"GAIN" REDUCES AUTOMATION AND BUSINESS COSTS

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GAIN Is A Group Of Gas Utilities Seeking To Save Money With Automation

Brooklyn Union and SoCal Gas formed the Gas Automation Integration Network (GAIN) in 1997 to help them save money with automation. Current members of GAIN are Brooklyn Union, Consolidated Edison, and Southern California Gas Company. Much of the drive for the formation came from top management and was focused on developing a common utility industry position on automation. GAIN also works with the electric and water industries to assure that all utility automated systems are compatible. The Institute of Gas Technology (IGT) is the contractor and is responsible for monitoring developments in the area, analyzing the results, and presenting GAIN positions.

The goals of the group are --

- Lower operating costs
- Lower automation costs, and
- Lower restructuring costs.

Achieving these goals offers utilities significant financial benefits. The Gas Research Institute (GRI) estimates total industry savings from integrated automation at $180,000,000. The Electric Power Research Institute (EPRI) has found similar results for the electric industry. The potential returns are so large that integrated automation is the largest item in GRI's program. Broadly, the method of realizing these savings is to integrate ALL automated utility systems together using "Open Architecture" interfaces.

"OPEN ARCHITECTURE" SAVES MONEY BY LOWERING COSTS

Open Architecture is a set of standard interfaces that can be used to connect components of automated systems. Open Architecture is perhaps most simply thought of in terms of plugs that connect system components, much like the familiar plugs used to link VCRs to televisions. The physical characteristics of the connecting plugs (shape and dimensions of the plugs, number of pins, etc.) are standard, known to all potential manufacturers and purchasers. The term "open" refers to the fact that the specifications are free (or "open") to anyone without license fees or permission. Open architecture is analogous to standard pipe threads, a system that allows ready connection between different components. Like the standard thread system, open specifications only tell how components are linked, not what the components do or how they are made. The term "architecture" refers to an overall plan that assures that each system component is assigned an appropriate function. Thus, each manufacturer can

design components to do their required jobs in the most cost effective way. This provides manufacturers with a wide range of opportunity for innovation. Manufacturers working within the architecture can produce components that perform required services and yet can be connected to other system components through common interfaces - no matter who makes the other components.

Interoperable equipment is estimated to cost 15-30% less than sole-source components. The two major economic forces that drive this price reduction are well-known from many areas of electronic equipment. The first factor is competition. For example, once personal computer standards emerged, the prices on computers, printers, modems, and scanners plunged due to aggressive competition among manufacturers. Second, the cost and complexity of linking components into interoperable networks drops dramatically as widely accepted connection standards emerge and are adopted. Again, this is well illustrated by the emergence of the internet and PC networks. GAIN expects interoperable equipment to reduce utility automation costs as mass markets for standard equipment develop.

The utilities that formed GAIN observed that the price-reducing competition that characterizes the personal computer and consumer electronics marketplaces is largely lacking in automating utility operations. SCADA, Automatic Meter Reading (AMR), customer billing, and network modeling systems made by different manufacturers are nearly always incompatible. In addition, these systems can not be linked to each other because they are not designed to exchange information. The lack of system compatibility can become particularly painful when companies contemplate mergers, acquisitions, and strategic partnerships. The technical barriers arising from inability to link expensive legacy systems can substantially reduce strategic business flexibility. Conversely, inflexible legacy systems can put utilities at a competitive disadvantage.

Several state legislatures have also recognized the benefits of interoperability. In particular, legislators often view interoperability as a way to enhance competition in the utility environment. Incompatible systems make it more difficult for customers to change suppliers. System incompatibilities also hinder the restructuring of companies that must form new alliances. Common interface standards also allow gas, water, and electric utilities to share communication infrastructures if they so choose. Both legislative groups and combination utilities have recognized this as an important benefit of interoperability.

The information GAIN provides its members helps reduce obsolescence cost in several ways. First, equipment that is purchased just before a new standard emerges has a high risk of becoming prematurely obsolete, even if many years of functionality remain. Timely information on the emergence of standards provides the early warning that helps avoid bad investments. In addition, GAIN members have the technical information with which to judge how easily each manufacturer can migrate its product lines to open architecture. GAIN also shares some of its information with public utility commissions to help them make informed decisions that are not biased by manufacturer perspectives.

While the technical details of open architecture are outside the scope of this paper, it is important to recognize the technical feasibility and economic benefits of this approach. In particular, utilities could save many millions of dollars and provide their customers with far better service if utility automation systems were interoperable. While there are some technical difficulties to be overcome, the institutional barriers are far more significant than the technical issues.

GAIN SHARES ITS APPROACH TO AN INSTITUTIONAL PROBLEM

The companies that formed GAIN recognized that a cooperative approach is needed to overcome the largely institutional barriers to interoperability. GAIN members realized that interoperable equipment will benefit all parties. Utilities benefit from lower cost equipment, reduced linking costs, and greater strategic flexibility. Utility customers benefit because they also can now access interoperable equipment and interface it to their own computers or energy management systems. Automation helps retain commercial, industrial, and the valuable "high-end" residential customers as well. Manufacturers grow their now relatively small markets into true mass markets. Even legislators who seek to increase competition in utility markets benefit because interoperability reduces barriers to customer choice and realignment of utility business units.

One clear issue that emerged early in GAIN's history was the lack of a clear, unified message from the gas, water, and electric utilities to the manufacturers as to what is needed for interoperability. Different utilities requested different interface standards. States began to develop a patchwork of inconsistent interfaces on a state by state basis. The more than 20 standards committees working on utility automation were not receiving consistent input from the utilities that they ultimately seek to serve.

GAIN charged IGT to monitor the developments taking place in many standards bodies, legislative hearings, other utilities (including water and electric), and manufacturer groups. The results of these investigations are then analyzed and presented to GAIN members, who develop a common position and charge IGT to present this unified position to the appropriate groups. This allows GAIN members to gather and share intelligence on the most appropriate open architecture standards and to articulate this consensus position to others. This intelligence lets GAIN members anticipate which standards will emerge and when. This results in up-to-date, technically reliable, neutral information on which to base purchase decisions.

Although not all information that is gathered is released, GAIN members are willing to share many of their results with other utilities. The members feel that this is both in

their own best interest and the interest of the utility industry as a whole. GAIN members believe that --

- Sharing insight as to what are the best interfaces builds mass market acceptance
- Manufacturers need unified messages that come from all utilities asking for the same approach and standards
- Standards committees need direction based on utility input, and
- Utility unity requires information and conclusions be shared.

The GAIN conclusions and recommendations that are being shared can be found at the web site at http://gain.igt.org. At this site, you will also find instructions on how to register for an automatic Email notification of developments of interest to GAIN members. All utilities are urged to consult this site for the most recent information and recommendations on interoperability standards.

GAIN IS ADDRESSING THE BARRIERS TO INTEROPERABILITY

GAIN has identified - and is addressing - 5 major barriers to the deployment of interoperable systems. These include --

- Not all technical work is complete
- Writing purchase specifications for "moving targets" is difficult
- There is no interoperability testing site
- There are no national standards, and
- There is a “Chicken & Egg” deadlock.

Each barrier and the approach is summarized below.

GAIN Is Encouraging The Completion Of Technical Work

While it is correct that most of the barriers are institutional, it is also true that not all technical work is complete. Standards committees are still developing some of the required standards and many manufacturers will need to modify their products to comply with the new standards when they are ready. Manufacturers and utilities alike will need to develop "migration strategies", which are a set of orderly transitions that allow utilities to gradually migrate their legacy systems to the open architecture world.

GAIN members are taking several steps to address the remaining technical issues. First, developing and articulating a clear, unified utility demand for interoperable equipment simplifies the remaining tasks and uncertainties facing standards groups, legislators, and manufacturers. GAIN works with manufacturers and standards groups to identify the technical difficulties open architecture standards present to existing products. GAIN can then work with these groups to negotiate mutually acceptable resolutions. GAIN continues to actively seek manufacturers who support the emergence of interoperable equipment and to work with these manufacturers to resolve

technical difficulties. By sharing their "lessons learned" with one another and cooperating manufacturers, GAIN members are helping resolve key implementation issues. These lessons learned also point the way to more effective migration strategies. Finally, GAIN input to standards groups and manufacturers assures that the resulting products will meet utility needs for gas, water, and electric automated systems.

GAIN Is Developing Purchase Specification Language

Given that utilities constantly need to purchase equipment and can not always wait for manufacturers or standards groups to complete their work, effective timing of purchases is a key interest to GAIN members. The rapid changes in standards committees, state legislative decisions, and new products combine to create a "moving target" for utilities that must specify equipment.

One of the most effective ways to address the "moving target" issue is to keep members well-informed on the timing of manufacturer plans and the acceptance of standards. GAIN cost-effectively provides its members with up to date information by sending representatives to a wide range of gas, water, and electric groups to report and analyze information. A second important help to GAIN members is the sharing of purchase specification language and lessons learned from RFP experience. GAIN members are also aware of which manufacturers are most capable of migrating to emerging open architecture interfaces.

GAIN Is Establishing An Interoperability Test Site

Although standards are being developed and some manufacturers are beginning to market equipment that is designed to interoperate, there is no facility at which the interoperability can be verified.

GAIN will establish a limited interoperability test facility at IGT. The facility will let manufacturers, software developers, and GAIN members test the compatibility of system components, communication links, and software in a single location. IGT's not-for-profit status allows these tests to be conducted by a neutral third party. This facility allows members to determine in advance which system components will actually function together.

GAIN Is Urging The Emergence Of National Standards

As various governments and utilities consider legislating standards, it becomes increasingly important that a single set of standards emerge. Different legislative bodies supporting different standards send manufacturers and utilities conflicting signals. While legislators may have significant power to influence decisions, they may not have access to reliable, unbiased technical information.

GAIN members have sought to facilitate sound legislation and the emergence of national, rather than state-by-state standards. GAIN representatives participated in the California Permanent Standards Working Group (PSWG). This group was convened to recommend interface standards for the restructured electric market. GAIN gas utilities participated in this process because they recognized that it is important for all utilities to have common interface standards. In addition, they recognized that the California electric industry decisions were likely to become a model for utilities in many states. Providing neutral technical information to state bodies is an important tool to avoid the potential costs of ill-conceived legislative decisions. The emergence of many different standards makes it difficult for manufacturers to realize the potential cost reductions of mass markets.

GAIN Is Seeking To Break The "Chicken And Egg" Deadlock

Manufacturers state that utilities never request interoperable equipment and utilities state that manufacturers do not offer open architecture systems.

As utilities begin to send the unified message that interoperability is an important component of the purchase decision, manufacturers will be able to combine orders for similar equipment to produce products that are designed to interoperate. GAIN will facilitate this by developing educational materials on interoperability and open architecture for its own members, as well as other utilities. When GAIN members jointly express the need for interoperability, their combined message exerts stronger strategic influence on the market than any single company could do by itself - and at lower cost for each member. Accelerating the rate at which interoperable equipment becomes available also accelerates the rate at which the cash flow savings are realized.

FOLLOW THE GAIN LEAD TO REDUCE AUTOMATION AND BUSINESS COSTS

For interoperable equipment to be widely deployed, it is critical that gas, water, and electric utilities send clear, unified messages to the manufacturers and standards groups that the utilities need such equipment. While GAIN can provide the message, it is critical that other utilities help by communicating the same message. Unified signals to the market place will allow utilities to reduce costs through competition, lower their obsolescence risk, increase their merger/acquisition savings, and add many strategic business options.

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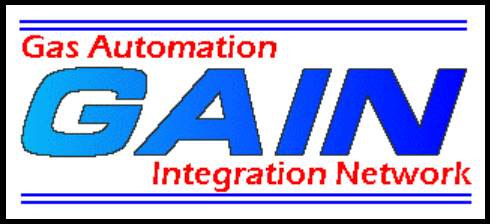
IGT IS A NON-PROFIT R&D INSTITUTE THAT FOCUSES ON THE GAS INDUSTRY

- **Founded 1941**
- **Staff Of ~ 150**
- **Budget Of $25 Million/Yr.**
- **Source Of Neutral Expertise**

GAIN HELPS GAS UTILITIES SAVE MONEY WITH AUTOMATION

- **GAIN = Gas Automation Integration Network**
- **SoCal Gas, Brooklyn Union, ConEd**
- **SCADA, AMR, Data Bases, Network Models, CP Potentials, Etc.**
- **Independent of Communication System**
- **Same System For Water And Electric**



GAIN BENEFITS UTILITIES

- **Goals**
  - **Lower Operating Costs**
  - **Lower Automation Costs**
  - **Lower Restructuring Costs**
- **Work With Electric, Water, & Gas**
- **Link ALL Automated Systems Through "Open Architecture"**

WHAT IS "OPEN ARCHITECTURE" - AND WHO CARES?

- **Open Architecture Uses Standard Connections**
- **Analog = English Thread**
- **TV/VCR Is Another Example**
- **Interoperable Equipment Costs 15-30% Less**

On ALL Automated Equipment, This Can Be Many Millions Of Dollars

GRI Estimates Total Industry Savings From Integrated Automation At $180,000,000

This Is The Largest Item In GRI's Program !

UTILITIES FORMED GAIN TO ACCELERATE BENEFITS

- SoCal And BU Started GAIN, ConEd Joined
- Driven By Upper Management Support
- Drive To Develop Unified Utility Position
- IGT Tracks, Then Presents GAIN Positions

INTEROPERABILITY REDUCES COSTS

- **Competition Reduces Sole-Source Premium**
- **Linking “Plug & Play” Equipment Costs Less**
- **High, Hidden Interconnection Costs**

OPEN ARCHITECTURE REDUCES OBSOLESCENCE COST

- Non-Standard Equipment “Obsolete”
- Early Warning Avoids Bad Investments
- Assure Manufacturer Can Migrate
- Neutral Input To PUCs -> Rationality
- Migration Strategy Bridges To Legacies

GAIN RAISES PROFITS, ADDS OPTIONS

- **Lower Merger/Acquisition Cost**
- **Flexibility To Form Strategic Partnerships**
- **Gas, Water, Electric Use Same Protocols**
- **Manufacturers Do Work, Bear Costs**
- **Automated Service Retains Best Customers**
- **Accelerate Benefit Cash Flows**

Inflexible, Legacy Systems Are A Competitive Disadvantage

UNIFIED MESSAGES GUIDE MANUFACTURERS & LEGISLATURES

- Costly To Manufacture Many “Standards”
- Common Interfaces -> Mass Markets
- National Standards Better Than State By State
- More Legislator Power Than Expertise
- Avoid Costs Of Ill-Conceived Laws
- Gas, Water, Electric Can Share Infrastructure

UTILITY COOPERATION HELPS ALL PARTIES

- **Utilities Get Lower Cost Equipment**
- **Customers Get Equipment They Can Use**
- **Manufacturers Get Mass Markets**
- **Legislators Get Easier Restructuring**

GAIN MEMBERS WILL SHARE MANY OF THEIR RESULTS

- **Sharing Builds Mass Market Acceptance**
- **Manufacturers Need Unified Message**
- **Standards Committees Need Direction**
- **Utility Unity Requires Information**

Visit

http://gain.igt.org

For Latest Updates

Gas Automation GAIN Integration Network

INTEROPERABILITY FACES 5 MAJOR BARRIERS

- Not All Technical Work Is Complete
- Moving Target Purchase Spec. Is Hard
- No Interoperability Testing Site
- There Are No National Standards
- “Chicken & Egg” Deadlock

GAIN ADDRESSES THE INTEROPERABILITY BARRIERS

- **Keep GAIN Members Informed**
- **Develop Unified Gas Position**
- **Secure Manufacturers**
- **Resolve Key Implementation Issues**
- **Develop Migration Strategy**

GAIN ADDRESSES THE INTEROPERABILITY BARRIERS (Cont)

- Support Utilities, Legislators, Standards
- Develop Educational Material For Members
- Establish Interoperability Test Site
- Test Equipment For GAIN Members

MORE STRATEGIC INTELLIGENCE & INFLUENCE FOR LESS

- **Members Share IGT Cost To Track Groups**
- **Early Information -> Well Timed Decisions**
- **Know Which Manufacturers Can Migrate**
- **Share Purchase Specification Language**
- **Promote Sound Legislation**
- **Standards Will Meet Utility Needs**

GAIN Articulates Its Positions

FOLLOW THE GAIN LEAD TO REDUCE AUTOMATION AND BUSINESS COSTS

- Reduce Costs Through Competition
- Lower Obsolescence Risk
- Merger/Acquisition Savings Add Options
- Unified, Effective Manufacturer Messages
- Strategic Intelligence, Influence For Less

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