

# Improving Wastewater District Monitoring Access, Visualize, Analyze



## 1 Problem: legacy technology

### ■ Critical infrastructure

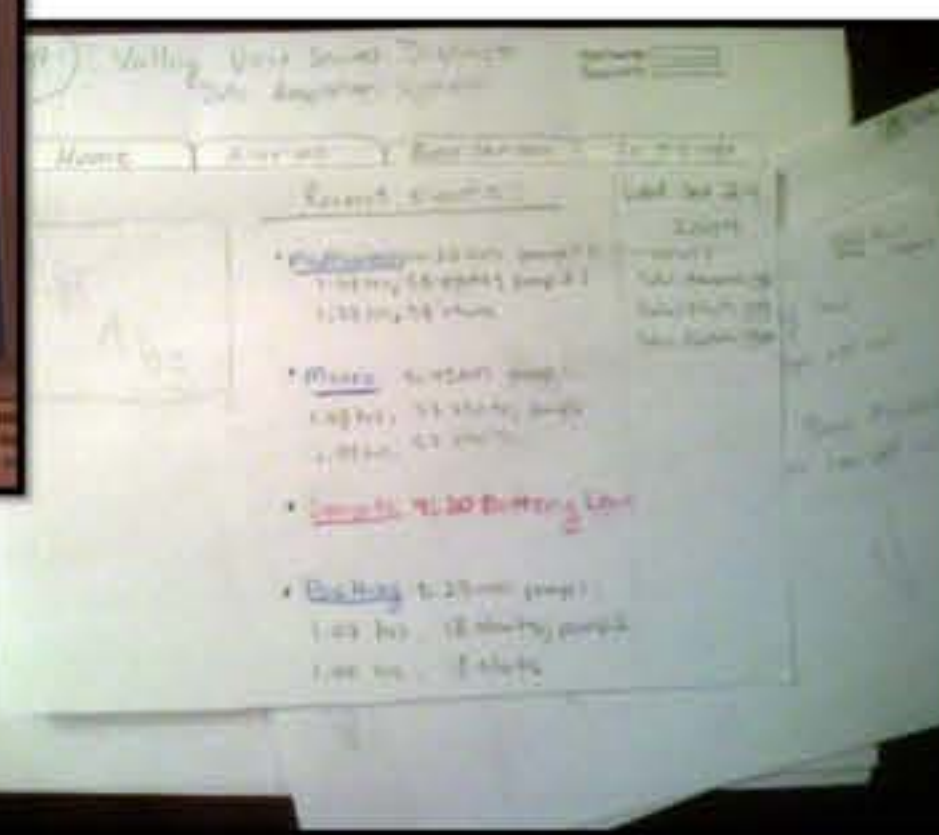
Critical infrastructures such as transportation systems, electricity generation, public health, water supply, and security services are essential to creating human sustaining environments. Project SCADA addresses perhaps the most fundamental and vital system to society, our water.

### ■ Wastewater

Often it is easy to take for granted how society handles the wastewater we produce. For example, we all flush toilets, take showers, or wash dishes and give little thought to where it goes. Wherever you live there is a dedicated system managing how these waters are processed. Wastewater districts work behind the scenes to make sure we are able to live life without the worry of waste pollution.

### ■ Old monitoring hardware

However, this crucial task sometimes relies on older technologies. For instance, many sewer districts utilize software more than a decade old. Project SCADA examines a legacy system and tries to enhance its data access, visibility, and analysis options.



## 2 Process: research & design

### ■ Field observations

Because our development team was unfamiliar with the existing system, there was much research required. Initially we participated in many field observations to become more acquainted with day to day operations. This involved going on pump checks at various stations, watching employees interact with the system, and examining the reports their current system generates.

### ■ Contextual interviews

We interviewed several employees that fulfill different roles within the organization. This allowed us to understand how the system was viewed by different stake holders. The interviews consisted of conversing with participants as they used the system and asking follow-up questions.

### ■ Paper prototyping & usability tests

Finally we were ready to begin putting some of our ideas into more tangible forms. We sketched out on paper potential interface solutions. Those sketches formed a paper prototypes that were used to demonstrate interaction to real users. After incorporating feedback we were ready to bring our system solution to a higher fidelity phase.



## 3 Solution: web-based technologies

### ■ SQL Database

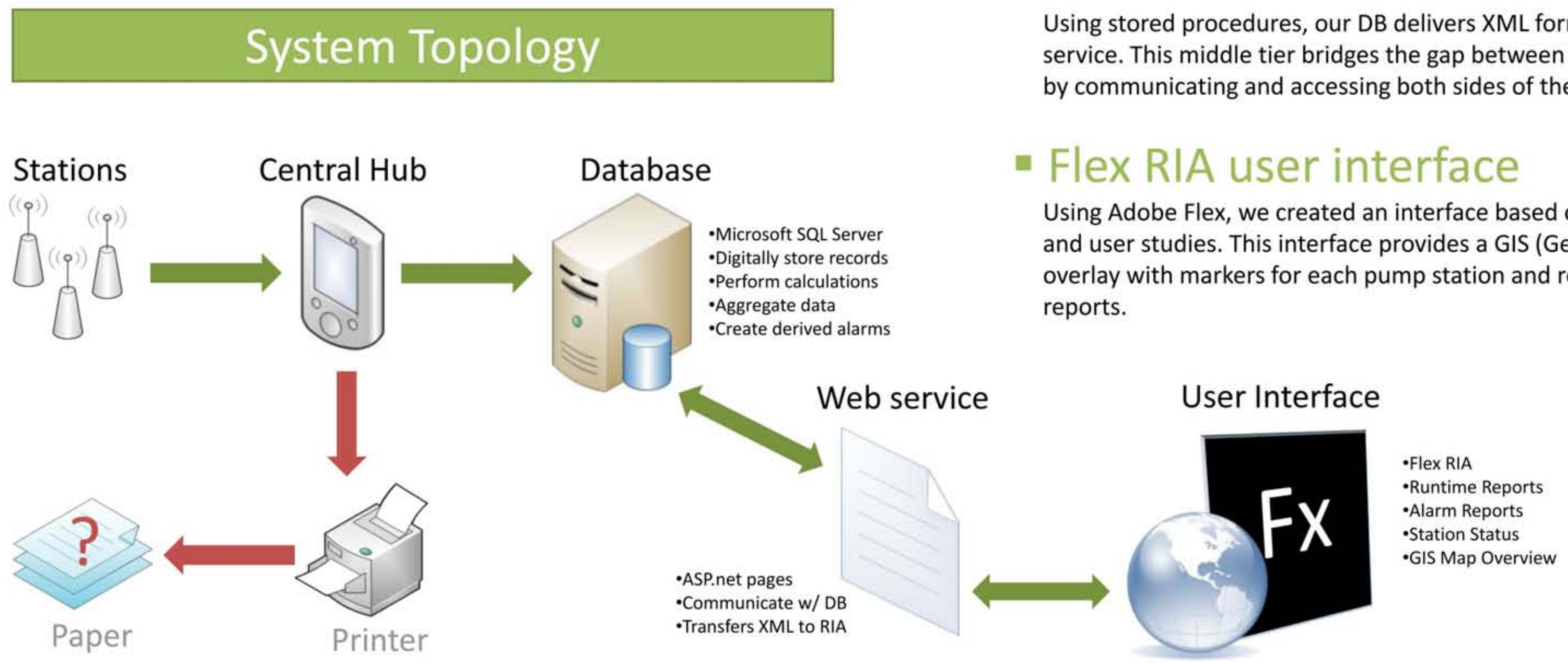
To get real data into the system and bring it online, we needed a database that could handle the output of the existing system. We designed a SQL Server Database that takes binary data from the original system and translates it into something more readable and user friendly.

### ■ ASP.net web-service

Using stored procedures, our DB delivers XML formatted data to our ASP.net web service. This middle tier bridges the gap between our database and user interface by communicating and accessing both sides of the application.

### ■ Flex RIA user interface

Using Adobe Flex, we created an interface based on the findings of our research and user studies. This interface provides a GIS (Geographic Information System) overlay with markers for each pump station and real-time alarm and runtime reports.



#### References

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Ranganathan, Ganesh. 3 Steps to Automated Treatment. *Pollution Engineering* 32.8 (August 2000): 40.



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