

## ChallengerX Problem Statement

While professional event responders and forecasters have some tools to forecast disaster, modeling and simulating any large problematic event (wildfires, floods, storms, etc) is still a huge task where technology isn't fully leveraged.

Our customers already possess scheduling tools and a comprehensive registry of assets (provided by IFS or not), as well as a healthy geodatabase keeping track of assets location. It would be advantageous to combine these data sources in order to provide a forecasting tool that addresses this challenge.

The issue we are attempting to solve can be reduced to:

**Given a map of my service area, can I model an event of any kind and determine the best response strategy for it?**

We are looking at building a comprehensive event-modeling suite, which allows a forecaster to define one or many events and view the resulting work. That work should be released to a workforce (also to be modeled in this tool) and optimized. The result should be a comprehensive analysis of a given workforce scenario against the event, recommending a course of action for a given event.

We are looking to automate the analysis of these scenarios, with the input of forecasters limited to what they do best – shift assignment and event modeling.

A few examples of scenarios we are trying to model:

- A fire is taking down 45% of my power poles between Highway 99 and the Cheekye River, should I activate my whole emergency response team, or will restoration be achieved just as quickly with only two-thirds of my workforce in this area?
- High winds are predicted all over Merritt. Historically, I know about 2% of my municipal trees will generate repair jobs. Should I pre-engage contractor to repair the damage or will the overall impact be negligible enough that I can deal with it in daily operations?
- A storm might hit the West Coast, and 44 drilling rigs are on its path. Where should I station my response team to be ready to intervene, given the failure propensity of my equipment is correlated with maintenance date (in 60% of cases)? Does this change of 10 of my drilling sites are down the same road, which might flood (in 10% of storms)?

Insights generated from these models should be easy to parse and open. The best solution might not be the fastest one, as non-modeled constraints (workforce specific regulation, safety issues, mutual aid, etc) may arise. A forecaster should be able to gain insight as to an organization's preparedness for the modeled event, share that insight and use it in preparing response scenarios.

The solution should include a modeling cockpit for forecasters to model events in and a workforce management tool allowing for shift definition and crew planning. Insights derived from the model should be useful and presented in a concise manner. In order to associate work and workforce, a REST Gateway allowing for the use of the IFS Scheduling Engine is provided, as well as its associated documentation. A sample GIS service to build against is also provided, should teams prefer to use it.