



Model Gateway

AUTOMATIC MODELING FOR ONLINE PROCESS

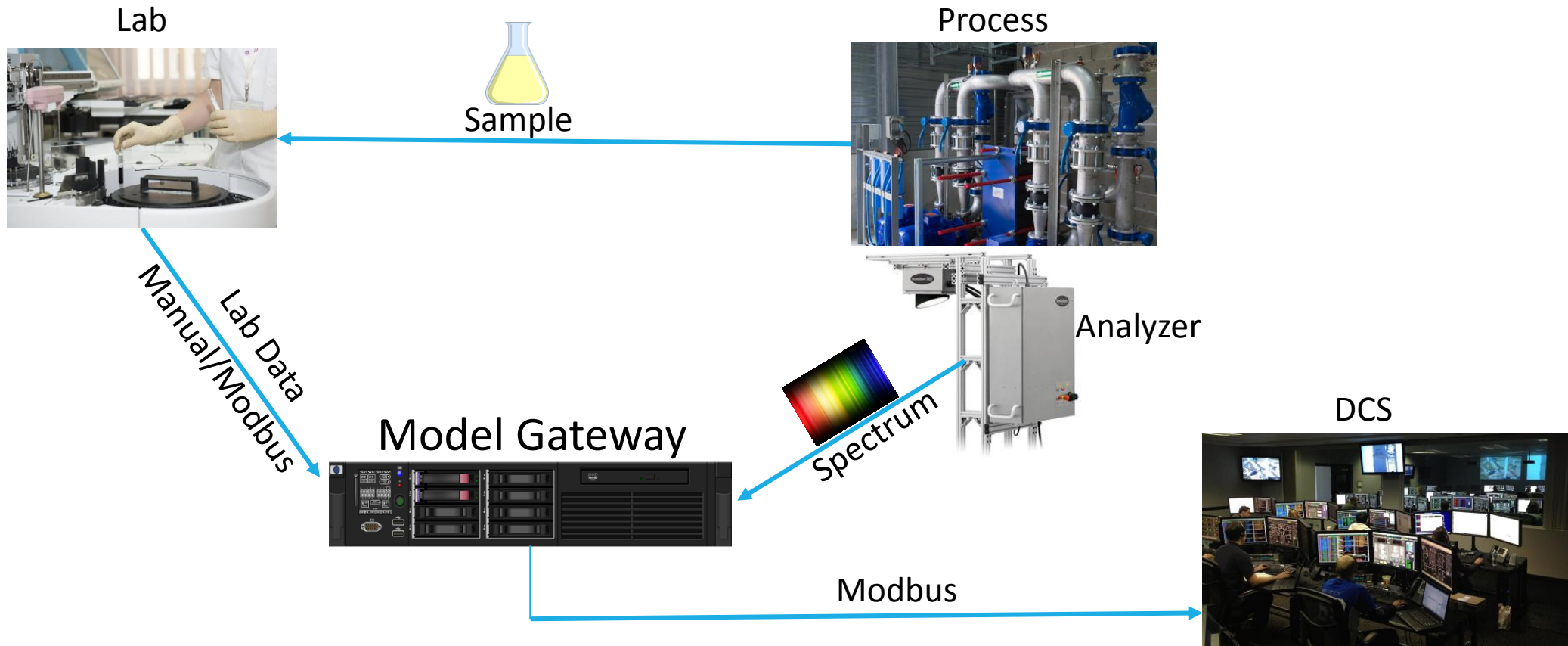
Company Background

- iModel is a startup company
- Experienced software development team
- Algorithm development / AI background
- Experience in the process control industry
- Developed analyzers, protocols and management tools for process environment
- The ModelGateway SW was installed in 8 sites (Refineries / Chemicals) since 9/2015

ModelGateway Software

- Software only solution (Windows XP or higher) with small footprint
- Automatic generation of PLS models
- Support any analyzer
- Integrates with Plant network through modbus protocol
- Supports Thermo Grams / Unscrambler models (used as reference)
- Provides graphic model comparison
- Automatic / Manual feeding of lab data
- Reporting / Alerts / Status indications

System Architecture



System Operation

On Line process

2. Newly acquired spectrum is loaded into the software automatically
3. Spectrum is processed (optionally) and stored in a database.
4. Models are used for predicting the new spectrum properties.
5. The predicted data is archived and sent to the DCS.

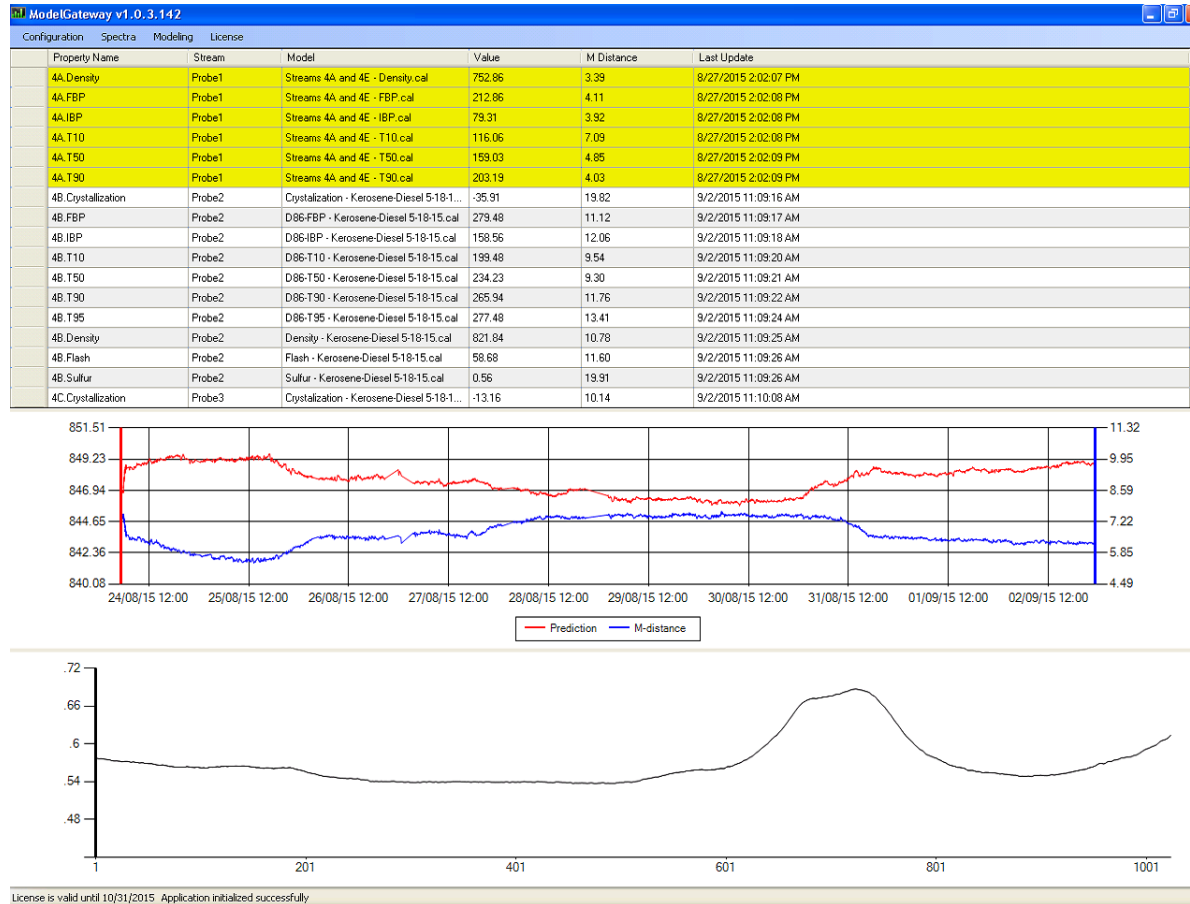
Model Maintenance

1. Lab Data is loaded into the software (manually or automatically).
2. Modeling process automatically builds a new model based on loaded spectra and lab data.
3. New model is evaluated before put into process.
4. The new model is stored for use by the online process.

Advantages

1. No user intervention required
2. Easy model maintenance
4. Fast Response to changes (analyzer/sample/temperature)
5. Over Fitting is improved when model gets more mature
6. Easy comparison between automatic models and reference traditional models (Grams)
7. Similar interface for multiple analyzers

Application Screen



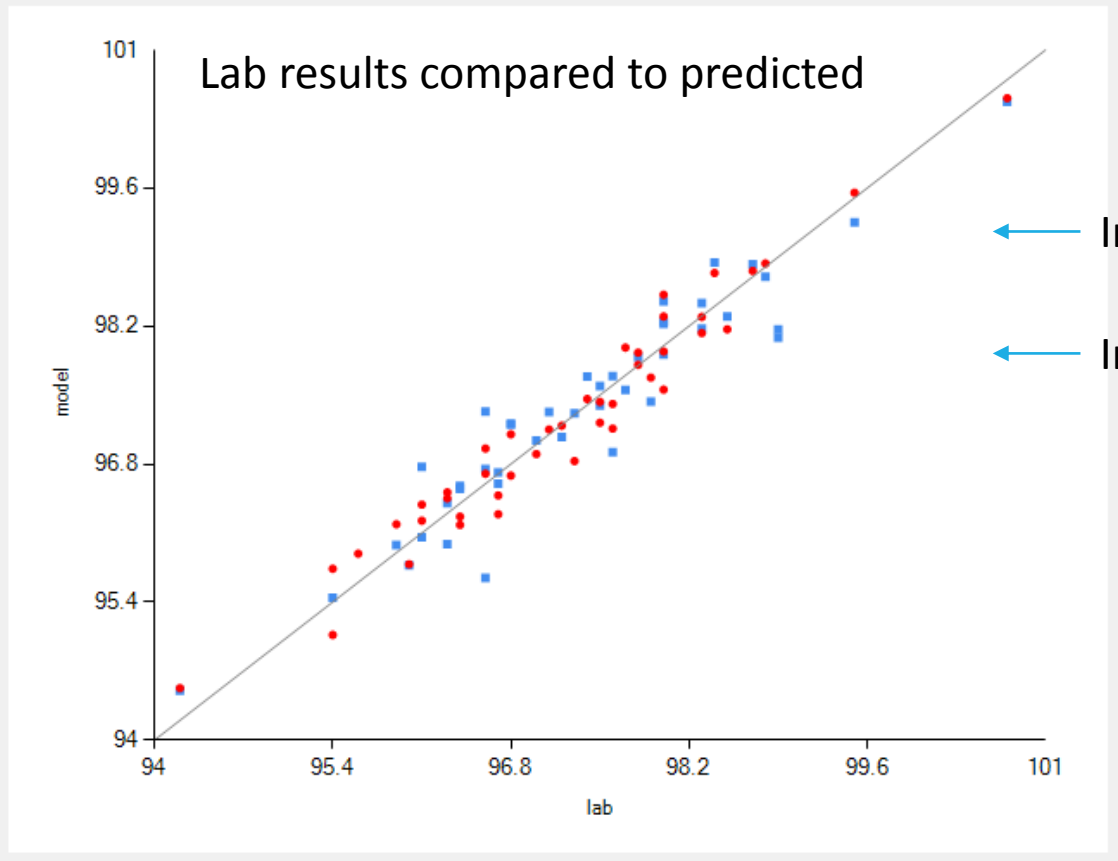
← In yellow – Stream not up to date

← Up to date streams

← Predictions and M-Distance

← Selected spectrum display

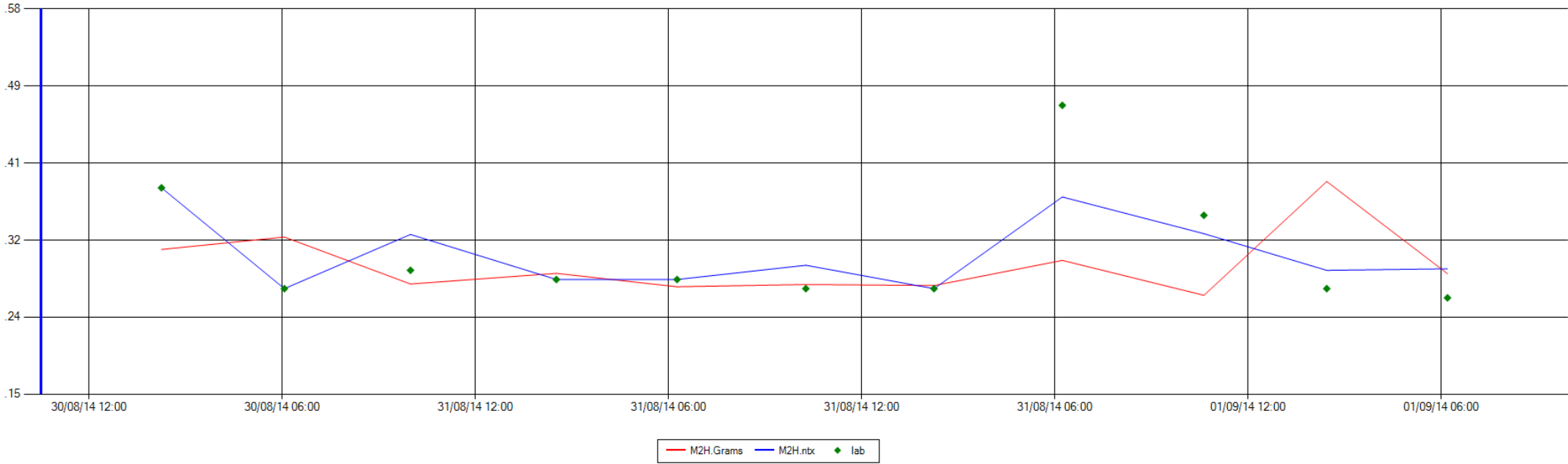
Model Search Algorithm (visual)



← In red – best model found

← In blue – current model being evaluated

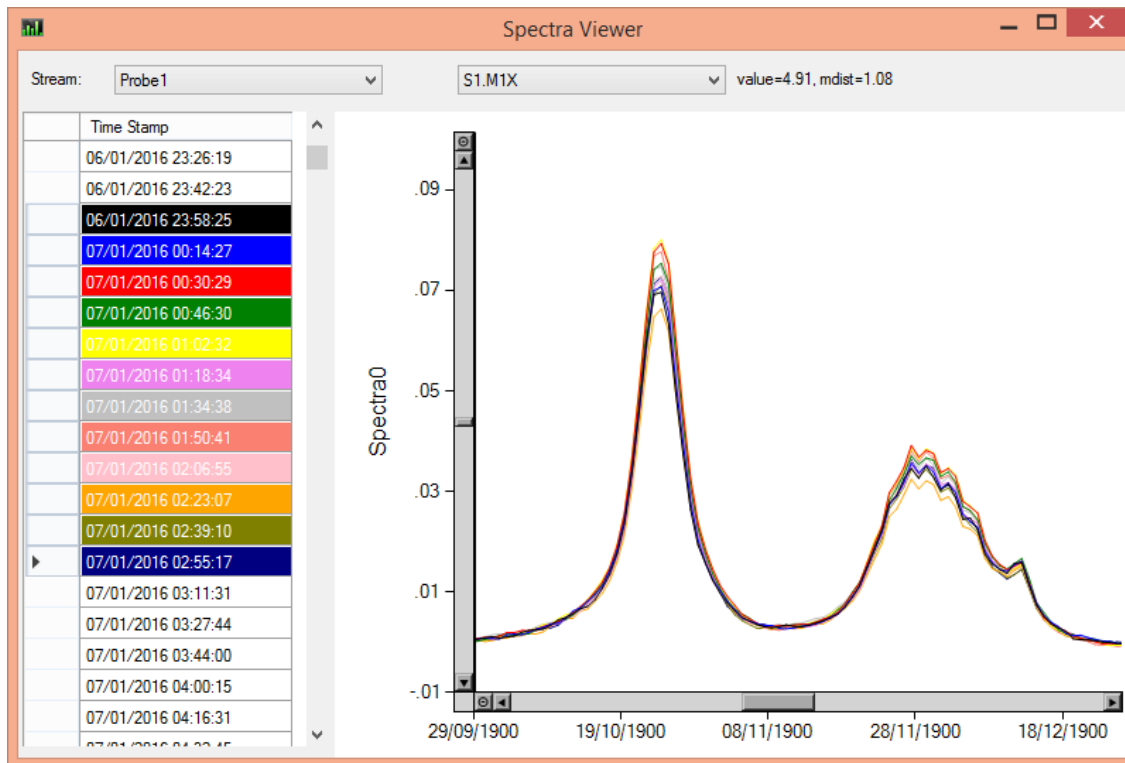
Model Comparison



Red – Grams Model
Blue – Automatic model
Green – Lab Data

Data Display

Spectrum Viewer – spectra comparison



Lab data (Excel Edit)

The Lab Values window displays a table of lab data with columns for Timestamp, S1.M1X, S1.M2X, S1.M3X, S1.M2HX, S1.MHX, and S1.HBOILX. The table has 15 rows of data.

Timestamp (MM/dd/yyyy HH:mm)	S1.M1X	S1.M2X	S1.M3X	S1.M2HX	S1.MHX	S1.HBOILX
12/16/2015 11:24	4.93	39.89	31.32	4.76	9.26	0.06
12/16/2015 19:21	4.64	39.3	31.61	5.04	9.48	0.06
12/17/2015 20:38	3.91	39.24	31.93	5.75	9.17	0.06
12/18/2015 00:50	4.1	39.35	31.93	5.52	10.65	0.05
12/18/2015 10:51	4.33	39.41	31.24	5.04	10.45	0.12
12/18/2015 19:15	4.16	39.4	31.27	5.47	8.91	0.09
12/19/2015 03:36	4.23	39.93	31.67	4.87	8.53	0.1
12/19/2015 10:49	4.46	39.39	31.26	4.76	10.93	0.1
01/09/2016 22:11	1.84	36.78	23.21	12.96	4.71	0.21
01/10/2016 03:52	8.58	44.22	22.27	3.56	10.93	0.05
01/10/2016 12:57	9.2	43.75	21.04	3.82	14.41	0.02

Thank you



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