Web Solutions for Orifice Measurement and Monitoring

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I. Introduction

Pipeline and production companies are continually faced with the challenge of obtaining operational data and making it available to their employees. In recent years the convergence in the advances in the technologies of the Internet, PC's, client/server technology, and IP ready communications have brought forth a new lower cost alternative to traditional SCADA systems. With the growing numbers of experienced and reputable suppliers of web based data monitoring and control systems in the market today, the feasibility of automating locations has changed. No longer do only the most productive wells or gathering systems receive consideration for automation. In today's technologically advanced environment even marginal producing wells can now benefit from the data monitoring and management services previously economical on only the more productive locations.

II. Benefits

The benefits of traditional SCADA systems are well known and relatively straightforward. Reduced operating costs both in the field and back office, increased production or throughput, asset maintenance and protection are all benefits that contribute to justifying the expense associated with implementing a traditional SCADA system. By implementing a web based data system, companies simply augment the benefits provided by a traditional SCADA implementation. Some of the additional benefits are:

- Reduced capital expense
- Increased scalability
- Easier implementation
- Decreased maintenance costs
- Flexible and user friendly presentation

III. Available Solutions

There are a number of different solutions available today that allow oil and gas companies to take advantage of the convergence of the different information technologies needed to bring data back to the end users. The internet is available 24/7 from almost anywhere today allowing companies to utilize ASP (Application Service Provider) offerings and customize them to fit there specific needs. There are three main levels of service that can be mixed and matched to achieve the economics necessary to justify a web based SCADA solution.

- Data Only Model: These are the most comprehensive of the measurement monitoring and control solutions available today. A "data only" model allows companies to pay a monthly subscription fee for their all their measurement, monitoring and control needs. This solution is ideal for companies whose human or capital resources limit the feasibility of taking on the implementation and maintenance of an in-house SCADA system. There are vendors offering complete turnkey services which include the RTU, communications, hosting, and web based delivery of data. For users looking for complete outsourcing of their measurement and monitoring needs there are various vendors with the expertise and financial stability to provide a complete solution. Obviously the complete outsourcing of a system might not be the right choice for every scenario; however, outsourcing of SCADA solutions utilizing internet technologies can make it economical to automate equipment that would have otherwise not been a candidate for automation.

- Hosting/Web Presentation: Probably the most widely utilized offering available. In this scenario companies outsource the hosting of the data from the RTU and web based data delivery portions but continue to operate and maintain their own communication and RTU infrastructures. This option provides a number of benefits as it allows oil and gas companies to avoid the expense of host software licenses, take advantage of the ASP vendors' data center redundant capabilities and realize the benefits of the increased data dissemination an internet based system provides. Most vendors offer a hosting/web presentation service for an economical monthly service fee.

- FTP/Web Presentation: Probably the most under utilized offering in the market today. If a company has the resources to maintain its own RTU, communication, and hosting or polling infrastructure they have a huge head start in journey to provide their employees with the data essential to manage their business. Many companies already have traditional SCADA systems in place. The next step is to get the data to the web, where it is more readily accessible, more of the time, to more of their employees. Several vendors offer services where for small monthly fees they will accept file transfers from the oil and gas companies host systems and place the data in user friendly web based applications.

IV. Choosing the Solution

With all the different options available from hardware, software, and communication vendors today, choosing a solution that best fits a particular scenario takes a little investigation and planning. Likely no one solution option will be ideal for all operating areas of a company. This is where the flexibility of web based systems is beneficial; the SCADA vendor can customize a solution that best suites each of the dynamic operating areas within a company. Some of the questions that need to be asked to help determine what solutions are best suited for an area:

- What type of communication system will be cost effective and reliable?
- Are the resources available to implement a traditional SCADA system…installing hardware, host software, and a communication system? If not what parts are feasible?
- How could different departments within the company benefit from operational, or volume data being more readily available? Gas marketing, technicians, accounting, etc.
- What are the long term objectives for the area being automated planned expansions, drilling programs, etc?

Once these questions are answered the company should have enough information to approach web based SCADA vendors enlist their help in determining which solution and vendor can best serve their needs.

V. Communications

Traditionally the most daunting task associated with any type of SCADA application be it internet based or otherwise has been implementing a cost effective, reliable communication system. A portion of the aforementioned advances in technology have come directly from the communications sector. The different methods of achieving remote communications have not changed for several years, however, advances in throughput capability, coverage, reduced power consumption, and lower prices due to increased competition have benefited the oil and gas company. It is now easier and more economical than ever before to implement a reliable cost effective communication solution. Most web based SCADA vendors are capable of helping companies choose and implement the most effective communication option. Options include:

- Land line

- Cellular
- Licensed radio
- Spread Spectrum radio
- Satellite

Land line phone options include dial up and lease lines. While easy to implement land lines are not always available in remote areas, even if they are, monthly fees are required. Most often we will see land lines being used as the primary communication link into a “gateway” that will communicate directly with units in the field through some form of radio or hard wire communication infrastructure. Rarely, will land lines be the solution for direct communication with an RTU because of availability and cost.

Cellular, options include analog or digital cell phone modems, CDMA, GPRS and CDPD. Coverage has become more widespread and service pricing more competitive in the last several years. Soon we will see more and better priced data only rates once the carriers make the switch from analog to digital infrastructure. However, still in many remote areas cellular coverage is not available and as always the monthly fees associated with these services can be prohibitive on large installations.

Licensed radio, once the standard for remote communications, is a very stable and reliable way to achieve remote communications. Licenses, however, are increasingly hard to obtain and it can take a significant amount of time for the FCC to process license applications. The advantages of licensed radio, if available, are that interference is usually not a problem and higher watt radios can be used resulting in greater transmission distances.

Spread Spectrum radio technology has made a lot of headway within the oil and gas community in the last few years. Interference issues which were once thought to be a concern with spread spectrum have proven not to be true. Because of their ease of use low cost to acquire the scarcity of new licenses being issued by the FCC spread spectrum is rapidly becoming the communications medium of choice for remote data gathering.

Satellite technology has made significant advances in the past couple of years and is many times the only option available to communicate with remote locations. The advantage of satellite is service is available virtually everywhere in North America and monthly service fees are now more economical than ever before. The disadvantages are hardware is expense is still somewhat prohibitive for individual site applications. However, the satellite is one of the more attractive solutions for establishing a communication link to a local radio network.

V. Conclusion

Traditional SCADA systems typically require significant capital outlay to implement, as well, as significant time devoted to training and maintenance of the system. Web based data delivery systems provided by an ASP require less capital expense, if any, to implement and monthly service fees can be taken from operating budget freeing capital for E&P activities. Any company regardless of its size or knowledge of SCADA systems can benefit from the web based presentation of their operational data.