

The Process

The process of using the Provisdom Decision Platform and its supporting Provisdom Decision Platform Software Ecosystem can be broken into the six steps outlined below.

1. Gather the Initial Information

The process begins with an information gathering exercise, often taking about 30-45 minutes. Key decisions now and in the future are identified, along with the uncertainties (e.g., future product sales), payoffs (changes in value), and other information affecting those choices. Sources of relevant information (data systems, employees, etc.) are also identified and Information Tools are used where necessary.

2. Input the Information Rules

The gathered information is entered into the Model Development Environment in as little as 45 minutes as rules, such as “When the design phase is complete, we'll find out if the prototype phase will be easy or hard.”

3. Run the Initial Model

Once all the rules have been entered, the model is run using the Provisdom Decision Platform. As the platform runs:

- The software evaluates the rules to see which rule should be executed next. The execution of a rule may result in the revelation of an uncertainty, the choice from a decision, or simply a change in variable. From a small set of rules, sometimes millions or even billions of future possibilities are created.
- A nonlinear optimization problem is solved repeatedly to find the probabilities throughout the model.
- Continuously-valued uncertainties and time are discretized, which approximates the exact solution.
- Proper discount rates are calculated from information regarding the future of the risk-free rate, the Market, and the relationships between the Market and the model's uncertainties.

4. Analyze

After the model is run, the optimal strategy can be investigated through Strategic Analysis Tools, including a dynamic decision tree, which can show any of the future possibilities that were created, along with the associated shareholder values, discount rates, probabilities, times, and other relevant variables. In addition, simulations may be run and ad-hoc questions may be asked (e.g., “In what cases should you switch strategy?” or “Under what conditions do I choose to expand manufacturing?”).

Sensitivity and “what-if” analyses can be performed, modifying and adding new information, choices, etc.

5. Make Corrections

Each iteration hones in on the most relevant factors and information. The decision maker’s judgment about what information will be most relevant will speed this process further. This process usually results in modifications to the model, as the decision maker realizes that important information had been excluded, or that some information was irrelevant. After a few such iterations, the decision maker finds that the model results and their intuition have converged.

6. Automate or Update Model Periodically

At this point, the model may be packaged as a software application, allowing for on-demand access to the optimal strategy given current information.

Samples

Sample Inputs

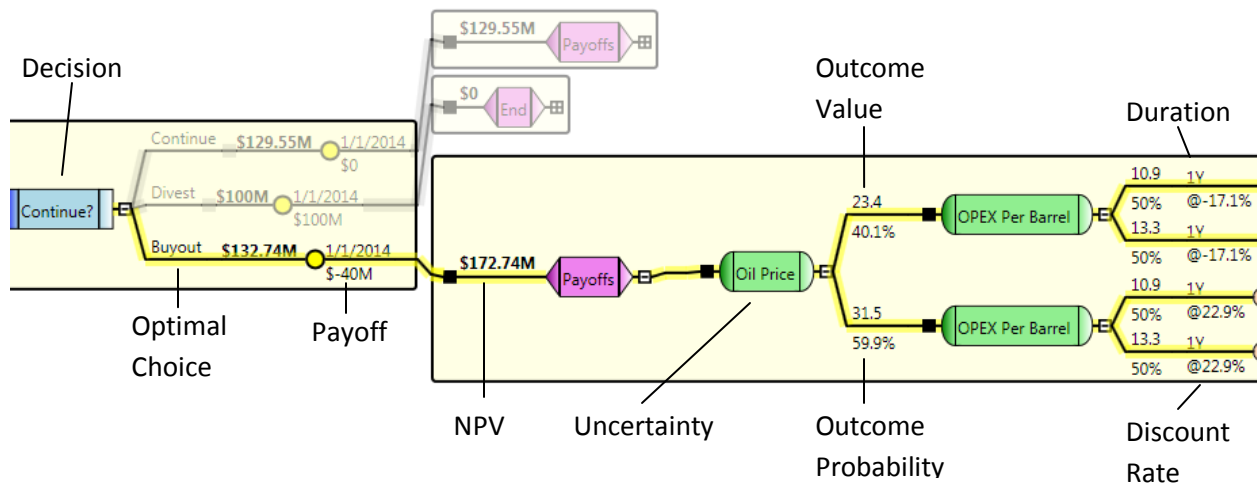
The Model Development Environment currently being used by Provisdom for building Information Rules uses C# code. Below are possible code snippets that build rules for “Did the design phase finish on time?” and “Decide on either internal or external engineers.”

```
ScenarioRule designRule = new ScenarioRule("Finished Design?", design);
designRule.AddAction(Actions.SplitStateVariable<MHD.State>("FinishedDesign"));
InitialState.AddRule(designRule);
```

```
DecisionRule engineerRule = new DecisionRule("Engineers?", true);
engineerRule.SetChoices("Internal", "External");
engineerRule.AddAction(Actions.SplitStateVariable<MHD.State>("Engineers"));
InitialState.AddRule(engineerRule);
```

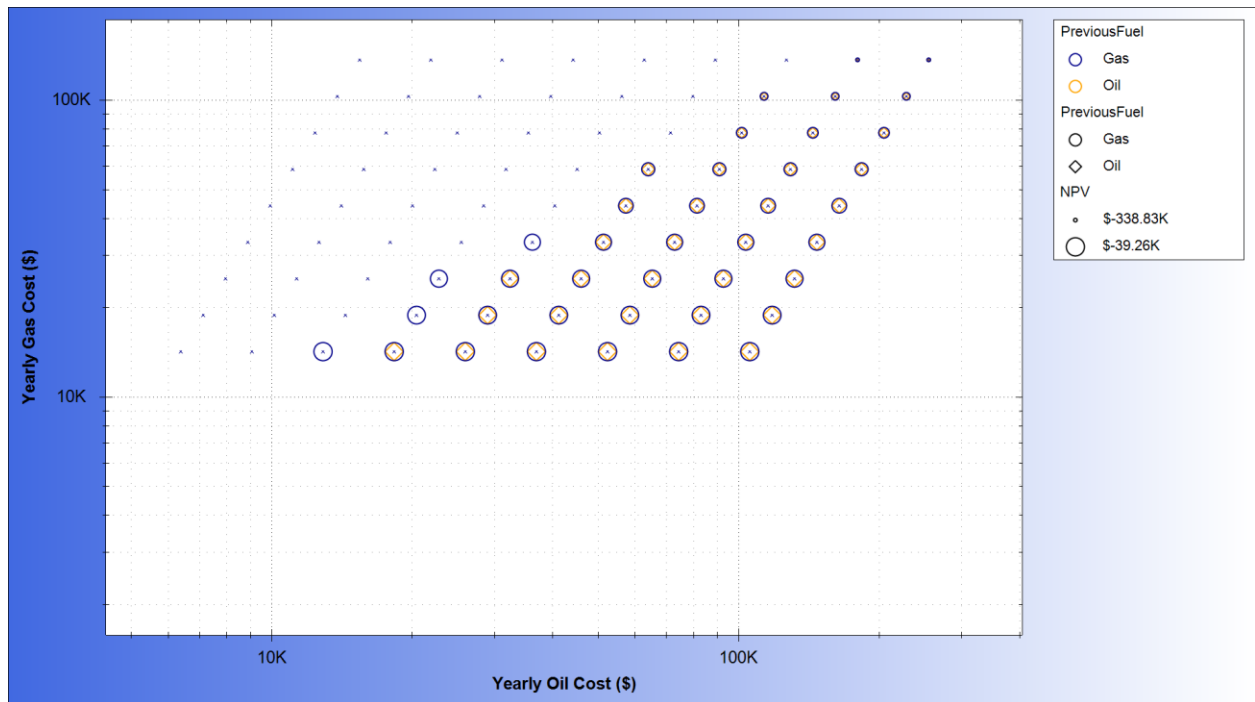
Sample Decision Tree

Below is a sample decision tree that shows decisions (blue), uncertainties (green), deterministic actions (purple), and their outcomes. The optimal path is highlighted and the shareholder value is shown in bold. The probabilities are in percentage terms, as are the discount rates which are labeled following an “@” sign. The dates and duration are also shown.



Sample Strategy

The graph below shows when the optimal strategy is to supply gas to a boiler that can burn either oil or gas. The strategy is determined by the prevailing gas and oil prices and by whether gas or oil is currently being used since there are extra costs associated with switching fuels.



Sample Sensitivity Analysis

Below is a sample “Gradient Analysis” taken from a financial option pricing model. The sensitivity of the current shareholder value to the strike price and initial value is represented in the graph.

