

# Profit Bridge

## Dynamic Non-linear Control and Optimization

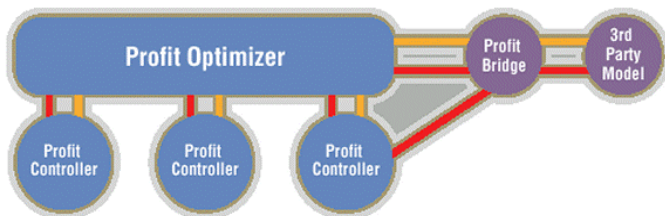


Profit<sup>®</sup> Bridge software provides dynamic non-linear control and optimization capabilities to Honeywell's Profit Controller and Profit Optimizer applications. By updating the linear models embedded in these applications with information from user-supplied, non-linear process models, Profit Bridge represents a high-performance alternative to large-scale, rigorous optimization systems.

Profit Bridge automatically extracts gain information from non-linear models and regularly updates the control and optimization models to reflect this information. The result is improved control and optimization benefits, since varying conditions that affect the optimum, such as changing feeds, economics and environmental factors, can be accounted for automatically.

Benefits include:

- Improved process performance
- Better return on your advanced control and optimization investment



Profit Bridge works in conjunction with Profit Controller and Profit Optimizer.

### Integrated Functionality

Profit Bridge software integrates non-linear process models with Profit Controller and/or Profit Optimizer applications to deliver enhanced control and optimization benefits. Profit Bridge automatically extracts gain information from these models and updates the linear models in Profit Controller and Profit Optimizer with the gain information. This gain updating feature provides superior control and optimization capability since the control and optimization models are constantly updated to reflect the current operating conditions.

Profit Bridge employs existing process models developed for off-line use in process design and analysis, leveraging the investment made to create these models, and ensuring consistent models for both off-line and on-line use. Profit Bridge is not limited to a specific type of process model; it can be easily configured to use models provided by most modeling systems or it can use custom user-written models.

Another advantage of Profit Bridge is that it allows smaller scale models to be used. Rather than modeling the entire process, Profit Bridge allows selective use of non-linear models when and where they are needed. Smaller scale models translate into lower installation and maintenance costs, higher execution speeds and higher service factors, all of which add to the benefits achieved from improved process performance.

## Components

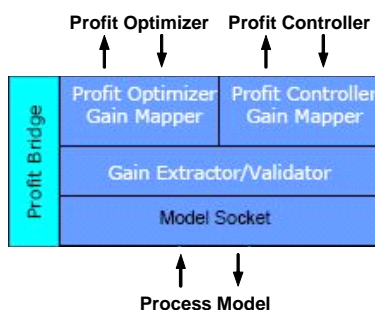
Four main components comprise the Profit Bridge application:

The **Model Socket** serves as the interface between the process model and the other Profit Bridge components. Standard model sockets are designed to work for a particular type of process model (e.g., steady-state simulator, reactor model), while custom model sockets are used for user-written models. A socket for Honeywell's UniSim<sup>®</sup> Design simulation tool is available.

The **Gain Extractor/Validator** automatically perturbs models, calculates gains and validates gains (e.g., max/min values) to ensure that they are reasonable for use in the control and optimization applications. The Gain Extractor/Validator is completely configurable and if desired, will allow models to provide gains directly instead of being calculated by the extractor.

The **Profit Controller Gain Mapper** automatically transfers the gains from the Gain Extractor/Validator to a Profit Controller model. This Gain Mapper also provides a filtering capability where gain changes are transitioned over a period of time. The Gain Mapper can also be used to transfer gains from any Profit Toolkit function to a Profit Controller model.

The **Profit Optimizer Gain Mapper** automatically transfers the gains from the Gain Extractor/Validator to Profit Optimizer bridge models and combined constraints. This Gain Mapper also includes a filtering capability where gain changes are transitioned over a period of time. The Gain Mapper can also be used to transfer gains from any Profit Toolkit function to Profit Optimizer bridge models and combined constraints.



Profit Bridge architecture supports gain updating for Profit Controller and Profit Optimizer.

## Applications

Profit Bridge can be used to achieve enhanced control and optimization benefits in a variety of applications.

### High-purity Distillation Column

In a high-purity distillation column application, Profit Bridge provides updated gains to Profit Controller using either a process model or an empirical model based on plant test data. As a result, control and optimization capability is realized across a wide range of operating modes. When non-linearities occur due to changes in feedstock or changes in product specifications, the gain updating provides improved control and optimization performance and faster transitions between operating modes.

### Fluidized Catalytic Cracker (FCC) Unit

For FCC optimization, Profit Bridge provides updated yields to Profit Controller and optionally Profit Optimizer using an FCC reactor model, enabling the tradeoff between feed and severity optimization to be determined on-line in spite of changing feed conditions. The typical non-linearity encountered in these units is due to overcracking and gain updating and is essential to determine the optimum operating conditions. Downstream units, such as alkylation, can also be included in the scope of optimization to further improve delivered optimization benefits.

### Ethylene Plant

For ethylene plant optimization, Profit Bridge uses a non-linear furnace model to provide updated yields to Profit Controller and Profit Optimizer applications, which in turn determine optimal plant operation. This solution is significantly quicker to install and easier to maintain than a rigorous steady-state optimization approach, with a much higher execution frequency. Profit Bridge enables accurate product yield gains to be calculated, which can vary as much as 200 percent with changing feed composition. Using these updated gains improves the overall control of the plant because control moves are more accurate. This feature is important for ethylene production because of frequent feed changes, the requirement for high-purity products, and the long response times between the front and back end of the plant.

## System Requirements

Profit Bridge off-line configuration software and on-line implementation software run on Honeywell's Application Processing Platform (APP) for Honeywell DCS systems and on Intel-based NT computers for non-Honeywell DCS systems. A Pentium equivalent or higher microprocessor is required to accommodate the computational requirements of this application. Profit Bridge is supported in Profit Suite R205.1 which requires Windows XP or Windows 2003.

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## More Information

For more information on Profit Bridge, visit [www.honeywell.com/ps](http://www.honeywell.com/ps) or contact your Honeywell account manager.

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