose compliance requirements when they deem it in the public's interest, for example, requiring that electric transmission lines and poles be reengineered or replaced to be large-bird friendly. Often these requirements carry significant penalties in fines or revenue rebates.

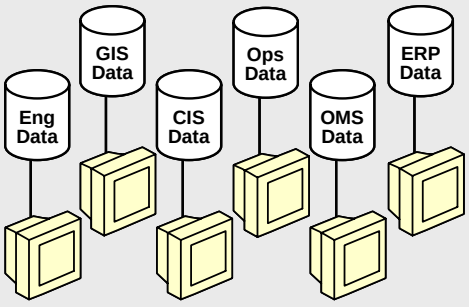
It is not clear that an out-of-compliance utility risking imminent commission retribution is a SOX financial-reporting concern, unless perhaps a revenue rebate would cause a restatement of prior earnings. On the other hand, management misstatements about compliance progress and attainment that is inconsistent with reality may be a SOX controls issue. In any event, many databases in the operational and engineering area carry compliance progress and attainment evidence that can be harbingers of pending material events.

A compliance technology provider says it well[2]: "Companies are governed by a complex web of regulations, laws, voluntary codes, industry codes, and corporate policies. Compliance with these intricate regulations, mandates and policies is not an easy task. Maintaining ongoing compliance is even more difficult due to continuous changes, amendments and overlaps. Inability to comply with the regulations can lead to large penalties or even temporary suspension of operations. Hence compliance is about protecting an organization’s license to operate – lack of compliance introduces a substantial financial and operational risk to an organization."

REDUNDANCY AMONG UTILITY DATABASES

According to CIO Magazine[3:] "Gartner Inc. released a startling statistic: More than 25 percent of critical data used in large corporations is flawed, due to human data-entry error, customer profile changes (such as a change of address) and a lack of proper corporate data standards... According to a recent study by Forrester Research Inc., 37 percent of companies cite duplicate and overlapping files as significant data-management problems."

Duplicate and overlapping files do not have to be a data-management problem. They can in fact be a data-management opportunity, when automation monitors multiple sources for data consistency. A single point of non-redundant data may provide comfort in that it goes unrefuted, but it also goes unconfirmed. More importantly, it goes unquestioned.



Typical Utility
Dis-integrated Data Environment

See Table 1 for an indicative profile of the applications in a typical electric utility.

Efficient utilization of this redundant-data tell-tale can be hampered by the parochial nature of disparate systems, requiring time-consuming narrow-focused system learning by the auditor that would be self-sufficient; but help is not far away.

VALUES IN PERSPECTIVE

Attestation under Sarbanes-Oxley is making new friends of auditors and management. They hang together now, so to speak. Little consolation for either: honest errors will continue to happen, as will fraud.

The intent of Sarbanes-Oxley (SOX) can be characterized as risk reduction: reduce errors, inhibit fraud, and provide shareholders with transparent equal-access to material knowledge. But implementation is principally procedural controls and documentation, under threat of penalty. The vague parts of SOX are where the real leverage lies: principles of intent, and corporate transparency.

Procedural controls are necessary. Good procedural controls, well documented, may even mitigate liability...somewhat. But procedural controls are passive, and will neither eliminate error and fraud in financial statements, nor eliminate uncertainty and risk in doing business. Nor will timely reporting of material events protect the auditor and manager if discovery is late. Attesting to the efficacy of controls and the presence of their documentation is necessary under SOX, but insufficient.

Table 1 - Application-Database Redundancy and Overlap in Typical Electric Utility

Disclaimer: This table is indicative, not definitive. There is vendor inconsistency on functionality and use of application acronyms, and there are other applications, such as those in risk management and energy purchasing, not included here.
Column Headings: Ast = Asset Info, Rev = Revenue Info, Exp = Expense info, Com = Compliance info.

Application	Typical Owner	Purpose/Content	Ast	Rev	Exp	Com
Financial/ERP	Finance.	Income, expense, asset and liability accounting	X	X	X	
Billing/ERP	Finance	Calculate, generate, track, receive invoices.		X		X
Asset Mgmnt/ERP	Finance	Age and value of assets	X		X	X
HR/ERP	HR	Personnel, compensation, benefits			X	X
Inventory/ERP	Purchasing	Monitoring equipment by count and location	X		X	
Purchasing/ERP	Purchasing	Purchase orders, vendors	X		X	
Materials/ERP	Material Acquisition	Specifications, vendors, receiving	X		X	
CRM/ERP	Sales	Individual customer info and interaction history		X	X	X
Sales Force Mgmnt	Sales	Lead assignment, follow-up, sales personnel		X	X	
Marketing	Marketing	Demographics, trends, research, campaigns		X		
GIS	Operations, GIS	Field asset network in geographic map format	X	X		X
OMS	Operations, Dispatch	Outage locations, analysis, resource dispatch		X	X	X
WMS, WFM	Operations	Coordinate/monitor work activity	X		X	X
SCADA	Operations	Monitor and control distribution feeder systems	X	X		
Load Management	Operations	Load consumption		X		
Maintenance	Operations	Planning and managing maintenance activities		X	X	X
AMR, Metering	Operations	Customer meter info acquisition		X		
IVR	Operations	Call routing and service help			X	X
Call Center	Operations, Outsource	Customer communication			X	X
CIS	Operations, Finance, Outsource	Customer communication		X		
Regulatory Systems	Quality Assurance	Rate design and tariff filings				X
SQA	Quality Assurance, Engineering	Determine compliance with regulatory mandate			X	X
Design	Engineering	Asset deployment and redeployment, projects	X		X	
PMS, Staking	Engineering	Project planning	X		X	
PCM	Engineering	Project management	X		X	
NPM	Engineering, Operations, GIS	Project management			X	

Abbreviations and Acronyms as Used Above:

AMR - Automated Meter reading	IVR - Interactive Voice Response	SCADA - Supervisory Control and Data Acquisition
CIS - Customer Information System	NPM - Network Project Management	
CRM - Customer Relationship Management	OMS - Outage Management System	SQA - Service Quality Assurance
ERP - Enterprise Resource Planning	PCM - Project Construction Management	WFM - Work Force Management
GIS - Geographical Information System	PMS - Project Management System	WMS - Work Order Management System

There is no substitute for detective work. Auditors with expertise and experience can smell a problem when patterns don't seem quite right, and focus their investigation to great effect. Those without this sixth-sense rely on statistical methods to uncover anomalies or provide some sense of comfort. New compliance intensity is increasing the ranks of the less experienced, and increasing audit-accuracy risk as a result.

The typical ERP system claims to have all that matters, and provides the auditor a convenient centralized data store for exploration and sampling. It also provides the fraudster an equally convenient point for manipulation, and the error a solid camouflage in system-wide propagation.

Regardless of ERP, all utilities have a plethora of independent departmental systems. Most of these departmental systems are isolated, and lack automated communication with other enterprise systems. Yet each has source data that should be in agreement with the enterprise financial systems.

Tapping these isolated data bases can verify reported financial data, and expose risks, data inconsistencies and data anomalies. For instance:

- Asset Management Systems, Geographical Information Systems (GIS), and Maintenance Systems contain overlapping source data on the presence and condition of generation, transmission, and distribution assets.
- The Customer Information System (CIS), Billing System, and GIS contain overlapping information about revenue and revenue sources.
- The Work Order Management System, Engineering Design System, and Project Management System contain overlapping information on regulatory and environmental compliance progress.

INTERPRETING INTENT

It is said that SOX is to be interpreted and implemented for intent, not for procedure. The intent is to minimize the opportunity and instance of undetected fraud and mistake. Ignoring potential evidence just because it resides in something as far from the auditor's mind as the GIS database, for instance, is asking for trouble. The GIS system should have the lock on asset presence and current valuation truth, as well as confirmation that meters, substations, and transmission lines can support reported revenues in financial systems.

William Donaldson, SEC Chairman, is quoted in an Edison Electric Institute report[4]: "Simply complying with the rules is not enough. They should, as I have said before, make this approach part of their companies' DNA." Jerry Edwards, of the Federal Reserve Board, in an unofficial PCAOB Roundtable Transcript[5], said: "I think [the] discussion here is beneficial to the board and should be considered in trying to build your final approach. ... there may be a kind of an accumulation of control evidence that may actually turn out to be, when looked at in its entirety, significant. ... the final language that you develop [should] allow for broader consideration of a number of different control items which might very well, in their totality, rise to the degree of significance. Also, I think that it's important that the external auditor look at at least some sample of the controls that are not necessarily deemed to be key or significant controls, just to ensure that something hasn't been missed and that there's not some possibilities for potential problems there."

Isolated systems are generally considered a problem by management. Information that must be transferred from one application or database to another, or extracted for reports and analysis, requires intervention by IT personnel to construct custom database queries. However, access aside for the moment, the auditor may view these isolated databases as a valuable sampling resource, an effective control against fraud collusion, and an interesting version of separation of responsibility in the SOX intent.

ACCESS IS THE ISSUE

Each one of these databases has a different application front end, a different user interface, a different underlying data structure, and often vendor-proprietary or company home-grown data representations.

For the auditor, enterprise-wide data transparency is the holy grail, ideally facilitated by what might be an *Auditor's Portal*, with point-and-click exploration, automated cross-database consistency checks, exhaustive sampling options, and integral analytics and report generation. Better yet, a capability to verify period cut-off accuracy, to compare current period detail-data with prior periods, and to sound the alarm in advance of a material event. With such a portal, audit accuracy would be less dependent on expertise and experience, attestation risk would be reduced, and much better results would take much less time. Auditors in wonderland - where SOX attestation is not an issue, and all the auditors are above average.

So why isn't this in every auditor's tool box? Principally for the same reasons something similar isn't in every manager's tool box. Enterprise-wide data transparency is incompatible with legacy IT infrastructure, and major infrastructure migration options are generally unaffordable, highly disruptive, and not without considerable risk.

Some day the so-called Service Oriented Architecture (SOA) will be here, and things will be different, we are promised. All business processes will be supported by a collection of loosely-coupled IT applications, communicating in a common language, through a common exchange, and able to request and access anything on demand, with authorization of course. When SOA finds its way into general usage, effective audit tools will be easy to accommodate. An auditor's portal will be the auditor's personal tool, with remote access from anywhere. Audit advice and consultation on-demand will be location and time independent. Pending problems will be brought to the auditors attention immediately, before they become material events. The same notifications and access will be available to management, transforming auditors from the bearers of bad tidings under conflicting pressures, into advisors and problem solvers. And auditors will sleep at night.

In the meantime ... Three companies offer approaches that demand both respect and investigation: ACL, MetaMatrix, and 4DataLink. All have in common the ability to access and correlate data in disparate and unconnected databases. ACL offers a cross-industry focused auditor's tool of some renown. MetaMatrix offers a cross-industry technology approach that promises an alternate and affordable way to integrate enterprise information. 4DataLink offers a utility focused approach with graphical views of data integrated across disparate databases. We will explore the 4DataLink approach after acknowledging the ACL and MetaMatrix positions.

ACL[7] provides an audit focused software package that has achieved the widest general usage among auditors in all industries. ACL claims they can provide interfaces to all databases of interest to the auditor, from ERP to the ever present financial spreadsheets. They provide automated tools for comparing data in different databases, monitoring data consistency, sounding the alarm when things go awry, and special analytics for the auditor's tricks-of-the-trade. Clearly a winner in the financial transaction database arena, but not so clear in its suitableness for mining data in the disparate engineering and operational databases typical of a utility.

Some might argue that ACL provides this Auditor's Portal spoken of earlier. Close in concept, but far in practice. Current ACL capability does not have the wide range of data access envisioned here, is less flexible in probe and sample freedom, and necessarily deals with a static and passive view of transaction data. Inherent limitations will be evident after EII and operational modeling concepts are introduced.

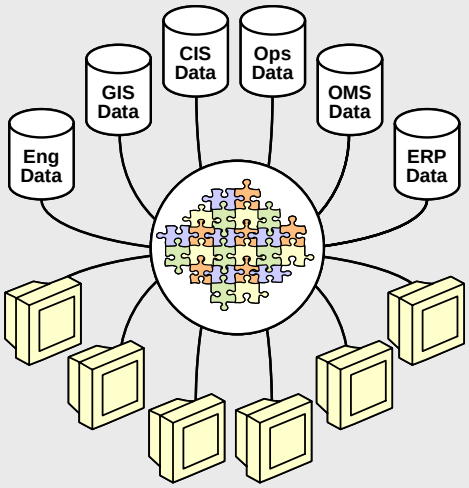
Enterprise Information Integration – The Gilbane Report on EII

Excerpted from the *Gilbane Report*[6]:

"No matter what business you are in, many, if not most, of your important business applications need to include information that resides in multiple databases or content repositories. There are lots of good reasons for this:

- Distributed information is a by-product of decentralized organizations that need to be able to scale.
- The relative value of information is dependent on its accuracy, quality, and timeliness. High-quality/value information can only be maintained when its control (creation and maintenance) is in the hands of local domain experts – those who understand what the information is, and what it means.
- Knowledge worker productivity depends on their being able to get the information they need, when they need it. Even more importantly, being able to aggregate information allows for previously unknown connections to become apparent. This kind of *emergent knowledge* is as critical for business as it is for science.

..... An important question is whether EII is a market of its own, or whether EII technology will simply be part of larger applications or infrastructures. Long term there will certainly be EII capability built into both... the need for expertise on how to effectively use it guarantees that integration specialists and product companies with domain expertise will be around for awhile.



EII Metadata Model Integrates Disparate Application Databases

According to Michael Lang[9] of MetaMatrix:

"The ideal information integration server requires several features:

- A security model to limit or grant access, flexibly, to the enterprise information systems.
- A standard interface language, such as SQL, to hasten application development.
- Extensible connector [link] technology to enable the enterprise to connect to any and all possible enterprise information systems.
- Standard client interface options, such as XML and JDBC, to offer easy access for the enterprise's information-consuming applications.
- Query planning and optimizing algorithms to ensure peak data access performance.
- Support for synchronous and asynchronous sources to ensure the enterprise can use the information it wants.
- Auditing to enable the enterprise to track usage patterns.
- Scalablity and fault tolerance to ensure continued operation.

Doppelganger: a ghostly double of a living person, especially one that haunts its own counterpart. [Webster's II, New Riverside University Dictionary, 1984]

These comments do not mean to take away from the values of current ACL capabilities, nor to indicate that ACL evolution will not continue to add more capability.

MetaMatrix[8] takes credit for coining the phrase Enterprise Information Integration (EII). This is an important technological concept that bears some discussion, and it is a compatible concept with SOA development. In short, the EII approach does not attempt to integrate the various enterprise application packages for direct communication, but rather builds a model of what is contained in those application databases. Unlike data warehousing, it does not duplicate what is contained elsewhere, but rather maps the nature and meaning of what is contained elsewhere as metadata. It is a model of the enterprise data, with links into each of the databases of interest. It can present to a user an integrated view of data without reproducing all of that data in a centralized database. The breakthrough value here is that customized inter-application interfaces do not have to be developed, which is where the major expense and risk of an integrated infrastructure rears its ugly head. To my knowledge no company has employed the MetaMatrix approach for assisting the audit function. Perhaps an Auditor's Portal can not justify a MetaMatrix implementation alone. But a company with this capability already installed for other purposes should not have much in the way of incremental expense.

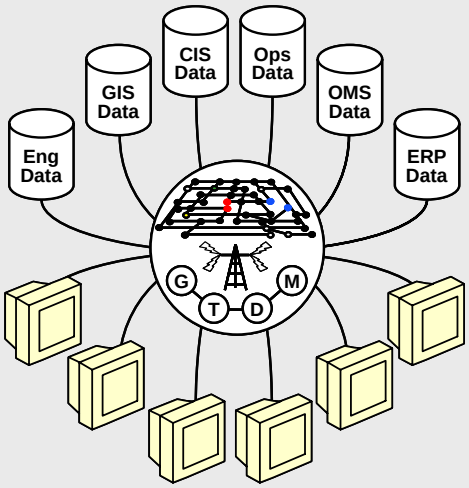
Two points about the general EII concept are worth noting: 1) EII can provide affordable and unprecedented data transparency, something SOX intent demands; and 2) EII can be implemented gradually and non-intrusively, and be expanded incrementally to include more or new enterprise data in the model, as desired, tracking changes and new interpretations of SOX compliance as they occur, effectively and affordably.

The EII metadata model can be broadened one database at a time, to fit the enterprise annual budgetary appetite. Adding application databases to the model should not require alteration or downtime to the application. There is no risk of disruption. Strong EII provides more than an integrated view of otherwise disparate data. It can provide automated bi-directional linkage between application databases, propagating data from one to another as and when desired. What a concept! It would seem that the block on infrastructure integration has a potential solution that demands investigation. Should an auditor find an EII foundation at a utility, it would not be unreasonable to ask that certain databases be considered for addition in subsequent years.

4DataLink[10] has employed an EII-like technology as an underpinning for a more powerful concept, one that utilizes information integration to drive a mirror-image model of the operating enterprise. The remainder of this paper will focus on the 4DataLink approach, because it sets a dramatic benchmark for what can be done to support the audit function in the utility environment.

Like general-purpose EII, 4DataLink's enterprise information model is linked into multiple application data bases of interest; and provides users with a single-point graphical and analytical interface across integrated data. Different types of users have custom portals providing the graphical views and analytics of interest to them. An electric utility engineer, for instance, may want to see the electrical circuit schematic for a specified substation, while a repair crew sees a map showing the physical location of all lines and devices in that substation, and a customer service rep sees a street map and location of the customers served by that substation.

Unlike general-purpose EII, 4DataLink's metamodel moves well beyond the data integration realm to become, in essence, a *doppelganger* of the utility's plant network: somewhat like a plant simulator, but reflecting a synchronized view of the live real-time condition of the plant. This plant model is composed of objects, each independently tracking the condition of their live counterpart in the plant, like a



4DataLink's Network Information System is an *active intelligent model* of the plant.

- Mirrors real-time functional status of entire gen-trans-dist-meter network.
- Replays anytime in the past.
- Simulates what-if futures.
- Maintains self-integrity

Key Concepts:

- EII-like metadata organized as objects linked to multiple databases.
- Objects mirror operating status and connectivity of real-world system components, such as generation, transmission, distribution, and metering assets.
- Objects are richly characterized, with information such as physical location, capability, compatibility, limitations, and complete life history.
- Model fidelity actively reflects changes in the actual system in near-real-time.
- Model history is actively recorded in real time as object-status changes occur.
- Model integrity is actively monitored and maintained.

substation, transmission line, or 50MVA transformer in an electric utility. Notably, changes to an object's condition are time stamped and recorded when they occur. Consequently, the plant model has a memory with perfect recall, and can be "rewound" to anytime in the past.

An auditor could ask some interesting questions of this model about conditions at precisely any end-of-period closing time in the past, or aggregated across any reporting period. The answers will be truth – because the model has recorded reality, the recording is securely audit-trailed, and reality has been verified.

DATA REDUNDANCY VERIFIES REALITY

Reality is verified with the inherent data redundancy in the typical utility IT application environment. There it is again – data redundancy in multiple databases as a benefit rather than a problem.

As humans we recognize that reality is ambiguous and imperfect. We routinely employ redundant information to make sense of the world we live in. Without redundancy to verify our conclusions we could never be sure our conclusions were right, and would have no clue when they were wrong.

The plant model actively monitors its own integrity by checking data from multiple sources for consistency. Two different databases should not contain contradictory information. Something is amiss if a maintenance database shows a specific substation out of service during the same period that the SCADA database shows it active. Perhaps the problem is simply one of synchronization, where the SCADA input is automated and immediate, whereas the maintenance information update is awaiting an entry by a repairman that may be a few hours in delay. The model takes this into account and won't request corrective action unless too much time elapses. Data inconsistencies beyond acceptable limits can be logged, creating a secure record and statistical performance reports for management and audit use.

Other modes of integrity verification are employed as well. The model knows the nature of physical assets and their functional characteristics, enabling it to complain if a 200 amp service is all of a sudden carrying 2000 amps, and to disallow a field repair update that shows an AC transformer connected to a DC line. This same capability could be employed to complain if the power shown as billed for a group of meters exceeds the power that was delivered by the substation feeding those meters.

AN ACTIVE INTELLIGENT MODEL

Though *doppelganger* captures the essence of 4DataLink's plant model, it might be more informative to describe it as an *active intelligent model*. Active because it is updating itself in synchrony with its real-world counterpart, and because it monitors its own integrity and initiates action to restore integrity when needed. Intelligent because it can communicate accurate images of the past from memory, interact meaningfully with the present, and draw conclusions about future actions.

Perhaps auditing the future is a contradiction. Nevertheless, the plant model will accommodate what-if inquiries about the effect of changes in such things as plant configuration and customer demand. Though this capability may not provide any value to the SOX audit function, knowing the capability exists rounds out an appreciation for the nature of the beast.

4DataLink calls this their Network Information System (NIS), referring to the plant network of assets that provide services to customers, such as electricity generation, transmission, and distribution assets; or water sources, feeder mains, purification plants, and distribution lines; or cable signal sources, feeder lines, and distribution lines. All right down to and including the customer's termination point.

This active intelligent model can display its operational status and history in a variety of ways best suited to a specific user. For example, all customers affected by a current disaster can be displayed as an expected-revenue-loss overlay on a service-area aerial view, all distribution assets retired from service in precisely the last 90 days can be pinpointed on an asset-network map, or billed power as a percentage of distributed power can pinpoint technical loss and theft as an overlay on a service area map.

4DataLink didn't develop this with auditors in mind. But there it is. It would be a simple matter for any of their customers to get a self-service thin-client portal catering specifically to the auditor's analytic interests.

AN AUDITOR'S PORTAL

Imagine ... a dedicated auditor's portal that provides total transparency into the entire disparate data collection typical at a utility. A portal that will display data conflicts and verify data consistency among many different data bases, detect anomalies, indicate attestation risk, detect fraud, produce analytical reports, and even enable customized self-sufficient data investigation without SQL expertise. An audit capability that produces superior results for even the inexperience auditor, does so in a small fraction of the typical audit time, with 100% data verification rather than sampling. A capability to detect material events and deteriorating risk-trends, and automatically notify all concerned in real-time when the situation warrants. An audit capability that eliminates the conflict and risk to the messenger of bad tidings, as events and indications for concern are automatically pushed to the CFO, CEO, and internal auditors when they occur, in real-time – and these same people have the same enterprise transparency through their own portals. Add to this a remote access capability that allows immediate and thorough investigation and advice on-demand, regardless of auditor location?

Not enough? How about a graphic representation of compliance controls that depicts control networks for IT, revenue, expense, and assets; lets you drill down in these depictions to examine control specifications; lets you see the actual history of control usage; and raises alerts when controls are not being employed as specified.

To good to be true? You be the judge. This paper explored the unique capabilities of a system already installed in many utilities, but generally not used for its SOX compliance capabilities, simply because these utilities didn't install the system with SOX in mind. Instead, these self-service portals are used by the regulatory compliance office, the CFO, the CEO, marketing, and various operational and engineering functions that need their own accurate view of current and past status, enterprise wide.

Though 4DataLink's system was not designed with SOX in mind, it was designed for regulatory compliance, broader in nature than SOX, from the beginning, with unique technology and capabilities as a result. Until recently these systems were all in South America, driven by pioneering deregulation that created new requirements for data accuracy, and penalties for inability to recreate material events of the past, in accurate indisputable detail.

4DataLink is mistakenly identified by some as a GIS provider. This is undoubtedly due to the dramatically advanced capabilities they display in this area, in essence redefining the market expectations of a GIS system. This dramatic GIS capability is simply a natural fallout from the active intelligent model at the heart of their Network Information System. The fundamental unit of their GIS capability is an active asset object, not a passive map drawing. So, rather than displaying or assembling sections of stored map drawings, they actually draw a new map on the fly each time a user expresses a need for a specific view. The drawing is automatically created by

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assembling the assets spatially in the called-for view according to their real operational status at the specific time of interest.

SOX-COMPLIANT ASSET TRACKING

So here are some of the things 4DataLink's active intelligent model can do as is, in the words of one insider: Sergio Sperat argues that SOX compliance-value exists in their current installed systems as is, even without an Auditor's Portal addition.

"All of our asset transactions (additions, retirements and relocations) are time stamped). Section 404 clearly states that the maintenance of records must: 'accurately and fairly reflect the transactions and dispositions of the assets of the registrant at a reasonable level of detail'. We ensure accuracy here as well because the plant model integrity checking won't let strange things happen, like retiring an asset that doesn't exist or installing a new asset connected to something that was not there at the time of construction.

"All of our model attributes are always time-stamped, including links into databases. These links can be used to model account numbers for customers, equipment nameplates, physical characteristics of assets, electric phasing and geometry information, materials, whatever. For SOX, this means, for instance, when a piece of equipment is decommissioned you can always tell the life span of operation, or for asset maintenance you can tell when material additions or replacements took place.

"Our past-history replay capabilities can verify that when a period is closed, all transactions, from all departments, were consistent with one another.

"And now we are working with some clients who want specific capabilities related to SOX compliance, so what is already useful should become more so shortly."

CONCLUSION

Disparate redundant data must be examined by the auditor. To ignore it is to invite risk and retribution, for it is an all too obvious tell-tale. This can be done today at any utility if the auditor simply sits with a specific application user and asks questions for probe, display, and printed report. There is no need to wait for the Auditor's Portal spoken of here. If a utility has implemented an EII integration strategy, the auditor will begin to enjoy some level of self sufficiency. Should an auditor be so fortunate as to have a client with 4DataLink's NIS, awesome should be the reaction.

Attestation of truth in financial reporting and controls efficacy, under great personal penalty, is the core SOX issue for auditors and corporate officers alike. Corporate officers of course have many more things on their minds as well, while auditors are focused almost exclusively on this issue, with new motivation and deeper requirements. Though this paper address the auditor directly, corporate officers should find value in knowing that redundant data can be put to good use.

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