

# New features in JMP® 16

See the new capabilities and enhancements of our latest release

Data analysis gets easier, yet more powerful, with enhanced data cleanup tools, additions to the modeling toolkit and more in the newest release of the statistical discovery tool of choice for scientists, engineers and other data explorers.

Here is just a selection of the enhancements in JMP 16. For the complete list of new features, visit [jmp.com/release-notes](http://jmp.com/release-notes).

Note: The **PRO** icon indicates features exclusive to JMP Pro 16.

## Key Features

**Action Recording and Enhanced Log Mode** features a new, structured layout with new logging functionality and more actions logged, including capturing most data cleaning operations for easier reproducibility.

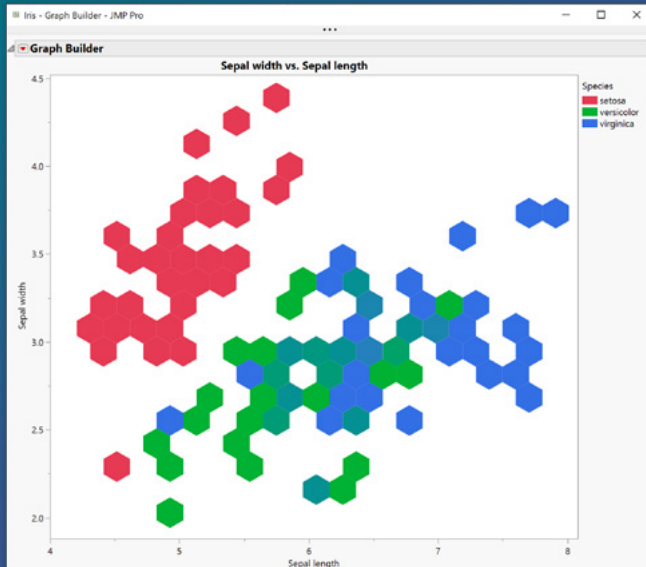
**New Model Screening platform** to run different predictive modeling platforms at the same time to help select the best-performing model. **PRO**

**Text Explorer:** New Sentiment analysis finds phrases in unstructured text using a customizable list of negaters, intensifiers and sentiment words. New Term Selection identifies terms associated with a response. **PRO**

**Control Chart warnings in JMP Live:** JMP Live sends notifications when a process is out of control.

The screenshot illustrates the enhanced log mode and action recorder in JMP 16. The log window at the top lists various actions performed, such as opening data tables, changing column names, selecting cells, and fitting models. The 'Graph Builder' window below shows a scatter plot of 'body mass vs. flipper length' with separate regression lines for 'Female' (red) and 'Male' (blue) penguins. A third window shows the corresponding JMP script code for these actions.

The enhanced log mode and action recorder captures operations performed in JMP to more easily examine and reproduce your analysis workflow.



Graph Builder has a set of new enhancements, including hexagonal binning for instances when hexagons are preferable to rectangles for representing heatmap data.

## Data Import, Data Table, Cleanup, Data Visualization, General

- Improved Compare Data Tables utility features a new user interface that now supports alignment of rows with a key, comparison of columns with different names and display of results as a table of differences.
- Enhanced Make Binning Formula utility allows interactive binning for continuous data.
- New standalone regular expressions column utility features improvements to the regular expressions library, enhanced preview controls, the option to save a configuration to a script and the ability to manually add regular expressions patterns.
- Hexagonal binning is available on Graph Builder heatmaps where both x and y are continuous.
- New unstructured text data filter allows unstructured text columns in the local and global data filters and simplifies finding key words, filtering and subsetting on key words.
- New custom date format configures a date as a string in the data table, Graph Builder, CSV import, filtering and JSL.
- Imported dates are now formatted in JMP as they are in Excel. Exported dates are formatted in Excel as they are in JMP.
- Graph Builder Enhancements:
  - Easy run chart using Row Order flag.
  - Cumulative sum statistic for bars and lines.
  - Enhanced line labeling options through graph legend.
- New ruler tool measures distances between two points on any graph.

- Support for local data filter in most platforms.
- Box plots now include continuous columns for the size role, aggregation statistics and notched box plots.

## Design of Experiments

- New Sample Size Explorer utility for interactively exploring power, sample size and margin of error.
- Improved process for creating supersaturated designs using Bayesian D-Optimal approach.
- Enhanced covariate handling in custom design.
- Auto-solve for power at some threshold p-value.
- Improvements to Limits of Detection Analysis make it easier to perform analyses and specify lower and upper detection limits for one or more responses in the Custom Designer. **PRO**

## Statistics, Predictive Modeling and Data Mining

- New Model Screening platform runs different predictive modeling platforms simultaneously to select the best-performing model. **PRO**
- Sentiment Analysis in Text Explorer finds sentiment phrases in unstructured text using a customizable list of negaters, intensifiers and sentiment words. **PRO**
- Term Selection in Text Explorer finds terms associated with a response. **PRO**
- New Extrapolation Control prevents extrapolating too far outside the range of the original data when exploring predictions in the profiler or performing optimization.
- Support for regression and automated tuning of hyperparameters in the Support Vector Machine (SVM) platform. **PRO**
- Structural Equation Modeling enhancements: **PRO**
  - New measures and visualizations for assessing measurement models.
  - Model shortcuts for easily specifying common models, including Confirmatory Factor Analysis, Mediation Analysis, and Latent Growth Curve Models.
  - Interactive Model Comparison table to compare nested models.
- New Fit Curve DOE (CDOE) analysis uses Generalized Regression in the Fit Curve platform to predict the response curve for combinations of supplementary variables not necessarily observed in a sample.
- New FDR Adjusted PValues categorical option adds columns to report tables that have p-values showing the False-Discovery-Rate-Adjusted PValues (Benjamini-Hochberg) to avoid tests being significant by random chance alone when running many tests.
- Animation profilers show a tour of how profiles change as each factor is changed.

- Enhanced Time Series Forecast platform allows forecasting of multiple time series, including utilities to manage models and a new Box-Cox transformation plot.
  - Fit up to 30 different exponential smoothing models and automatically select the best fitting model.
  - Use built-in workflow to create a holdout set for model validation.
- Improvements to the Time Series platform include validation support, addition of State Space Smoothing models and support for Box-Cox transformation.
- Updated Oneway analysis launches Fit Model to show correct analysis when blocks are unbalanced.
- Equivalence tests now allow unequal variances.
- The Profiler recognizes the disallowed combinations constraint script in the data table created in DOE and can perform optimization subject to the disallowed combination constraint.
- Improvements to Explore Outliers platform include:
  - Updated K-NN with more detail on the largest outliers.
  - New Robust PCA replaces Multivariate Robust Outliers and provides a solid multivariate method that respects the multivariate structure of the data and allows missing values.
- New Target Level column property specifies the positive level (high level is the default).
- Enhanced Response Screening supports local data filter and column switcher.
- Functional Data Explorer Updates: New Functional PCA diagnostics present a clear view of how the number of selected FPC scores impacts the resulting predictions. **PRO**

## Quality Engineering and Reliability

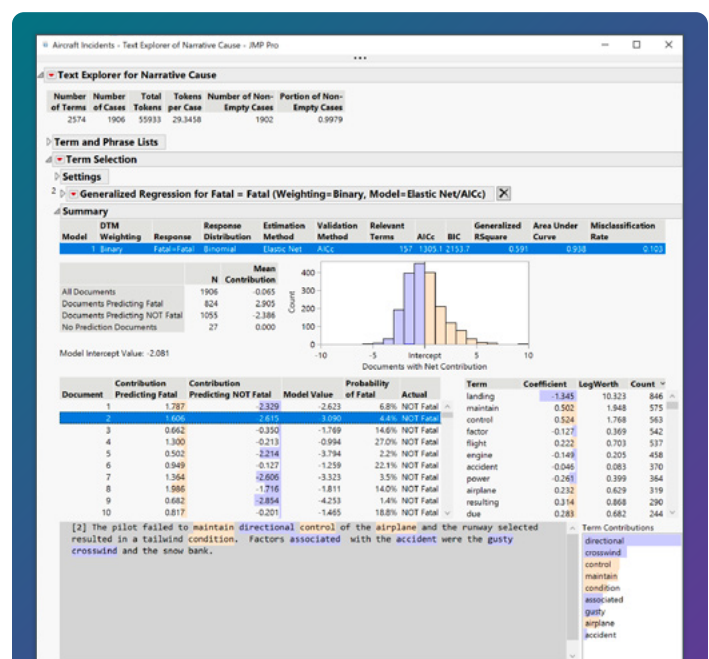
- Updated EWMA platform features enhanced interactivity and functionality with three default charts - EWMA with limits, Individuals chart with MR limits and Residuals chart.
- Enhancements to Control Chart Builder, including the ability to run Western Electric Tests on control charts with one-sided limits. Note: Show Excluded Region and Test Excluded Subgroups should default to Off.
- Improvements to the Reliability Block Diagram include new "Generate Algebraic Expression Data Table," in which each component is corresponding to a column and the last column is the system reliability algebraic expression as a JSL expression taking component columns as arguments.
- The Fit Life Distribution platform now reports median rank regression (MRR) Weibull parameter estimates when there are no censored observations.
- Measurement Systems Analysis (MSA) Designs generates a full factorial (fully crossed) design for an MSA test and provides diagnostic measures for evaluation. Accessible in DOE > Special Purpose.
- Updated user interface for OC Curves (available in Analyze > Quality and Process).

## Automation and Scripting

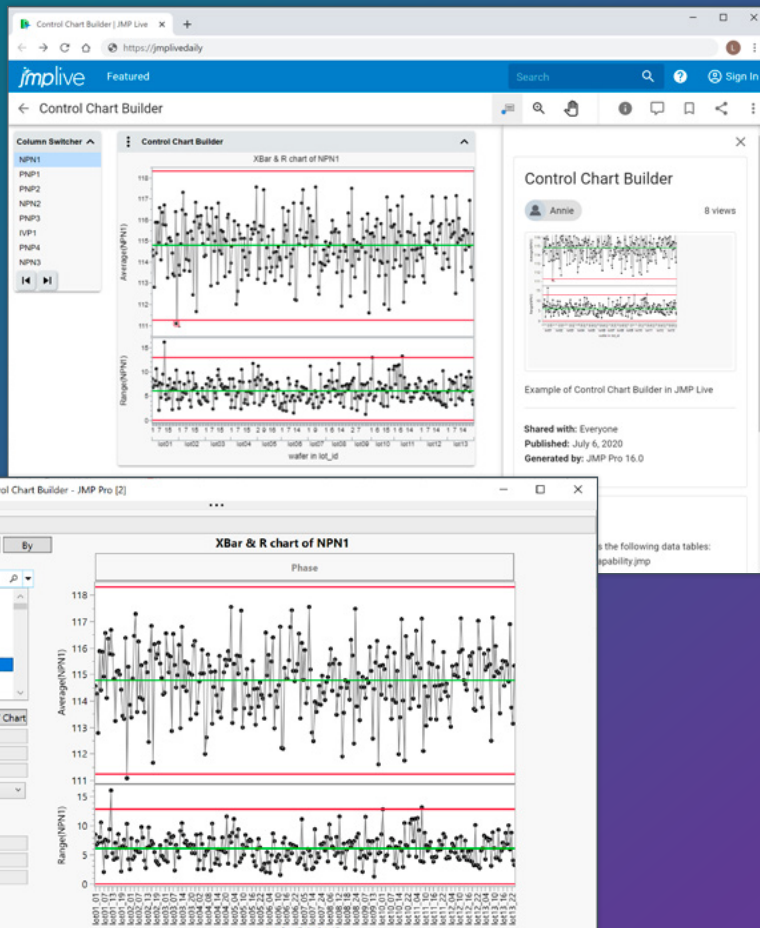
- Enhanced log mode with action recording, features a new, structured layout with new logging functionality and more actions logged, including capturing most data cleaning operations for easier reproducibility.
- New JSL functions for container-based loops provide ways to easily loop over, transform and filter a container or containers.
- JSL support for running a script after a column switch.
- Multiplatform column switcher.
- The display box JSL message <<Set Auto Stretching (x, y) is now the message <<Set Stretch (x, y), where x and y can be one of "Neutral" "Off" "Fill" or "Window."
- Note: Complete list of JSL changes available from Help > New Features.

## Data Sharing

- Projects enhancements include the ability to save JMP files and reports directly to the project file for a single, self-contained file (.jmpproj) that can be distributed, backed up or archived.
- JMP journals now feature getting started tips, a toolbar for adding new content easily, a new script box object to edit and submit JSL from within the journal and options to insert content into a specific location more easily.
- Graphs in Interactive HTML and JMP Live now support zooming and panning.
- Column switcher is now available in Dashboard Builder, allowing all platforms that depend on the same data table to switch together when running the dashboard.
- Profilers within the Functional Data Explorer platform (FDOC and FPC) are now interactive when exporting to interactive HTML or publishing to JMP Live.



Text Explorer's new term selection enables data-derived sentiment analysis of unstructured data.



JMP Live sends email notifications to specific users when control chart posts indicate out-of-spec conditions.

## JMP Live

JMP Live takes the robust statistics and visualizations in JMP and extends them to the web, privately and securely. See [jmp.com/live](https://jmp.com/live).

- **New Control Chart Warnings** notify subscribers when charts show conditions outside of predetermined specifications.
- **New Manage Connections** tool defines and names connections in one-time set up.
- **Automatic page refresh** when new information is available.
- **Enhanced JSL interface** supports name-based connections, changes to attributes on individual reports, updates to data on an existing post, empty folder creation, report and folder deletion and search for posts, folders and reports.
- **New data management options** allow updates to an individual child post and updates to data on an existing post without republishing the original post. Note: Permissions control who can update data.

## ONLINE RESOURCES

### Get the details

See a comprehensive list of new features for JMP 16 and JMP Pro 16.

[jmp.com/release-notes](https://jmp.com/release-notes)

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