SATURN SYSTEMS

CASE STUDY

ELECTRONIC TIMECARD & EQUIPMENT TRACKING SYSTEM

eLEM WINDOWS & WEB CLIENT SOLUTION

SUMMARY

Saturn Systems worked with United Piping, Inc. (UPI) to replace a paper based time card, equipment and materials tracking form with a fully electronic system with the goal of increasing yield for services performed, reducing accounts receivable turnaround time and improving equipment utilization efficiency.

THE CHALLENGE

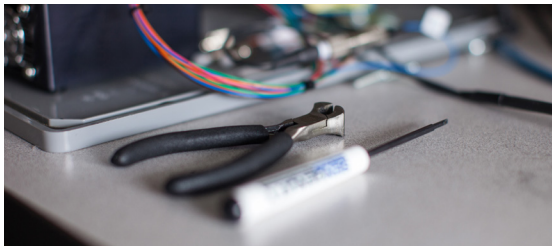
UPI fields teams of pipeline maintenance and construction specialists to ensure the integrity of our nation's gas and petroleum pipelines. Each team is led by a project foreman who carefully documents labor and equipment hours and materials use for each project on a daily basis. Accurate documentation is a critical first step in the billing and subsequent reimbursement process. For many years, UPI used a paper based Labor, Equipment and Materials (LEM) form for this purpose. Creating, organizing and maintaining paperwork in the field was challenging, and ushering the paperwork through an elaborate workflow approval process was very time consuming. Lost or incomplete LEMs or supporting documents resulted in inefficiencies and lost revenue. The timeline from work performed, through billing and finally to receiving payment had grown considerably. UPI management recognized an opportunity to increase the yield and efficiency of their LEM and invoicing systems and create cost savings and competitive workflow advantages internally and for their customers.

THE SOLUTION

The goal was to create a completely paperless LEM system that could operate reliably in remote locations which sometimes lacked wireless infrastructure. UPI foremen, who manage the pipeline crews and document LEM information, required use of a software application that could operate in the absence of a network connection, caching data locally, yet was able to automatically exchange information with a central server in the presence of a network connection. This requirement shaped the architecture of the eLEM system. The remote application, used primarily for LEM data entry, was developed as a Windows™ laptop application using the Windows Presentation Foundation (WPF) framework. All administrative, workflow, back office and reporting functionality was developed as a web application utilizing Microsoft Azure™ Cloud hosting services.

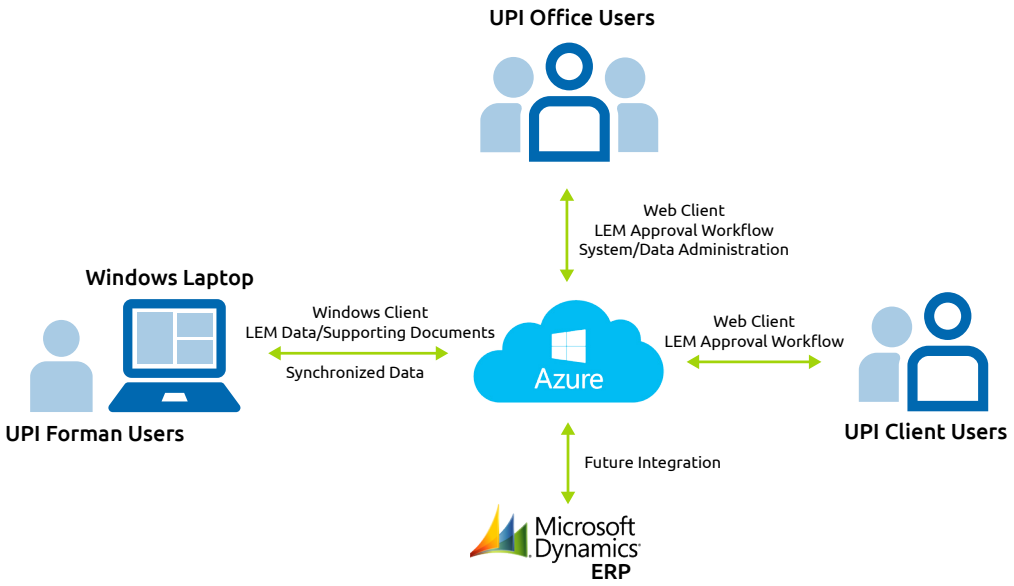
ABOUT THE CLIENT

United Piping, Inc. (UPI) is a general contractor, providing new and existing facility construction, pipeline fabrication and other specialized services for the oil and gas industry.



KEY TECHNOLOGIES AND FRAMEWORKS

- Microsoft C# .NET
- Microsoft Azure Cloud Hosting Services
- SQL Server
- BreezeJS
- DataTables
- Durandal
- Elasticsearch
- EntityFramework
- Glimpse
- KnockoutJS
- RequireJS
- Serilog
- SimpleInjector



Application Functions and Workflow

The laptop based remote tracker client posts JSON-serialized LEM documents to a web endpoint which deserializes them and saves them to a SQL Server™ database. On the web client, uploaded LEMs appear in the Project Manager (PM)'s dashboard grid for further processing. A series of workflows allow UPI management and client personnel to review, modify and ultimately approve eLEMs which are then submitted for payment. An elaborate version management engine keeps track of all eLEM modifications for future reference.

Equipment

Equipment Manager (EM) users and administrators store and manage equipment records, and associated information such as assigned job/locations, rental or vehicle-specific data. The system uses equipment data, as well as eLEM records, to provide reports that calculate the costs of using equipment on jobs. Because the calculations for these reports are extremely expensive to run directly against the database, data for the reports is aggregated and flattened into documents that are stored in Elasticsearch indexes, which greatly speeds report execution.

Planned Enhancements

The eLEM system will be configured to exchange data with a Microsoft Dynamics ERP installation.

Application Security

The eLEM system utilizes a user role based security system. Users are assigned roles, which allow or restrict access to functionality within the application.

THE RESULTS

The new, completely paperless, streamlined eLEM application has provided substantial operational efficiencies and data analysis possibilities. United Piping recently reported the new system has yielded over $800,000 in operational efficiencies in the first year of operation alone!

To learn more about Saturn Systems visit SaturnSys.com or call (888) 638-4335.