

# ModelOp



## Automated Model Validation

# Automated Model Validation

## SOLUTION OVERVIEW

**Background:** As a result of the variety of consumer protection and recession-proof regulatory acts (CCAR, FCRA, FILA, Frank-Dodd Act, etc.), banks and other financial institutions have had to develop very large model validation teams (300-500+ headcount) to ensure that all regulated models are reviewed and audited according to the guidelines set forth in SR7-11 and other publications.

**Challenges:** Banks are under tremendous pressure to reduce their OPEX, and the model validation team is a pure cost center. This is exacerbated by the fact that the number of analytical models being used is growing exponentially--and they are becoming more complex in the advent of AI—thus driving up the annual costs for the model validation teams.

**Solution:** Based on our experience, we've found that a significant number of steps in the model validation process are repetitive and thus it is possible to automate a portion of the validation process for a certain classes of models. Our BPM-driven ModelOp solution is ideal to provide a configurable, business-

logic driven approach to automate the various steps in the model validation process. Our solution does not try to boil the ocean and automate all model validation; rather, we start by automating the 30-40% of the least complex models, which in turn, allows you to optimize your annual OPEX for model validation.

**Proposed Engagement:** we propose to engage in a development partner relationship whereby we will leverage our ModelOp Center solution to automate the validation process for 3-5 models to start. We recommend picking models that are in the lower class of complexity to begin. We will work collaboratively to develop the automated business process flows within our software that is tailored to the specific model validation processes. The end result would be an end-to-end automated process from model submission by the model creators to the final validation review and approval. In addition to the automation of the process, we capture and persist the detailed end-to-end process lineage that can be used for audit inquiries.

## VALUE TO THE CUSTOMER:

An automated model validation approach unlocks the following benefits

### OPEX SAVINGS

Can be upwards of 20-30%, depending on the scope and breadth of the solution enablement

### INCREASE TRACEABILITY

To support audit requests, there will be full traceability of all steps in the model validation process, including reproducibility, testing, verification, etc.

### FRAMEWORK FOR AI SUPPORT

Our solution provides a consistent approach to model management and governance, including initial capabilities to test and govern model interpretability and bias.

## VALIDATION PROCESS CURRENT & TARGET STATE: CURRENT MODEL VALIDATION PROCESS

### Obtain Model Artifacts

- Model documentation
- Data sets
- Model code
- Model test run reports

### Assess Intent & Approach

- Review documentation
- Review stated model purpose
- Review approach
- Review assumptions
- Review selected data sets
- Assess model approach against known theoretical limitations

### Assess Inputs

- Confirm compatibility of (validator) environment, by test a set of provided inputs
- Review data parsing and cleaning approach, especially handling of missing values
- Review approach, rationale, and assumptions for all features
- Assess performance of selected key input parameters
- Benchmark performance of alternative key input parameters

### Re-create Model Independently

- Independently re-create the model inputs
- Independently re-create the model calculations
- Verify the outputs of the independently-created model against the provided model, using test data sets

### Verify Performance

- Choose a metric by which the model will be validated
- Benchmark using in-sample and out-of-sample data against the chosen metric
- Benchmark using alternative models: (a) different model architecture/hyperparameters (b) different model framework

### Generate Documentation

## VALIDATION PROCESS CURRENT & TARGET STATE:

### (AUTOMATED) MODEL VALIDATION PROCESS WITH MODELOP

#### Model developer checks in all required artifacts into ModelOp Center

[pre-req] Data/Ops architecture and security approvals to provide a seamless transfer of data assets from the Creation environment to the Validator's environment.

#### ModelOp Center automates the following (repetitive) tasks and provides the output report to the Validator:

##### Assess Inputs

- Confirm compatibility of (validator) environment, by test a set of provided inputs
- Review data parsing and cleaning approach, especially handling of missing values
- Assess performance of selected key input parameters
- Benchmark performance of alternative key input parameters

##### Re-create Model Independently

- Independently re-create the model inputs
- Independently re-create the model calculations
- Verify the outputs of the independently-created model against the provided model, using test data sets

##### Verify Performance

- Choose a metric by which the model will be validated
- Benchmark using in-sample and out-of-sample data against the chosen metric
- Benchmark using alternative models: (a) different model architecture/hyperparameters (b) different model framework

Generate the base Documentation required for the validator

#### ModelOp Center prompts the Validator to perform their final review and approvals:

##### Assess Intent & Approach

- Review documentation
- Review stated model purpose
- Review reports
- Assess model approach against known theoretical limitations

Once Approved, ModelOp Center sends the documentation and approvals to their central Validation system (varies by bank)

## ABOUT MODELOP

ModelOp puts your models in business by providing the industry's only enterprise-class suite of software and services solely focused on ModelOps. ModelOp was founded in 2016 by industry veterans with deep expertise in data science and large-scale enterprise IT operations. Backed by leading industry luminaries and visionary venture capital, ModelOp has offices in Chicago, IL, San Jose, CA, and Salt Lake City, UT.