Release Notes

Tecplot 360 EX 2019 R1

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Bellevue, WA
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Additional Resources

In addition to these Release Notes and HTML Help, Tecplot 360 includes access to these manuals to help you explore all of Tecplot 360's functionality.

- Getting Started Manual Your introduction to Tecplot 360 EX includes a tutorial that will help you learn your way around the product.
- User's Manual This manual provides a complete description of working with Tecplot 360 EX features.
- Scripting Guide This guide provides macro command syntax and information on working with macro files and commands.
- Quick Reference Guide This guide provides syntax for zone header files, macro variables, keyboard shortcuts, and more.
- Data Format Guide This guide provides information on outputting simulator data to Tecplot file format.
- Installation Guide These instructions give a detailed description of how to install Tecplot 360 on your machine.

My Tecplot

My Tecplot is Tecplot's one-stop portal that allows you to download software, manage your license keys, and more. Visit it at https://my.tecplot.com/.

Welcome to Tecplot 360 EX 2019 R1

Tecplot 360 2019 R1 is largely focused on PyTecplot and loader improvements but that doesn't mean there isn't something for everyone in this release. Read on to see what's new.

If you don't see the improvement or bug fix you wanted, let us know what's missing by contacting us at support@tecplot.com.

What's New In Tecplot 360 EX 2019 R1

Highlights of Tecplot 360 EX 2019 R1

- **PyTecplot 1.0**
  - Backward compatibility will be guaranteed for all documented APIs.
  - APIs have been added for Frame Linking and Value Blanking. These APIs are also recorded when recording PyTecplot scripts.
- **OpenFOAM loader**
  - Up to 40% faster load times
  - No longer loads procBoundary zones.
  - Eliminated duplicate cells on the volume boundaries.
- **New TELEMAC Loader.** See http://www.opentelemac.org/.
- **ABAQUS loader.** Now supports 2019 odb files.
- **TecIO-MPI write speed improved** by ~15x via output file caching and reducing data exchanges**.**
- **Extracting slices over time more tightly integrated.** The *Data* > *Extract* > *Extract Slices Over Time...* menu option has been removed. Please use *Data* > *Extract* >

Extract Slices... or the *Extract Slices...* button on the *Slice Details* dialog.

- **Saving a layout after extracting primary slices** no longer forces saving the data.
- **Getting Started Guide** now includes more sections for working with CONVERGE (internal combustion engines) and FVCOM (ocean simulations) data.
- **Reprise License Manager (RLM)** updated to 12.4.

Bug Fixes and Enhancements

- FEA loaders now support Unicode characters in the file path.
- New macro preprocessor directives allow macros to skip over newer instructions based on Tecplot revision for future backward compatibility.
- Fluent Additional Quantities are loaded by default when using Advanced Options.
- Fixed invalid connectivity producing an error when polyhedral slices were coincident with cell faces.
- Fixed crash when saving a multi-dataset layout with the IJK Blanking dialog open.
- Contour levels listed in the Contour Details dialog now correctly displays lists for zero-contour-level-groups.
- Added --help command line option.
- ROMS loader updated to read data for type double.

What's New In Tecplot 360 EX 2018 R2

For Geoscientists

- **New FVCOM loader.** FVCOM is a popular ocean model used around the word. Our FVCOM loader is fast and memory efficient.
- **ROMS, WRF, Telemac loaders.** Loaders for these popular models didn't quite make the cut for this release. They will be available upon request. Contact

support@tecplot.com to gain access to loaders for these models.

- **Sequential - Viridis & cmocean colormaps.** Which colormap you use to represent your data makes a difference. Sequential – Viridis is the new default. Also, check out the new cmocean colormaps copyright (c) 2015 Kristen M. Thyng. For more details on the cmocean colormaps visit https://github.com/matplotlib/cmocean.
- **Georeferenced images may now be imported into Tecplot 360.** Georeferenced images can provide important context when viewing geographic model results and work with both 3D and 2D plot types. See the video here https://www.tecplot.com/2018/10/17/georeferenced-images-in-tecplot-360/.
- **Shapefile converter.** While it's not part of the installation, we've recently developed a PyTecplot script which converts shapefiles to Tecplot binary PLT files. Like georeferenced images, shapefiles can provide important context when looking at your model results. See the video here https://www.tecplot.com/2018/10/17/converting-shapefiles-to-plt-using-pytecplot/ and download the script here: https://github.com/Tecplot/handyscripts/blob/master/python/dataconversion/shapefile_to_plt.py.
- **Handy PyTecplot scripts.** PyTecplot makes the slow things fast and the hard things possible. In conjunction with this release, we've developed a few PyTecplot scripts to help analyze your data. Check out our new GitHub page for some scripts that will help automate your workflows and perform advanced analysis. Here are just a few:
  - *TimeAverage.py* – Computes a time average of your transient data. See the video here: https://www.tecplot.com/2018/10/17/calculating-average-over-time/.

- *VerticalTransect.py* – Computes a vertical transect (curved slice) from a set of defined XY point locations (requires a 'siglev' variable which exists in FVCOM data). See the video here: https://www.tecplot.com/2018/10/17/vertical-transect/.
- *VerticalProfile.py* – Extracts a vertical line through time and plots the results in a new frame. This is useful if you want to view well data or understand what is happening in a water column.
- *ImagetoPLT.py* – Creates an IJ ordered zone from an image file. To view the results you'll have to use RGB coloring and ensure the RGB color range is from 0-255. This script can be useful if you have an image you want to drape over a topography – draping will require interpolation of Z values to the image. This script works with georeferenced images by looking for a paired world file.

New Colormaps (and a new Default)!

We've added 19 new colormaps to the selection in Tecplot 360, including using *Sequential – Viridis* by default. Over the past decade, research has revealed many negative aspects of the *Rainbow*. That same research has offered better colormaps which are perceptually linear or diverging. This change of default may affect the result of scripts. If you really need *Small Rainbow* back you can change the default by adding the following lines (for example) to your tecplot.cfg file:

```
$!GlobalContour 1 ColorMapName = 'Small Rainbow'
$!GlobalContour 2 ColorMapName = 'Large Rainbow'
$!GlobalContour 3 ColorMapName = 'Diverging - Blue/Red'
$!GlobalContour 4 ColorMapName = 'Small Rainbow'
$!GlobalContour 5 ColorMapName = 'Small Rainbow'
$!GlobalContour 6 ColorMapName = 'Small Rainbow'
$!GlobalContour 7 ColorMapName = 'Small Rainbow'
$!GlobalContour 8 ColorMapName = 'Small Rainbow'
```

If you have your own custom colormap that you always want available, just drop a *.map file in the new 'colormaps' directory in the installation.

Loader Updates

- **New FVCOM loader.** FVCOM is a popular ocean model used around the word. Our FVCOM loader is fast and memory efficient.
- **ROMS, WRF, Telemac loaders.** Loaders for these popular models didn't quite make the cut for this release. They will be available upon request. Contact support@tecplot.com to gain access to loaders for these models.
- **Excel Add-In** now includes the filename in Zone Auxiliary Data of each created zone, so you can more easily identify from which file the zone originated.
- **CONVERGE Output file loader** – CONVERGE users can now load the cell averaged output files (not the post*.out files) in a single step with this new loader. This loader is also available in Tecplot for CONVERGE .

Multiselect & Context Menus

Tecplot 360 now allows you to group select multiple items, such as text and geometries. We've also added brand new context menus for text and geometry objects. Give it a shot by right-clicking when you have a piece of text selected.

PyTecplot

PyTecplot is faster! We've made significant improvements in the speed of PyTecplot. Running in connected mode will typically be 3-5x faster. We've also cut time it takes to `import` so your script will begin execution sooner.

Handy PyTecplot scripts. PyTecplot makes the slow things fast and the hard things possible. In conjunction with this release, we've developed a few PyTecplot scripts to help

analyze your data. Check out our new GitHub page for some scripts that will help automate your workflows and perform advanced analysis.

Platform Support Updates

We've updated our supported operating systems and plan to drop Windows 8.1 in 2019. Please refer to the install guide for complete details.

Bug Fixes

- Fixed loading of large poly or mixed element files with Ensight loader.
- Corrected Fluent loaders reading of wall shear variables which were off by -1.
- Updated vectors to ignore parent volume vector values if surface values are valid.
- Updated WMF export to use polygons which render more precisely in Microsoft Office products.
- Fixed crash when using the macro debugger to record a PyTecplot scripts.
- Fixed crash when double clicking on certain parts of the Quick Macro Panel.
- Fixed crash with SZL data when slicing across multiple zones where the slice variable is nodal in one and cell-centered in the other.
- Enabled the ability to exclude Custom Labels when writing a dataset.
- Configuration file now obeys $!DefaultText assignments.
- Updated web license key URL in the Install License File dialog to point to new My Tecplot portal.
- Corrected Mass Flow Rate calculation for polygon slices.
- Fixed crash with polyhedral slices and isosurfaces.
- Improved performance of extracting a polyline from SZL data.
- Altering grid variables now updates face normals.
- Isosurface dialog now allows values larger than 2147480000.
- Switching image clipping in 2D updates the plot immediately.
- Fixed race condition when creating Tecplot's initial

temporary directory.

- Allowed layouts to contain zero contour levels.
- SZL Server is now able to handle file trees with permission errors.
- License expiration display is always available to the user.

Bug Fixes & Enhancements in 2018.2.1

- Added option to export animations to a series of individual images.
- Updated MPEG-4 to support high resolution exporting, loading into HTML5 websites and Windows Media Player.
- Fixed crash on Mac when exporting long or high supersample animations.
- Export region default changed to All Frames.
- Added Animation Speed parameter back to WMV export.
- Improved rotational rendering performance when exceeding limits in graphics hardware.
- Fixed crash loading Fluent files with zone names longer than 128 characters.
- TecUtilServer now gives error if attempted to run in batch mode.

Pytecplot Updates in 2018.2.1

- Released with PyTecplot 0.12.0.
- Transient animation export.
- Frame by frame animation export.
- Fetching zones and variables by name is now much faster for large datasets.
- Fixed recording of PyTecplot copy/paste frame.
- Added ability for PyTecplot to subsequently acquire a license if the first attempt failed due to contention.
- Dataset.copy_zones() now copies all zones by default.

TecPLUS Subscriptions

As of January 1, 2017, TecPLUS replaces Tecplot's Software Maintenance Service (SMS). With TecPLUS, you get all the benefits of SMS, including:

- No-charge upgrades to Tecplot 360 EX during your subscription period
- Unlimited technical support
- One free hour of online training per year

Additionally, an active TecPLUS subscription gives you access to the following components, boosting your Tecplot 360 EX license to a whole new level of value:

- Tecplot Chorus

  Our simulation analytics product for engineers who work with large numbers of cases. Previously, Chorus included Tecplot 360 EX to view individual cases' data files; we've flipped that, and now offer every Tecplot 360 EX user access to this powerful tool.

- PyTecplot

  Tecplot and the Python programming language reunite! PyTecplot works with your system's installed Python and with popular Python tools like NumPy,

SciPy, and Jupyter. PyTecplot features an easy-to-use object-oriented approach to working with your data and plots using the engine that powers Tecplot 360 EX.

- Tecplot SZL Server

  When your data is too big to move around comfortably, you can install this lightweight server on most Linux hosts to quickly and securely access your remote data.

Your basic Tecplot 360 EX license is perpetual: even if your TecPLUS subscription expires, you will still be licensed to run any version of Tecplot 360 EX released while your subscription was active—forever.[1] However, your access to these additional software components (Tecplot Chorus, PyTecplot, and Tecplot SZL Server) ends when your TecPLUS subscription expires.

Most Tecplot 360 EX users now receive a new license key annually, even those without TecPLUS. If you currently have a Tecplot 360 EX license with active SMS, you can receive a new license key that activates the TecPLUS features through My Tecplot or by contacting sales@tecplot.com.

Usage Data Collection

To help us better understand how our customers use our products and improve them further, Tecplot 360 EX includes an analytics feature that reports user activity over the Internet using the Google Analytics™ platform. This feature tells us which dialogs you use and which controls you manipulate in them. However, to protect your privacy and trade secrets, we do not see names associated with your data (such as variable, zone, or file names) or the actual values of fields in dialogs, nor do we receive any information about you or your organization's identity.

1. While your license is perpetual, we cannot guarantee compatibility of today's Tecplot products with future systems.

If you do not wish to participate in this program, turn off "Collect Anonymous Usage Data" in the Help menu.

We receive basic information about your operating system, product version, and license at each launch of Tecplot 360 EX, even if you have opted out of the usage data program. This information is not tied to any usage data collected.

No usage data of any kind is collected if you do not have access to the Internet or if the Google Analytics service is blocked by a firewall.

Remote Display

Tecplot 360 EX with active TecPLUS subscription now supports the Tecplot SZL Server, a lightweight Linux server component that lets you access your data more easily from remote servers. If you are currently using remote display to access remote data, you may find Tecplot SZL Server to be the better solution.

Linux systems can use X Windows to display Tecplot 360 on a separate system from the one on which Tecplot 360 is actually running. Your X display software must support the GLX OpenGL Extensions, or you must have the graphics rendered by the host CPU using the Mesa software renderer (`tec360 -mesa`).

Remote users may find performance better using remote desktop software instead of X. In our tests, the HP Remote Graphics Software was generally the most performant such solution for Linux.

On Windows systems, you can use the included Remote Desktop Connection utility, which transmits the entire user interface to a remote computer. This allows the rendering to be performed in hardware on the host computer and the results transmitted across the network. On server versions of Windows, more than one simultaneous session of this type can be supported. ThinAnywhere is a plug-in that can

improve the remote performance of 3D applications over slow networks.

On Mac, use the Screen Sharing feature, which can be enabled in the Sharing control panel (or a third-party equivalent such as Vine Server, which may provide better performance in some situations), and a VNC client, such as Chicken of the VNC. This supports a single user at a time.

Remote desktop software is generally not suitable for situations in which multiple remote users need to run GUI applications such as Tecplot 360 EX on the host system at the same time. In these situations, X on Linux is generally the preferred solution (though the clients can be other platforms).

Crash Reporting

Please help us make Tecplot 360 EX better by sending a crash report to us in the event that the application terminates unexpectedly.

On Windows, Tecplot 360 EX creates a crash dump file. You will receive a message indicating that a crash dump file has been created. Click **Yes** in this dialog to open the folder where the file is created. You can then e-mail the most recent *.dmp* file in this folder, along with a description of what you were trying to do, to support@tecplot.com.

On other platforms, no crash dump file is created. However, we urge you to send us a report anyway with as much detail as you can remember.

If you have a moment and a desire to be extra helpful, please re-open Tecplot 360 EX and choose **Enable Diagnostic Logging** in the **Help** menu. Then redo the steps you took to cause the crash. Tecplot 360 EX will record your actions as a macro file. If you are able to reproduce the crash, send the resulting *.mcr* file to us (along with the *.dmp* file if you use

Windows). On non-Windows platforms, you can find the *.mcr* file in */usr/tmp/tecplot_$USER/tpa_diagnostics*.

Crash dumps and diagnostic macros are stored in a temporary folder and will be eventually be deleted by the system. There is no need to delete them manually.

Graphics Drivers

For best results, please make sure that you are using the latest graphics drivers compatible with your hardware and operating system. These can be obtained from your graphics adapter vendor's Web site. Old versions may have issues with Tecplot 360 EX, especially with larger data sets.

- NVIDIA: https://www.nvidia.com/Download/index.aspx
- ATI: https://www.amd.com/en/support
- Intel: https://downloadcenter.intel.com/Default.aspx

Platform-Specific Notes

The following table outlines the support for various platform-specific features in Tecplot 360 EX 2019 R1.

	Linux	Mac	Windows
FLOW3D loader	✓		✓
ABAQUS loader			✓
Excel Loader			✓
Tecplot Chorus	✓		✓
Tecplot SZL Server[a]	✓		

a. The SZL Server runs only on Linux, but Tecplot 360 EX running on any supported platform can connect to the server as a client

Refer to the remainder of this section for issues specific to your operating system.

Windows

Your account must have administrator rights on your computer to install Tecplot 360 EX, or else right-click the installer and choose "Run as Administrator."

Linux

- **Ubuntu Linux**

  With Ubuntu's new Unity UI, minimizing Tecplot 360 EX may cause its pull-down menus to become unresponsive when the application is later restored. As a workaround, you may choose "Ubuntu Classic" or "Ubuntu 2D" when logging in, or set your user account to use one of these as the default in the Login Screen control panel.

  Tecplot 360 EX is supported only on LTS (Long Term Support) releases of Ubuntu.

- **Temporary Directory**

  Tecplot 360 EX relies on being able to create temporary files in the system temporary directory. On Linux, this directory is typically `/usr/tmp` or `/var/tmp`. If your user account does not have permission to write into the system temporary directory, you can use a different

directory either by setting the `TMPDIR` environment variable in your profile or by setting the `TEMPFILEPATH` in the *tecplot.cfg* file.

- **Menu Shortcuts**

  Menu shortcut keys may not work if the NUM LOCK is on. You may set the NUM LOCK to turn off automatically at boot in your computer's BIOS.

- **SELinux**

  SELinux (provided with some Linux distributions) adds an extra layer of security. If you see this error message:

  ```
  .//bin/tecplot.shared: error while loading
  shared libraries: .//lib/libtec.so: cannot
  restore segment prot after reloc:
  Permission Denied
  ```

  Enter these two commands, replacing `/path/to/tec360/lib` with the actual path of your installed Tecplot 360 EX *lib* directory (your account needs `sudo` permission):

  ```
  sudo chcon -v -R -u system_u -r object_r -t
  lib_t /path/to/tec360/lib/

  sudo chcon -t texrel_shlib_t /path/to/
  tec360/lib/*
  ```

  You can then run Tecplot 360 EX without disabling SELinux.

- **Remote Display Issues**

  If you have a **Network** license, you can run Tecplot 360 EX on one computer and display it on a second computer (via an X server). The X server must support GLX extensions, or else you must use the `-mesa` option when launching Tecplot 360 EX to have all OpenGL rendering performed in software on the host. Working with large, complex files may benefit from the `-mesa` option (see next bullet) even if your X server supports GLX.

When displayed remotely, Tecplot 360 EX may exhibit substantially lower drawing speeds than when it is displayed locally, especially for text and geometries.

- **Mesa Rendering**

  Mesa, an OpenGL-equivalent graphics library, performs 3D rendering in software. It is typically used when hardware acceleration is unavailable or when working with remote display of large data.

  The Mesa version of Tecplot 360 EX is slower, especially for 3D plotting. If you must run the Mesa version and display remotely, you can speed up the rendering for XY Line and 2D plots by setting the environment variable below. On some machines, this may also improve the speed of 3D plotting that does not use translucency. (Mesa translucency performance is known to be very bad.)

```
export MESA_BACK_BUFFER=Pixmap
```

Mac

- **Keyboard Shortcuts**

  Previous versions of Tecplot 360 used the Control key for most keyboard shortcuts, rather than the Mac standard Command key. Tecplot 360 EX changes these shortcuts to use the Command key under Mac. Similarly, when rotating a 3D plot, you now hold down the Command key while dragging with the right mouse button.

  Note that the Alt key may be called Option on some Mac keyboards.

- **Right Mouse Button**

  If your Mac's mouse has only a single button, hold the Control key while clicking to access right-click functionality.

- **Middle Mouse Button**

There is no functionality in Tecplot 360 EX that *requires* a middle mouse button; however, it does provide some shortcuts. Users of single-button mice cannot emulate the middle button, but users of mice with two buttons can hold down Control while right-clicking if their mouse does not support a true middle-button click.

- **Remote Display**

  As Tecplot 360 EX uses the native Mac user interface on the Mac, you cannot access the application on a remote workstation using an X window server. Instead, use the Screen Sharing feature in the Sharing control panel (or a third-party equivalent such as Vine Server, which may provide better performance), and a VNC client, such as Chicken of the VNC.

  Since Tecplot 360 EX is not an X application under Mac, is not possible for multiple users to run Tecplot 360 EX on a Mac host remotely.

Enjoy Tecplot 360 EX 2019 R1 and master the view!