Release notes v4.5

Important! .DSET files saved in the new version can't be opened in earlier versions of EasyMorph. Read "Breaking changes" below for more details.

Important! Create a backup copy of your projects and connector repositories before updating to the new version. Projects saved in version 4.5 can't be opened in earlier versions.

A few words from the creators of EasyMorph

Version 4.5 is intended to make EasyMorph a better tool for advanced users who already have extensive experience of working with EasyMorph or similar tools. The most prominent novelties in this release:

- Module overview diagrams. The lack of a high-level workflow overview was sometimes mentioned by users that switched to EasyMorph from more traditional ETL tools. Version 4.5 addresses this concern and introduces module overview diagrams in EasyMorph Desktop that provide a bird's eye view on the workflow of a module.
- EasyMorph Server spaces can now work under different Windows accounts. The ability to use multiple accounts for running tasks and accessing files greatly improves security and makes EasyMorph Server suitable for enterprise-wide deployments. The new process architecture also allows graceful termination of "misbehaving" (e.g. non-responsive or memory-holding) tasks without restarting the Server service.
- New parameter types: fixed list and checkbox. Together with optional parameter labels (another new feature) they improve user experience. New advanced parameters types (more of them will be introduced later) and parameter labels signify the start of evolution of EasyMorph parameters from simple key-value definitions towards more functional data entry forms.
- The new "Repeat" action enables new types of workflows in EasyMorph – the "DO…WHILE/UNTIL" loops, i.e. loops in which the number of iterations is not known ahead of time and depends on a condition. In addition to that, the action enables recursive calculations and allows dealing with parent-child data structures.
- The "Bulk export to database" action performs fast export of millions of records into a database. With a large dataset it can export data 10-100 times faster than the "Export to database" action. As of its introduction in v4.5 the action only works with MS SQL Server. Support for a few more database types will be added in future versions.

Besides that, we've made the supercompression permanent and increased the row limit for in-memory datasets up to 536 million rows. Together with the significant calculation speedup achieved over the last 12 months, it allows EasyMorph to handle order of magnitude larger volumes of data which makes it better suited for enterprise-grade tasks.

Overall, the new release is a major step in laying the foundation for version 5 which is the next generation of EasyMorph, and the new products that will be built on top of it.

Breaking changes

Upgraded .DSET format

The native .DSET format has been upgraded in order to support the increased row limit for in-memory datasets in EasyMorph (now 536 million rows). The upgrade is a breaking change. Therefore .DSET files saved in the new version can't be opened in older versions. However, the new version can open .DSET files created in earlier versions without any problems.

Tableau users should choose to install the updated version of the Tableau Plug-in during installation of version 4.5 (both Desktop and Server). The old version of the plug-in doesn't work with the updated DSET format and won't work with the new version.

What's new

Tabs are now table groups

Tabs in EasyMorph projects have received semantic meaning and are now called *table groups*, or simply *groups*. The module overview diagram described later in the document shows dependencies between groups as well as between tables in groups.

Groups are an important concept in EasyMorph. They provide a high-level structure to workflows and represent logical phases (stages) of a workflow. We've recently added a new tutorial article that explains groups: [Table groups](#).

Besides having a role in overview diagrams, groups will be the basis for a new workflow failover mechanism to be introduced in one of the future versions of EasyMorph.

Parameter labels

Parameters now have optional labels that are intended to make parameters friendlier to the end users. When specified, labels replace parameter names in prompts for parameters in Desktop, Launcher, and Server. For instance, parameter "Date" can have label "Please provide the start date" that will be displayed instead of the parameter name when the parameter's value needs to be entered.

Parameter labels are only used in the user interface. In expressions and actions, parameters are still referenced only by name.

New parameter type: Fixed list

The parameter type "Fixed list" allows specifying a value from a fixed list of up to 200 pre-defined values. In the user interface, the parameter is shown as a droplist (a.k.a. combo box).

The pre-defined values can also have optional labels that are shown in the user interface instead of parameter values. In actions and calculations the respective parameter value will be used.

New parameter type: Checkbox

A parameter of type "Checkbox" is shown in the user interface as a checkbox. It can have only two states: checked and unchecked. Depending on parameter settings the state corresponds to text values "Y" and "N", or numbers 1 and 0, or the Boolean values TRUE and FALSE.

New actions

The **Repeat** action allows arranging the DO…WHILE and DO…UNTIL types of loops. It repeatedly calls a module until / while its result table is not empty. The action can be used in various cases, for instance:

- Obtaining data from REST APIs with data pagination (see example)
- Polling a web API until an external task is complete
- Waiting until a file appears in a folder
- Dealing with parent-child data structures (see example)
- Repeatedly apply the same calculation to a dataset until it no longer changes

If the called module contains the "Input" action, on the 1st iteration it's populated with the input dataset of the "Repeat" action that calls it. In consequent iterations it's populated with the result dataset from the previous iteration. In other words, the result of previous iteration is automatically passed as input to the next iteration. See "Advanced topics" in the tutorial article "Iterations (loops)".

The **Bulk export to database** action performs fast export into a database table using the native bulk load capabilities of the target database. The action is intended for exporting large volumes of data (e.g. millions of rows). In version 4.5 only MS SQL Server is supported. More database types will be supported in future versions of EasyMorph.

The **Halt on data type mismatch** action stops project execution if selected columns contain values of an unacceptable data type. The action can be used, for instance, to ensure correct data types before exporting to an external system, or to validate data quality of an input dataset.

Changes to existing actions

The **Send email** action can now insert a basic HTML table produced from the action's input dataset right in the message body. This makes is very easy to send out, for instance, daily emails with small tables containing KPIs. The feature is only available in the HTML mode.

The **Export to database table** action now can export data by batches of 10'000 rows. Note that some databases may have a limitation for SQL query size and therefore using very large batches may cause a database error.

New functions

tounixtime(number_date) – converts a date into a Unix timestamp. Examples:

`tounixtime(#2020-09-28)` returns 1601251200.

New connector: Exchange Online

Configuring a connection to MS Exchange Online is now easier thanks to the new email connector "Exchange Online". The connector also supports the OAuth2 authentication method not currently available in the generic email connector.
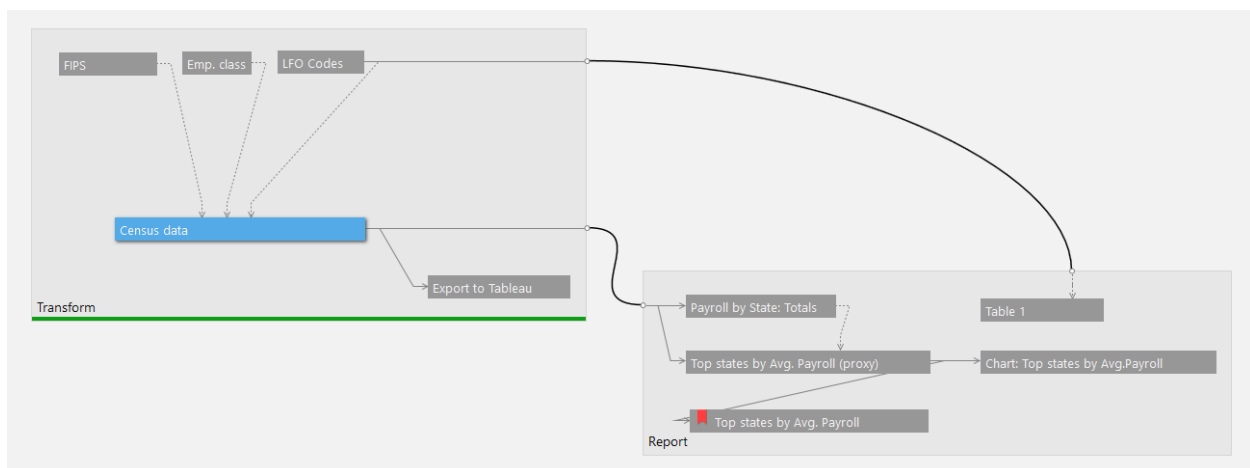
Changes to existing connectors

The native connector to PostgreSQL now supports Windows authentication.

What's new in Desktop/Launcher

Module overview diagram

The EasyMorph Desktop's ribbon menu now has a new tab named "Diagram". It displays an overview diagram for the current module.
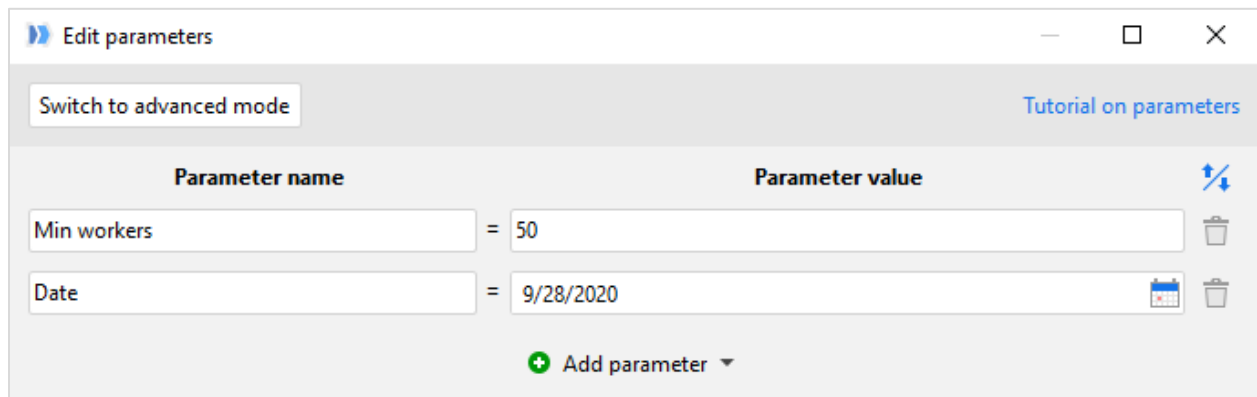
Screenshot 3: Module overview diagram.

The diagram shows the module groups, table in the groups, and the dependencies between them. Users can perform the following actions in the overview:

- Open group/table in the regular tabbed view
- Open a table in the analysis (maximized) view
- Rename a group or table
- Create a new group
- Derive tables
- Move table(s) into another group
- Annotate a group
- Delete a group or table

Simple mode of Parameter Editor

As parameters in EasyMorph have become more advanced in terms of features and capabilities, it became clear that the complexity of parameter settings can be confusing for new users. Therefore, in the new version we've added a simple mode for the Parameter Editor which is default for new EasyMorph installations.

The simple mode is very similar to what the Parameter Editor was prior to version 4. Note that advanced parameter types such as "Fixed list" and "Checkbox" are read-only in the simple mode.

Miscellaneous in Desktop

- New keyboard shortcut *Ctrl+Shift+B* sends the output of the currently selected action into a sandbox in a newly created group (tab).
- Tabs (groups) can now be annotated. A tab (group) annotation is shown when a tab name is hovered.
- The new expression syntax is now ON by default for new projects.
- The "Open from Server" dialog has been redesigned for better usability.
- The rich tooltips for actions now explain action states (such as skipped action).
- The sidebar with parameters has been redesigned to support new parameter types and features, also for better usability.
- Launcher: the task parameter tab has been redesigned to accommodate the new parameter types.
- Launcher: special icon for the "Run" button for tasks that prompt for parameters on start.
- Both EasyMorph Desktop and Launcher now require .NET Framework 4.7.2 or higher.

What's new in Server

Important! This version introduces significant changes in the Server's architecture. While it was thoroughly tested, it is still recommended to make a side installation of v4.5 and test it with your

projects before updating your current production environment to the new version. To help with the update, free 30-days license keys for tests and evaluation are provided. To request a 30-day key please send your test Server installation signature to support@easymorph.com.

Use of individual Windows accounts for spaces

EasyMorph Server (only in the Enterprise edition) now allows designating a Windows account to a space. When a Windows account is designated to a space, everything that happens in that space (task execution, file access, etc.) happens under that account.

The new tab "Accounts" in EasyMorph server is intended for configuring Windows accounts for further use in spaces, displaying the current account status, and recycling/deleting accounts.

Recycling provides a graceful and safe way to forcefully terminate tasks that "misbehave" (e.g. freeze, or lock memory up) as well as delete/reconfigure accounts without restarting the Server service.

| Tasks | Files | Pages | Log | Settings | Spaces | Accounts | Mail |

New account

Accounts that can be used to run tasks in spaces.

Account	Status	PID	Jobs	RAM	CPU	Spaces	Mapped drives		
Default	In use	20540	2	258.2 MB	35 %	3	M, Z		
test	Starting	7008		11.4 MB	17 %	1	-		🗑
CORP/dbreadonly	Idle	49356		37.3 MB	0 %	1	-	♻	🗑
CORP/marketing	Idle	29088		40.0 MB	0 %	2	-	♻	🗑

Accounts that have been detached and will be shut down when tasks finish running.

Account	Status	PID	Jobs	RAM	CPU
test	In use	7864	1	65.4 MB	9 %

Screenshot 5: List of accounts in EasyMorph Server.

For more details about configuring and using accounts in EasyMorph Server please consult the respective section of the "EasyMorph Server Administration Guide" that comes with the Server installer.

Miscellaneous in Server

- Task parameters are moved into a separate tab "Parameters"
- Network drive mapping has moved to the account settings, tab "Mapped drives"
- Special icon for the "Run" button for tasks that prompt for parameters on start

Previous release notes

Link: [Release notes for v4.4.1](#).