

Pathfinder ArcGIS Desktop Addin

version

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Pathfinder addin for ArcGIS Desktop

Pathfinder is a cloud application and HTTP REST API developed by **Gilytics**, used for the planning and routing of linear infrastructures like powerlines, underground cables, pipelines, roads, railways, as well as optimal placement of solar plants and other location-dependent facilities.

This user manual focuses on the Pathfinder addin for ArcGIS Desktop, which allows ArcGIS users to use Pathfinder services directly from ArcGIS 10.x Desktop applications like ArcMap.

Download a [PDF version](#) of this manual.

Note

This manual refers to **version 1.0** of the ArcGIS Desktop addin, which can be downloaded from our [plugins page](#).

- Introduction to Pathfinder
- Installing the Pathfinder Addin
- Using the Pathfinder Addin
- Project Menu
- Results Menu
- Help Menu
- Support and FAQ

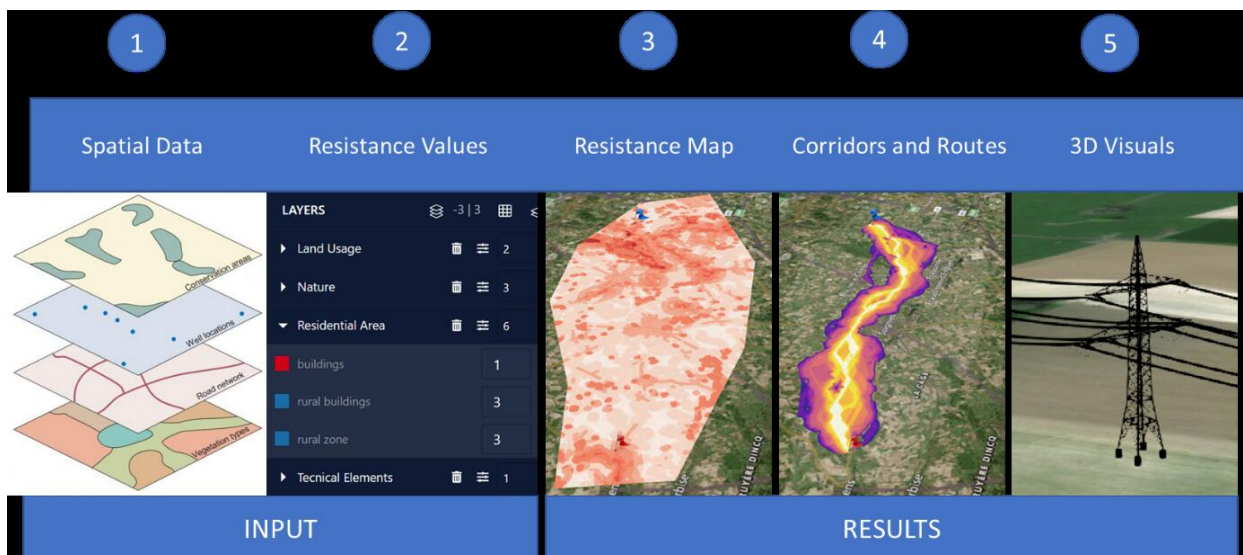
The left navigation area provides quick links to all the content.

Introduction to Pathfinder

Pathfinder is a decision support system which implements a proven methodology to optimize the location and routing of infrastructure elements, taking into account spatial and cost constraints.

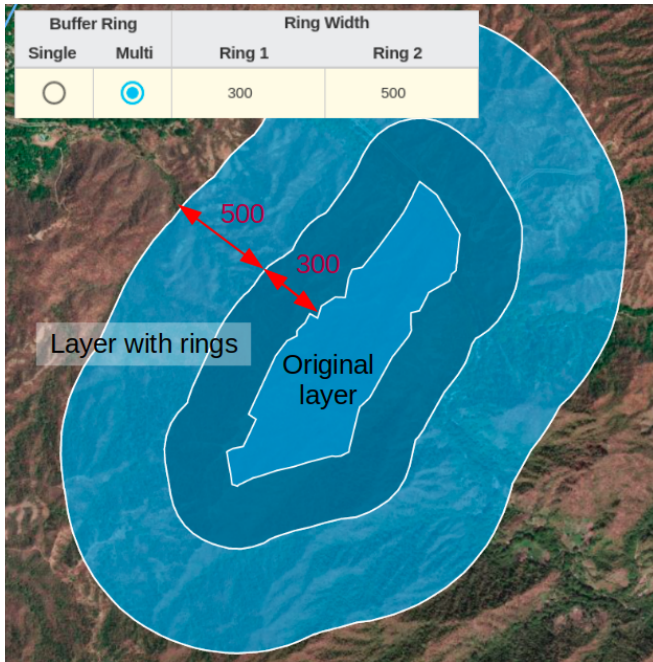
The Pathfinder methodology

The following diagram describes the typical steps followed with Pathfinder.



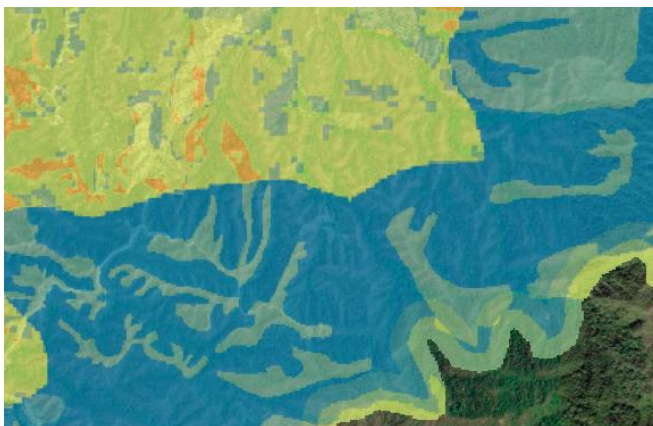
1. In a first step, relevant *spatial data*, representing constraints for the routing, are identified and imported into the application. A **project** is created for a specific *study area* and it typically contains *start* and *end* points for the routing.
2. Next, spatial data **layers** are assigned *parameters* representing their suitability for the infrastructure (e.g. power lines). These parameters are *ring distances and resistance values* and should take into account regulations, costs and other planning constraints.

The *ring distances* define areas of influence around the original data layers, and are used to assign different resistance values depending on the distance.

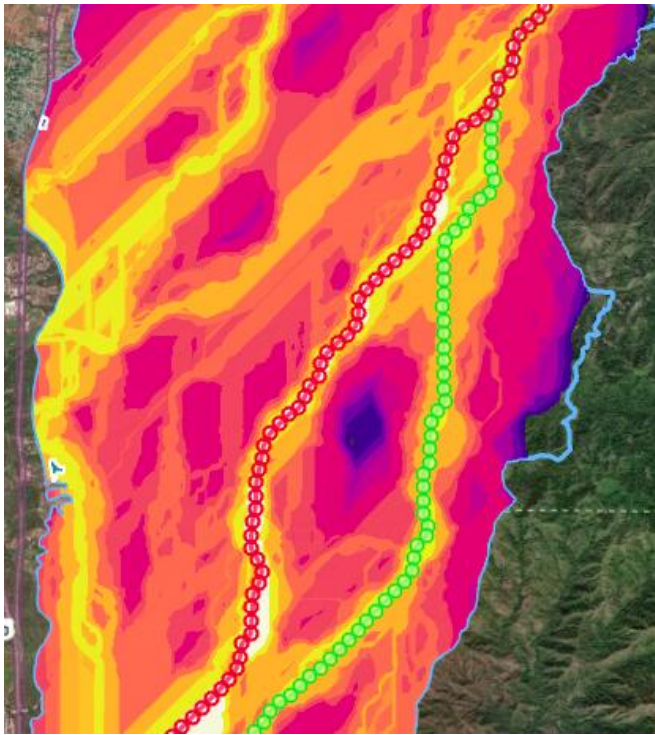


The *resistance values* define how suitable a layer area is for the location of the infrastructure (e.g. being crossed by powerlines and placing their pylons) and they usually have different values for each layer ring.

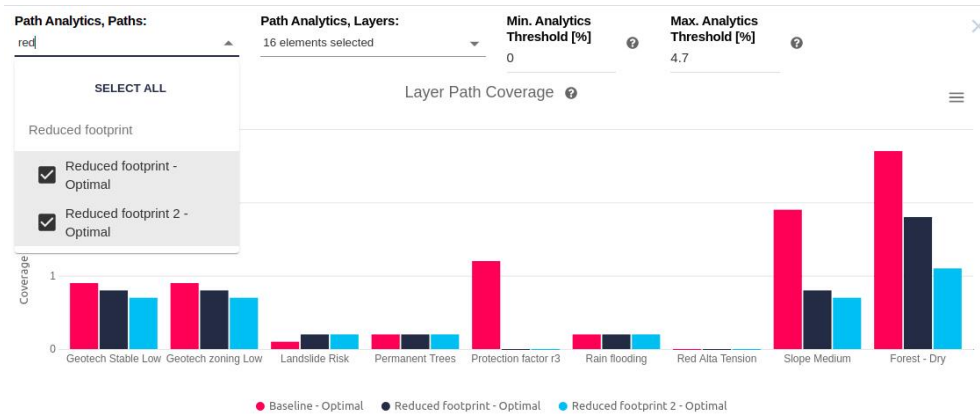
3. Based on these scenarios, Pathfinder runs a multi-criteria decision analysis (**MCD**A) to calculate the **resistance map** for the entire planning area.



4. The resistance map is the basis for Pathfinder to identify a **corridor map** and **optimal paths** within the planning area.



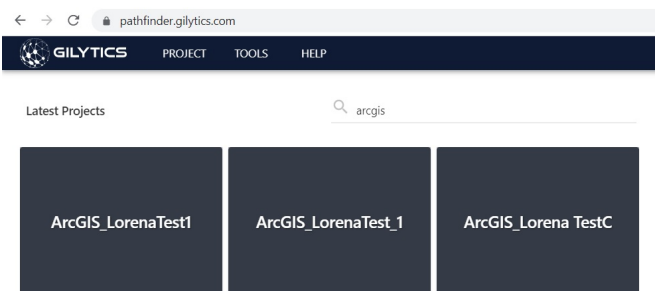
5. The results can be **evaluated** quantitatively and visually on the map or 3D view, and **exported** to georeferenced files.



Using Pathfinder's Web Application

The same Pathfinder account credentials used to access the ArcGIS addin can also be used to login into the [Pathfinder web application](#). In fact, all the projects created from the ArcGIS addin can be accessed in this web application.

If you ArcMap document is named "Area1", then you can find the corresponding project in Pathfinder as "ArcGIS_Area1":



Read the [Pathfinder's user manual](#) if you want to use the web version of Pathfinder and take advantage of its advanced features.

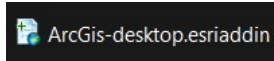
Disclaimer: the scenarios depicted in this manual do not represent actual customer projects or infrastructure proposals, and are presented for demonstration purposes only.

For more help, please [contact Gilytics](#).

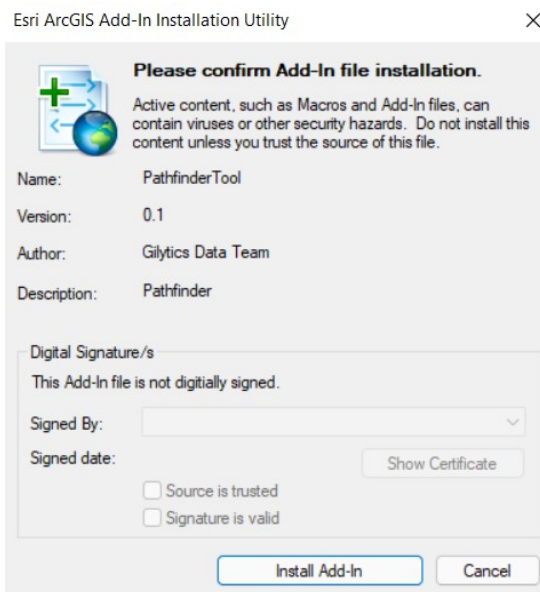
Installing the Pathfinder Addin

Download the addin file from the [Gilytics plugin web page](#) .

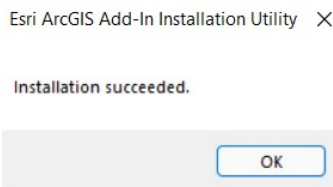
To install the add-in, double-click on the downloaded `.esriaddin` file.



A pop-up window will open.



After clicking on *Install Add-In*, the installation will be done.



The Pathfinder toolbar will be available the next time you open the ArcMap Desktop application. If you had it open during the addin installation, close it and open it again.

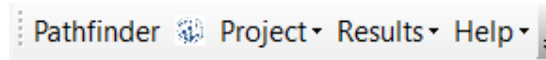
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Using the Pathfinder Addin

The Pathfinder Addin allows ArcMap 10.x users to create Pathfinder projects and run routing calculations directly from ArcGIS.

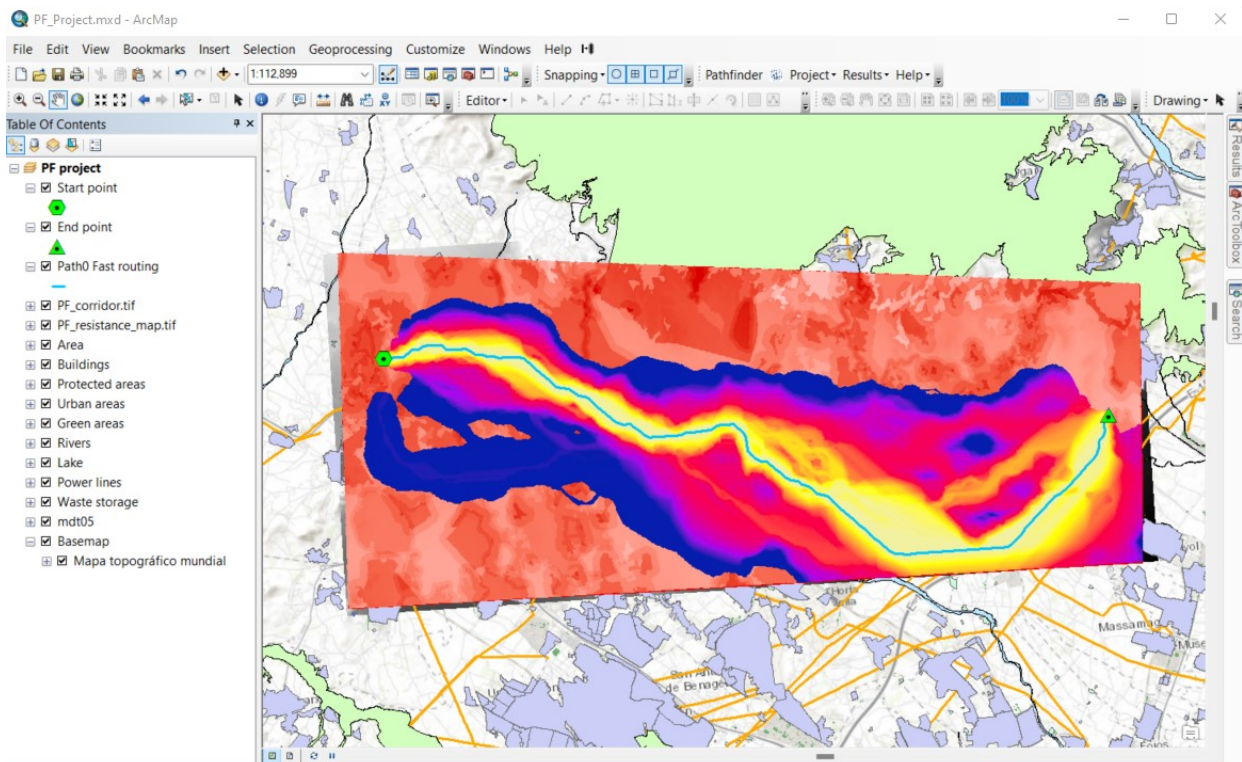
When the addin is installed, a toolbar with menu options will be visible.



A typical addin workflow will follow these steps:

1. Add the relevant data as layers in your ArcMap document. Save the document.
2. Create a Pathfinder project with some selected data layers and set their constraint parameters.
3. Calculate the Pathfinder routing results, Resistance Map, Corridor Map and Path(s), which will get stored as local files and added to your ArcMap document.
4. Use these results to print maps or perform further analysis.
5. Access the project in the Pathfinder web application if you wish to use additional features like geoprocesses, analytics and reporting.

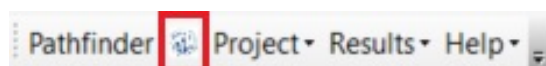
This image shows an example of routing results in ArcMap once the workflow is complete.



Login with a Pathfinder account

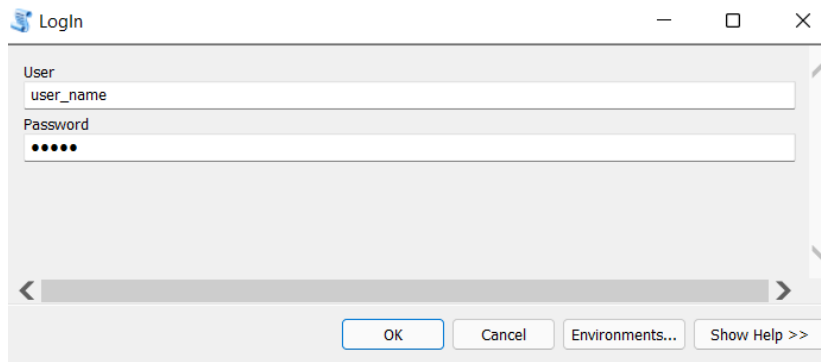
In order to use Pathfinder services, you will first need to authenticate with your Pathfinder credentials.

To log in, click on the Gilytics icon in the Pathfinder toolbar:

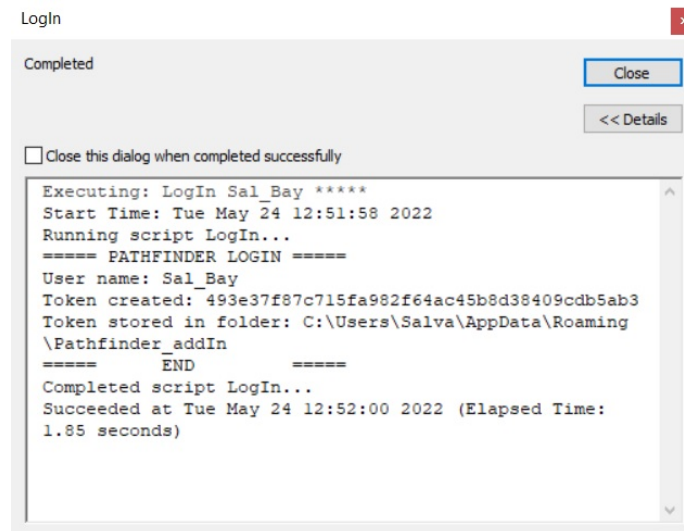


Enter your username and password in the Pathfinder Login tool.

Project Menu



Click OK.



Once the login process is completed, close the geoprocessing dialog.

You can now create your Pathfinder project.

Note

The addin will remember your login credentials, so you won't need to enter again the credentials in the next sessions.

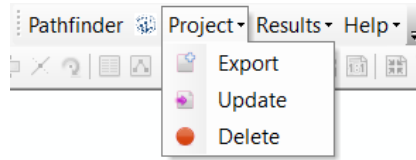
If you try the menu commands without logging in first, the addin will prompt you to do so.

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Project Menu

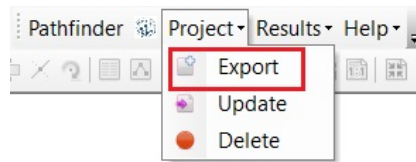
This menu provides access to the project management actions:



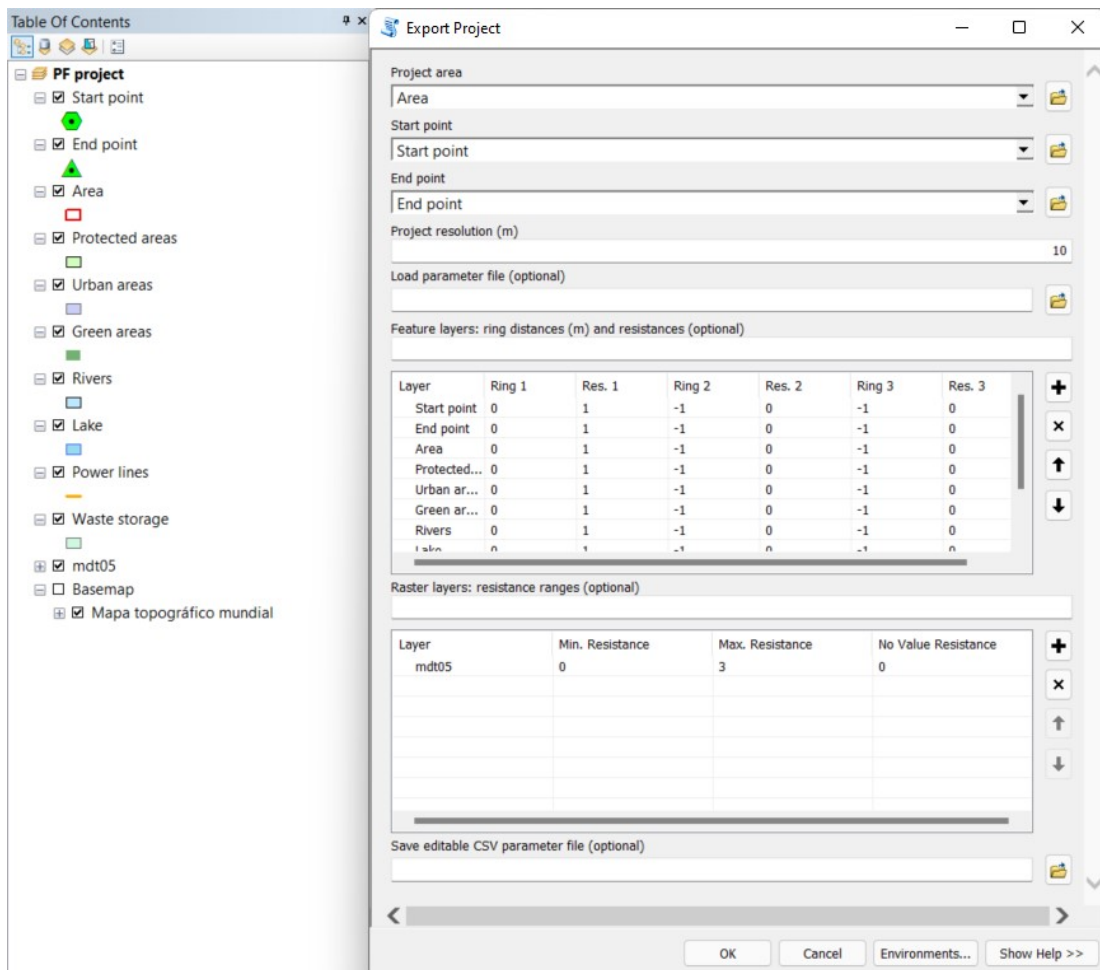
1. *Export*: create a new Pathfinder project based on the current ArcMap document.
2. *Update*: modify the Pathfinder project:
 - Update layer information (features or raster)
 - Delete or add layers
 - Change the constraint parameters
3. *Delete*: remove the Pathfinder project and its data in the remote server if you don't need it anymore.

Create project

To create a project, use the *Export* button on the *Project* menu.



When the tool dialog opens, the feature and raster layers in the ArcMap document will be automatically detected and added to the export lists.



Note

Save the ArcMap document before creating the Pathfinder project. Otherwise, a message will prompt you to do it.

With the *Export layer tool* you can:

- Set the **initial parameters** to generate a Pathfinder project.
 - *Project area*: the region where the simulations are performed
 - *Start and End points*: the points where the simulated routes must start and end
 - *Project resolution*: the spatial accuracy of the calculations. It is set to 10 meters by default. It may be necessary to increase this value for very large areas.

Note

The project area and both the start and end point must be existing ArcMap layers or data files.

The project area and the project resolution cannot be changed once the project is created. You would need to delete the project and export it again. The start and end points can be changed with the Update option.

- **Select the layers** you want to consider in the Pathfinder routing project. By default, all the layers in the ArcMap document will be uploaded. They are listed in two separate tables for feature and raster layers.

To remove some layers from the feature or raster lists, select their rows by clicking on the layer name (you can use Shift to select multiple rows) and then click on the *remove* button on the right panel to delete them from the export list.

Feature layers: ring distances (m) and resistances (optional)

Layer	Ring 1	Res. 1	Ring 2	Res. 2	Ring 3	Res. 3
Start point	0	1	-1	0	-1	0
End point	0	1	-1	0	-1	0
Area	0	1	-1	0	-1	0
Protected ...	0	1	-1	0	-1	0
Urban areas	0	1	-1	0	-1	0
Green areas	0	1	-1	0	-1	0
Rivers	0	1	-1	0	-1	0
Lake	0	1	-1	0	-1	0

Raster layers: resistance ranges (optional)

Layer	Min. Resistance	Max. Resistance	No Value Resistance
mdt05	0	3	0

Note

Usually, it's not necessary to export the layers containing the project area and start/end points.

Also, be aware that the routing results will be added as layers to ArcMap and you normally won't need to export them back to Pathfinder.

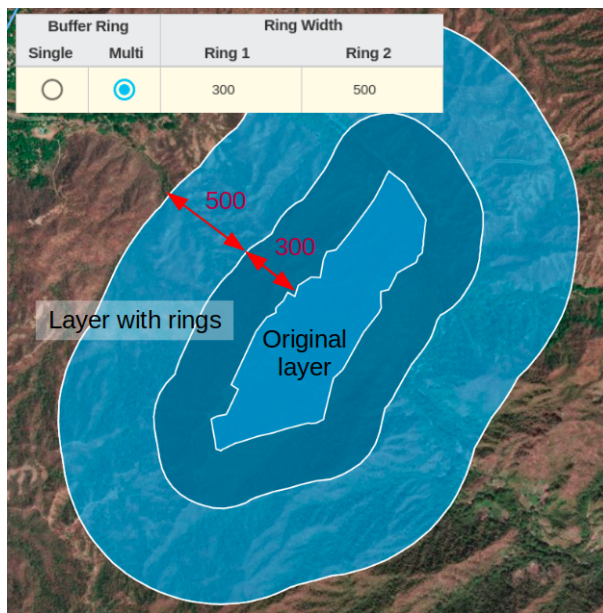
- For feature layers, define their **rings/buffer sizes** in meters. You can create multiple influence areas or rings around the original layer features, so different resistance values can be assigned to each ring.

By default, feature layers have one ring. You can create two more rings by changing their default width of -1 to a positive value.

For instance, in this image we see how to create three rings for the “Protected areas” layer. The first ring has width 0, so it is identical to the original area, the second ring has a width of 500m and the third ring has a width of 150m.

Layer	Ring 1	Res. 1	Ring 2	Res. 2	Ring 3	Res. 3
Protected areas	0	-999	500	2	150	1
Urban areas	0	3	200	1	-1	0
Green areas	0	1	-1	0	-1	0
Rivers	0	3	100	2	-1	0
Power lines	10	3	300	-1	200	0
Waste storage	0	1	-1	0	-1	0

The layer constraints will then be applied as in the following image, with three rings:



- **Resistance values.** The same feature and raster layer tables can be used to set the layers' resistance values. These are integers representing the difficulty level or cost of passing through the data area. Smaller or negative values can be used to make easier for the route to follow certain features.

- In the *feature layers* table, specific negative or positive values can be set for each ring. A special value (-999) is used to signal that the area is **Forbidden**.

Layer	Ring 1	Res. 1	Ring 2	Res. 2	Ring 3	Res. 3
Protected areas	0	-999	500	2	150	1
Urban areas	0	3	200	1	-1	0
Green areas	0	1	-1	0	-1	0
Rivers	0	3	100	2	-1	0
Power lines	10	3	300	-1	200	0
Waste storage	0	1	-1	0	-1	0

- In the *raster layers* table, resistance is assigned with three parameters. If the raster value is *no data*, the assigned resistance value will be the one entered in “No value resistance”. Otherwise, the resistance will be interpolated between the settings for the minimum and maximum raster values (*min. resistance* and *max. resistance*).

Layer	Min. Resistance	Max. Resistance	No Value Resistance
mdt05	0	3	0

Note

The range for the resistance values is arbitrary. You can use negative values to signal areas which are better for the route, but in general only the relative difference between the values matters. You can use a -10 to 10 range, or a 0 to 100 range. It's up to you.

- **Save or load a CSV parameter file.** To backup and reuse the layer settings in different projects, we can store these values in a text file in comma-separated format (CSV). This file can be edited in standard spreadsheet software.

To save a CSV file with all the layer settings, use the "Save editable CSV parameter file".

We can also use a previously saved or edited CSV file to set the parameters. To do so, use the "Load parameter file" input and browse for the CSV file.

Export Project

Project area
Area

Start point
Start point

End point
End point

Project resolution (m)
10

Load parameter file (optional)
C:\parameters.csv

Feature layers: ring distances (m) and resistances (optional)

Layer	Ring 1	Res. 1	Ring 2	Res. 2	Ring 3	Res. 3
Protected areas	0	-999	500	2	150	1
Urban areas	0	3	200	1	-1	0
Green areas	0	1	-1	0	-1	0
Rivers	0	3	100	2	-1	0
Power lines	10	3	300	-1	200	0
Waste storage	0	1	-1	0	-1	0

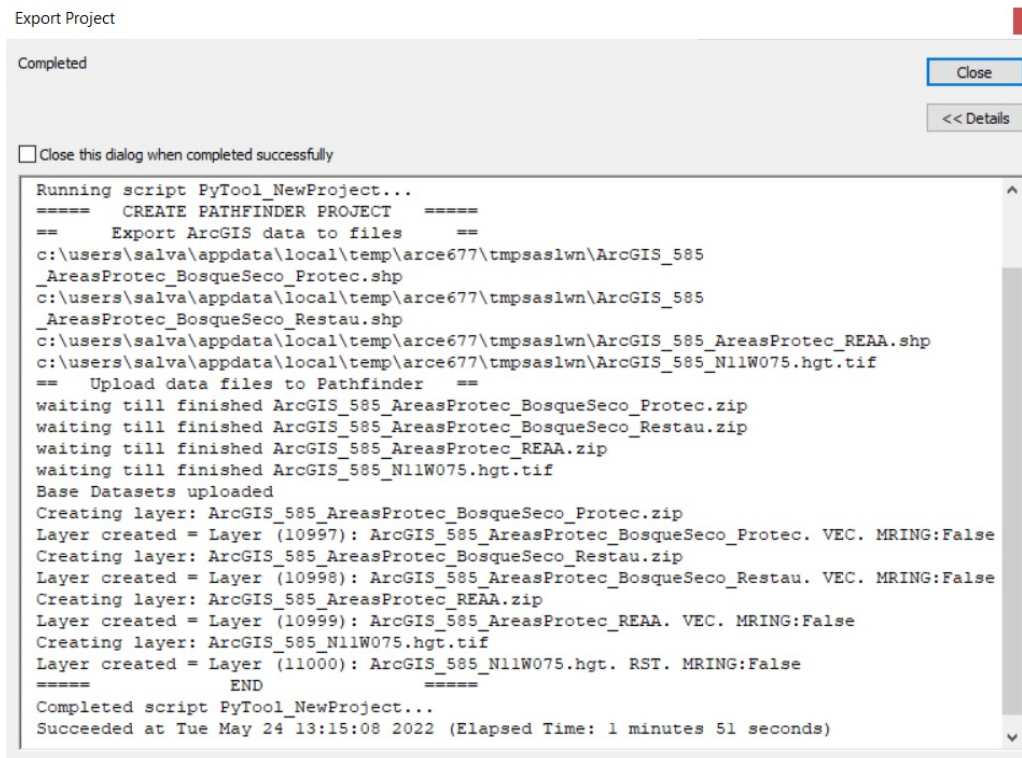
Raster layers: resistance ranges (optional)

Layer	Min. Resistance	Max. Resistance	No Value Resistance
mdt05	0	3	0

Save editable CSV parameter file (optional)

OK Cancel Environments... Show Help >>

After all the inputs are set, click on *OK* to run the process. It may take some time to complete, depending on the number of layers, their sizes and your internet connection.



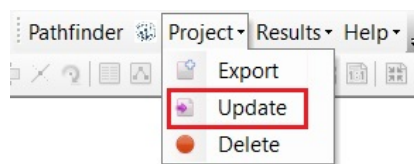
Multiple steps are performed during the process, including the Pathfinder project creation, exporting your layer data (within the project area), uploading them to Pathfinder and applying the ring parameters.

Note

If the exporting process succeeds, the addin will remember the layer parameters. However, it is advisable to store the parameters in a CSV file in case the exporting fails and you want to try again.

Update project

The Update option can be used to change the data or constraints exported to the Pathfinder project.



The inputs in this tool is similar to the *Export project* option. It is possible to:

- Change the *Start point* or *End point* for the routing process by selecting a point ArcMap layer or data file.
- Change which vector or raster *layers* are considered in the routing calculations, or modify their data content, ring sizes and resistance values.

Let's see how to perform these modifications:

- **Remove a layer** from the routing project. Layers already in the project have a *Keep* data status by default. These layers can be removed from the routing project in two ways:

1. Change the *Keep* status to *Delete*.

Layer	Dataset	Ring 1	Res. 1	Ring 2	Res. 2	Ring 3	Re
Area	Write	0	1	-1	0	-1	0
Buildings	Write	0	1	-1	0	-1	0
Protected areas	Keep	0	3	150	2	-1	0
Urban areas	Write	0	3	50	1	-1	0
Green areas	Keep	0	2	-1	0	-1	0
Rivers	Delete	0	3	100	2	-1	0
Lake	Keep	0	3	-1	0	-1	0
Power lines	Write	5	1	-1	0	-1	0

2. Select the layer row and click on the *Remove* button on the right to eliminate it from the list.

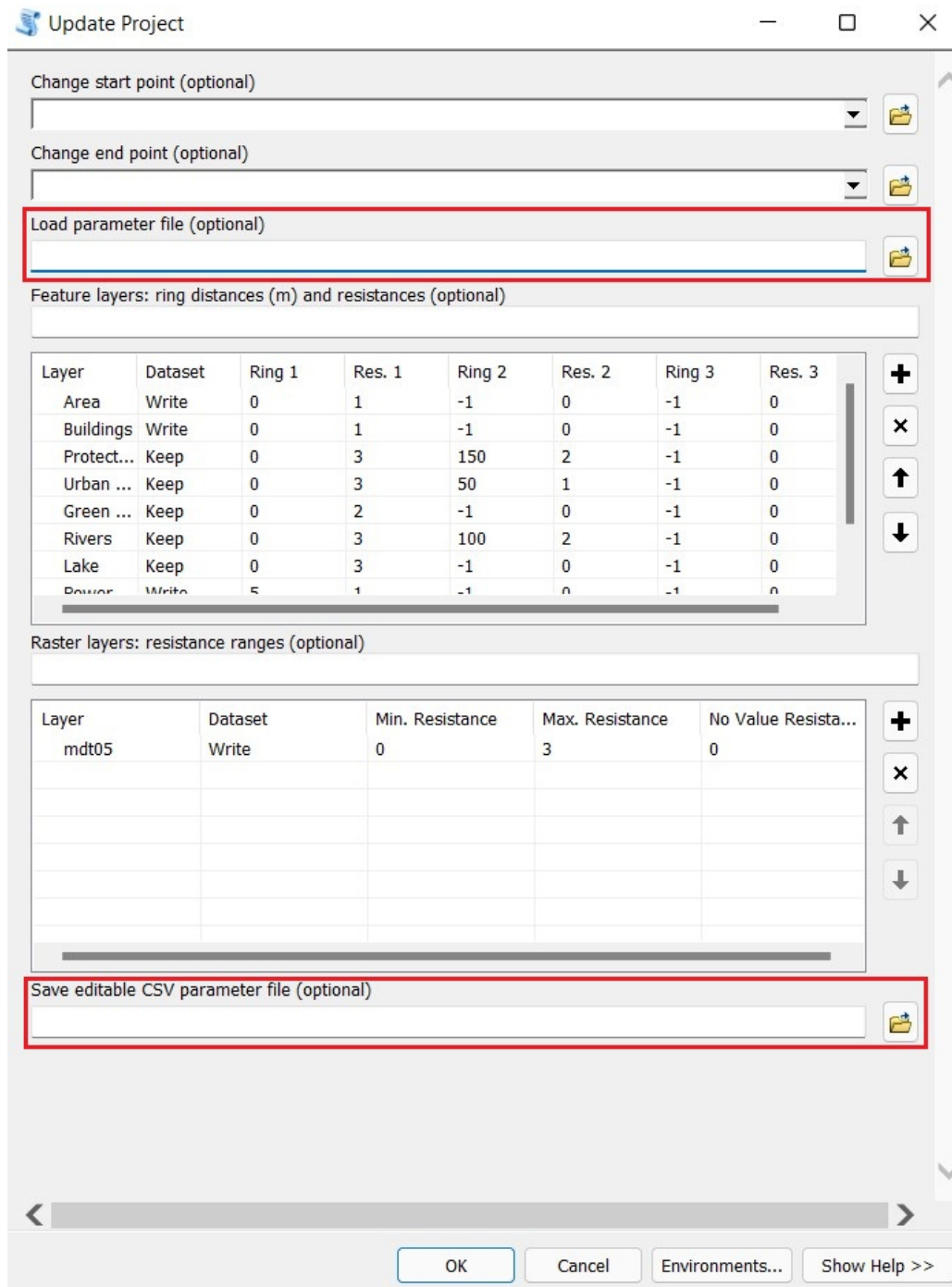
- **Add a layer** to the routing project. Layers which are not already in the Pathfinder project have a *Write* data status by default, so they are uploaded and added to the project with the parameters set in the table.

If you don't want this layer added to the project, select its row and remove it from the table.

Layer	Dataset	Ring 1	Res. 1	Ring 2	Res. 2	Ring 3	Re
Area	Write	0	1	-1	0	-1	0
Buildings	Write	0	3	100	1	-1	0
Protected areas	Keep	0	3	150	2	-1	0
Urban areas	Keep	0	3	50	1	-1	0
Green areas	Keep	0	2	-1	0	-1	0
Rivers	Keep	0	3	100	2	-1	0
Lake	Keep	0	3	-1	0	-1	0
Power lines	Write	5	1	-1	0	-1	0

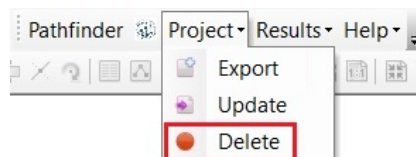
- **Modify the constraint parameters** of existing layers. To do this, maintain the *Keep* data status and change the layer parameters (rings widths and resistances) in the corresponding row.
- **Modify layer data.** If you have edited a feature layer or modified a raster layer in the ArcMap document and want to apply these changes to the routing project, change the *Keep* status of the layer to *Write*.

As mentioned before, the layer parameters can be set manually within the table or loaded from a CSV file. The new parameters can also be saved to a CSV file.



Delete project

If we don't need to perform any more routing calculations, the Pathfinder project can be eliminated by using the *Delete* menu option.



Note

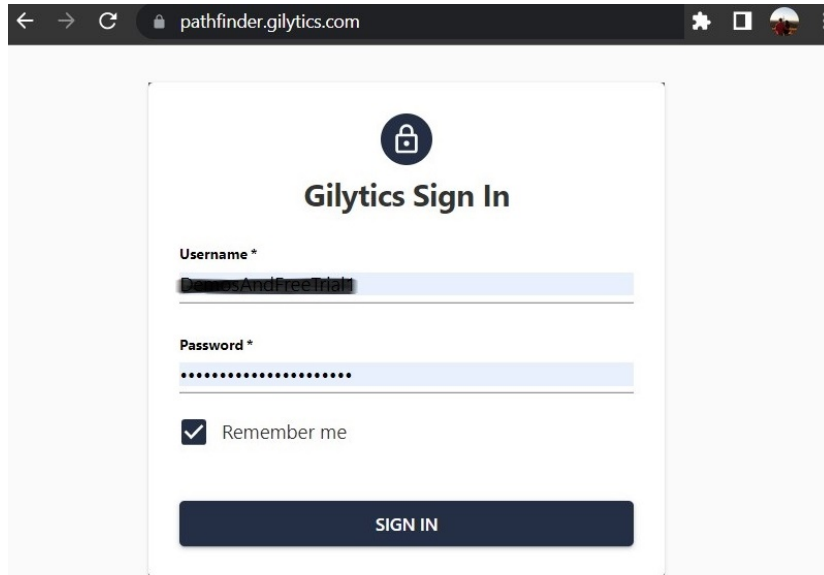
It is highly recommended to remove the Pathfinder project when you no longer need to perform routing calculations. You will save storage space in the server and consume less projects from your company license quota.

If you removed or misplaced your ArcMap document and you want to remove the Pathfinder project, you can do so from the Pathfinder Web application (see next).

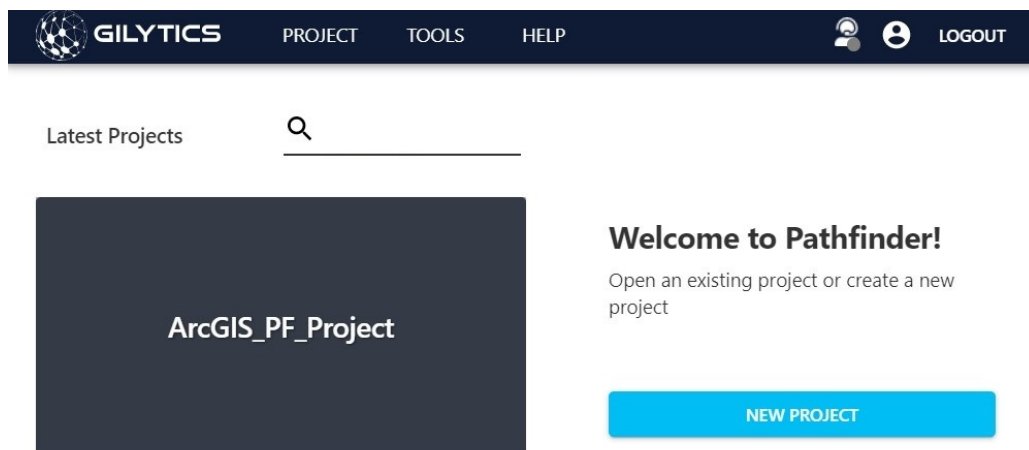
Access the project on the web

You may need to open the project via the Pathfinder web site to have access to some functionalities only available online, like the Printed Report or the 3D visualization.

To access the project online, go to [Pathfinder](#) and enter your username and password in the login page.



Once logged in, you will see all the projects created in your Pathfinder account. The projects created from the ArcGIS addin will have an *ArcGIS_* prefix followed by the ArcMap project name.



To open a project, just click on the tile with its name.

Note

Do not change the content of the project (add/remove layers or modify parameters) in the Pathfinder web application. This would break the synchronization with ArcMap. Changes will not be transferred to your ArcMap document and later Update commands from the addin would overwrite changes done in the web application.

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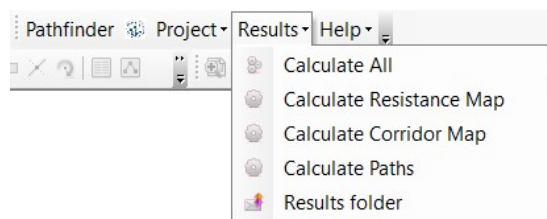
For more help, please [contact Gilytics](#).

Results Menu

Pathfinder services can generate multiple analysis deliverables based on the parameters set in the project, providing information about the optimal location and route of the infrastructure.

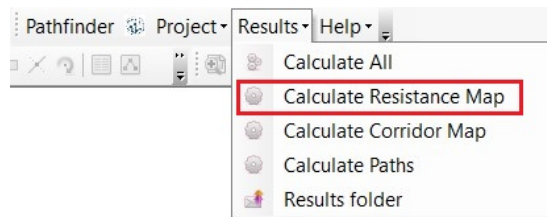
Typically, the results are generated in sequence, since each one is needed to calculate the next one.

To run the generation processes and access the available results, use the *Results* menu in the Pathfinder toolbar.



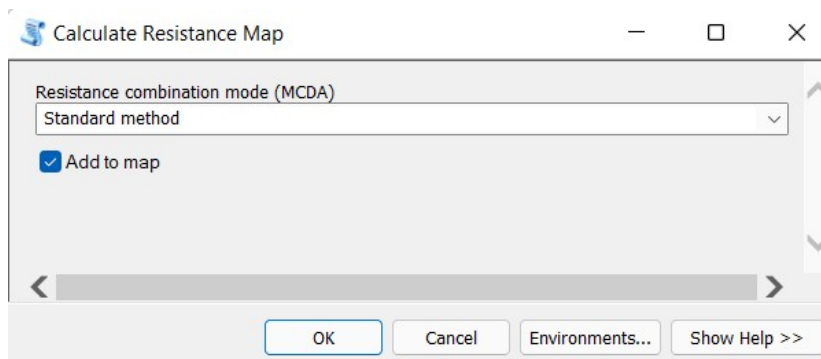
Calculate Resistance Map

The first result to be calculated is the Resistance Map (RM), which combines the resistance values of the layers in the project.



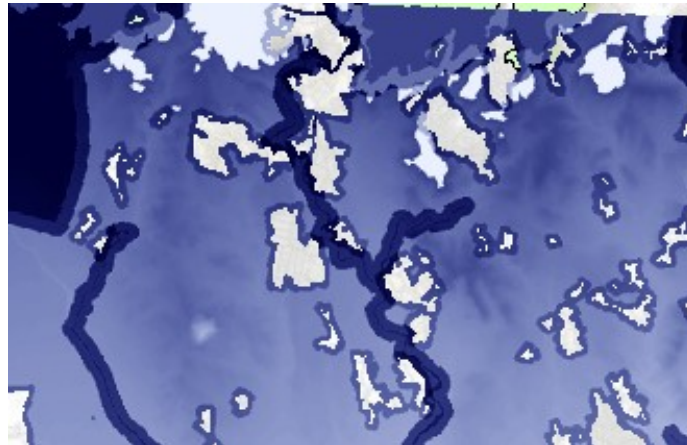
To generate the RM, click on the *Calculate Resistance Map* menu option.

In addition to the standard method, which adds all the resistance values, there might be other combination methods available in your license for specific purposes.



If the *Add to map* option is checked, the RM will be added to the map document as a raster layer after the process is finished. In any case, the corresponding raster file is saved to the results folder in the same location as your ArcMap document.

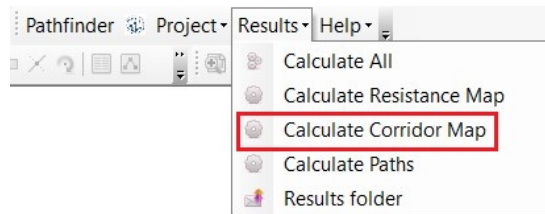
Areas with *Forbidden values* (-999) or outside the project area will look transparent. Larger values in this raster mean a higher resistance. As with any raster layer, the symbology can be changed to use your preferred color ramp or display specific value ranges.



Calculate Corridor Map

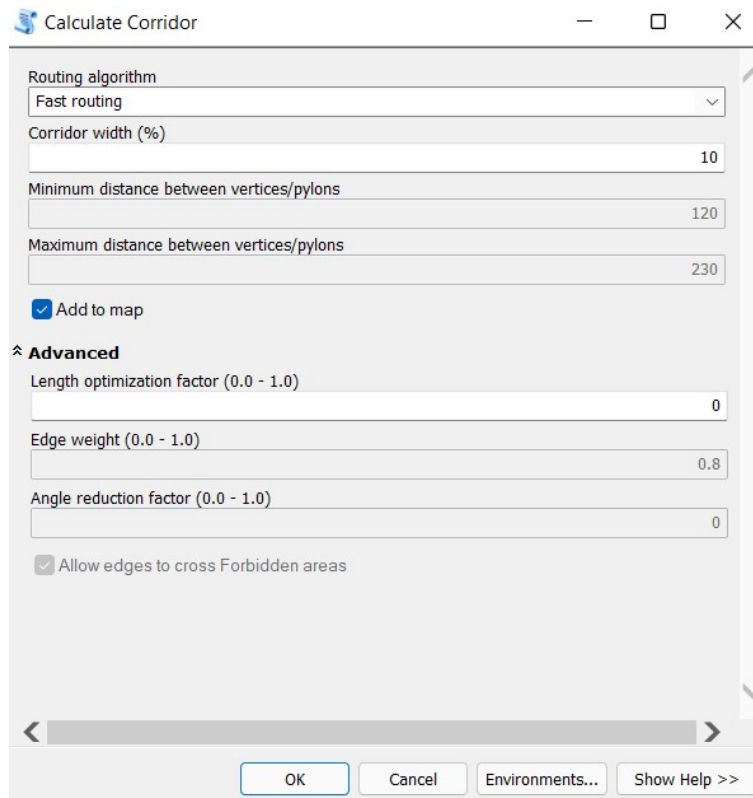
The Corridor Map provides a summary of all possible paths from the Start to the End point which have an accumulated resistance near the optimum, so in addition to hinting where this optimum will be located, it also shows possible alternative routes.

As with the Resistance Map, go to the *Results* menu in the Pathfinder toolbar and click on the *Calculate Corridor Map* option.



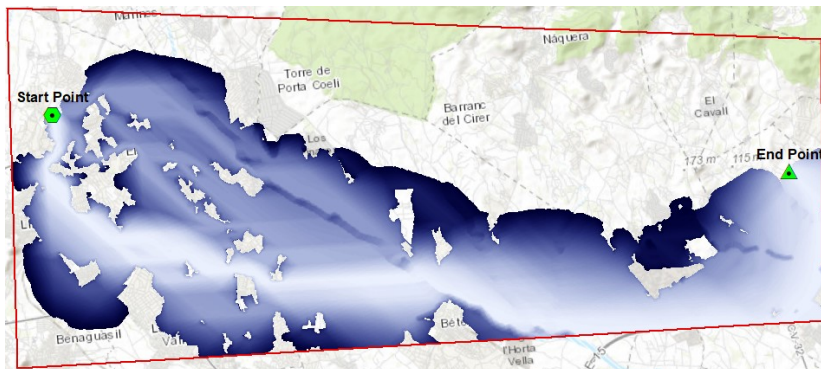
The area covered by the corridor map is defined by a percentage value, the *width* of the corridor, which can be set by the user. This percentage value indicates how much above the minimum path resistance is to be included in the corridor. As an example, if the resistance along the optimal path is 1200 and the corridor width is 10%, the corridor map will show areas containing paths with a resistance lower than $1200 + 10\% \text{ of } 1200 = 1320$.

Depending on the [routing algorithm selected](#), additional options will be available.



After the calculation process is completed, the corridor map will be displayed in the Map view.

By default, lighter colors in the corridor mean lower resistance (near the optimal) and darker colors mean higher resistance. Areas with a resistance higher than the threshold corresponding to the width are shown as transparent. As with the RM, the user can change the color palette using the ArcMap symbology options.



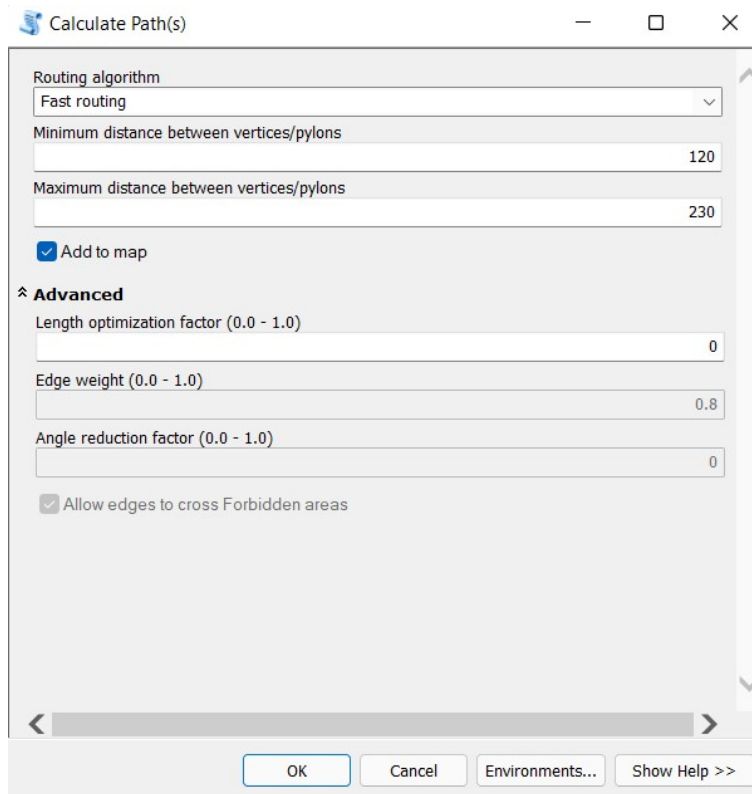
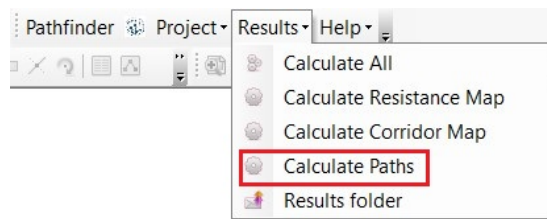
Note

You might get a failure message if the Start or End points of the project are located in an area with "Forbidden" resistance.

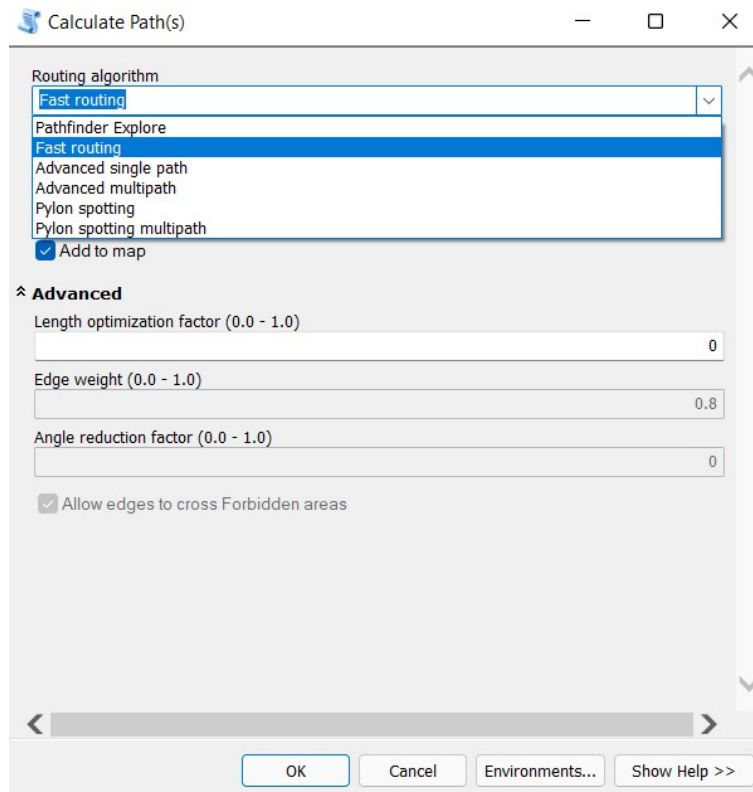
Calculate Path(s)

The final goal of Pathfinder is to find the optimum routes for a linear infrastructure between the Start and End points.

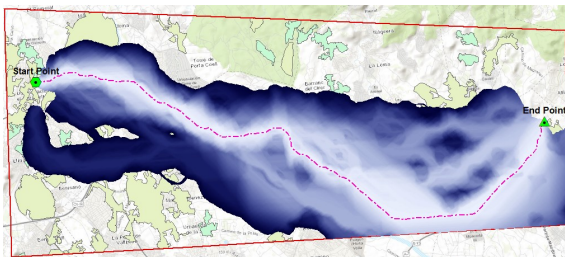
To run this calculation, click in the *Calculate Paths* option in the *Results* menu.



Pathfinder offers a default [Fast routing algorithm](#) to perform this calculation. Depending on your company license, you may also have access to other algorithms. In the *Calculate Paths* tool, it is possible to choose the one you prefer.



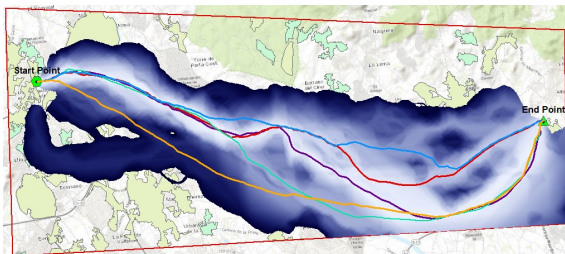
- **Fast Single Path:** this is the fastest to compute. It generates a single optimal path by finding the least resistance route in the corridor map, crossing the lightest areas.



- **Pylon spotting:** it optimizes the pylon/tower locations and angles for electricity transmission applications. Additional parameters let the user control the relative importance of resistance along the line (versus the resistance at the pylon locations) and the minimization of the angles.

Because of the additional resources required to run this algorithm, it may take longer to finish.

- **Pathfinder Explore:** it returns multiple path results, providing more alternative solutions.



When the Pylon Spotting or Pathfinder Explore algorithms are selected, the user can set additional parameters:

- **Edge weight (0.0 to 1.0):** relative importance of the resistance along the line compared to the resistance at pylon locations. A value of 0.0 means that only the resistance at the pylon locations is important for the

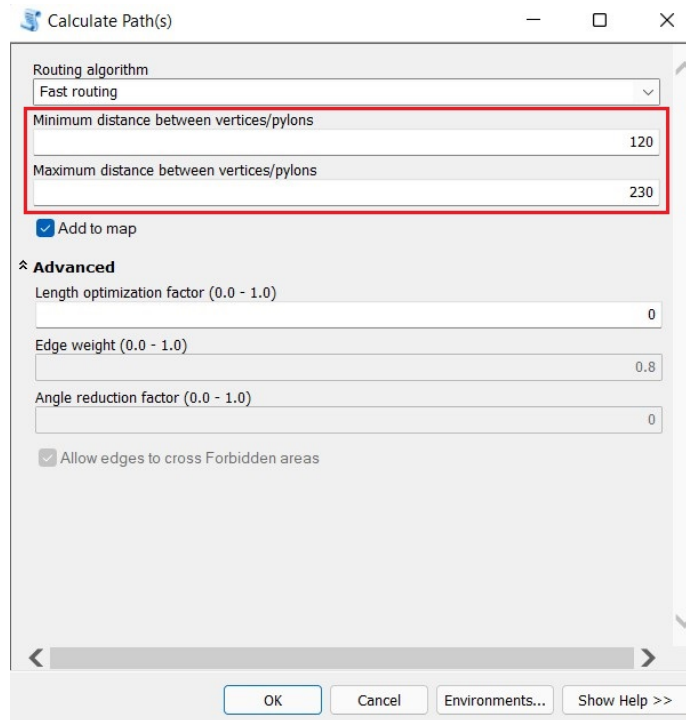
route optimization, 0.5 means both are equally important and if 1.0 is set, only the values along the line are important. By default, the value is 0.4.

- *Angle weight*: relative importance of the path angles in the optimization. By default, the value is 0. (0.0 means angles do not matter, 1.0 means only angles matter).
- *Forbidden crossing allowed*: If selected, it is possible to cross forbidden areas if the vertices (pylons) are outside. If this option is disabled, it will not be possible to cross forbidden areas. By default, it is allowed.

In the pylon spotting algorithm, two more options are available:

- *Maximum direction deviation*: maximum angular deviation from the start-to-end direction. The angle units are degrees. The default value is 90 degrees, because in this method the path can't go backwards.
- *Maximum angle*: the maximum angle change at any vertex. By default, the value is 180 degrees.

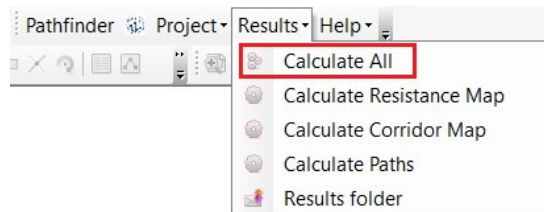
It is possible to specify the **minimum and maximum separation between pylons** in any of the algorithms. In the case of the *pylon spotting* algorithm, it is recommended that the maximum and minimum distance values are not far apart. In this way, the algorithm will run faster and use less memory.



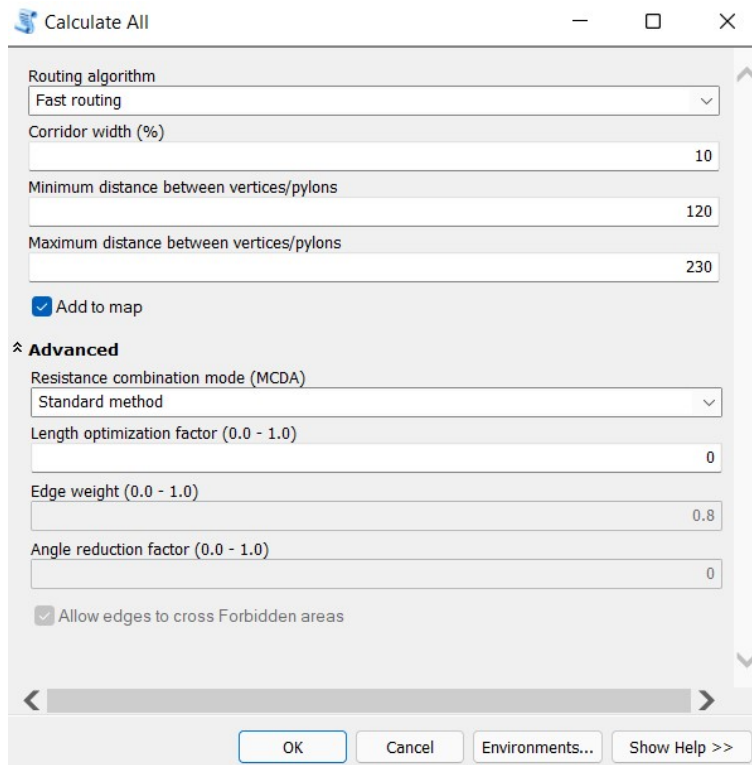
After the path calculation process finishes, the paths will be added to the Map as line layers.

Calculate All

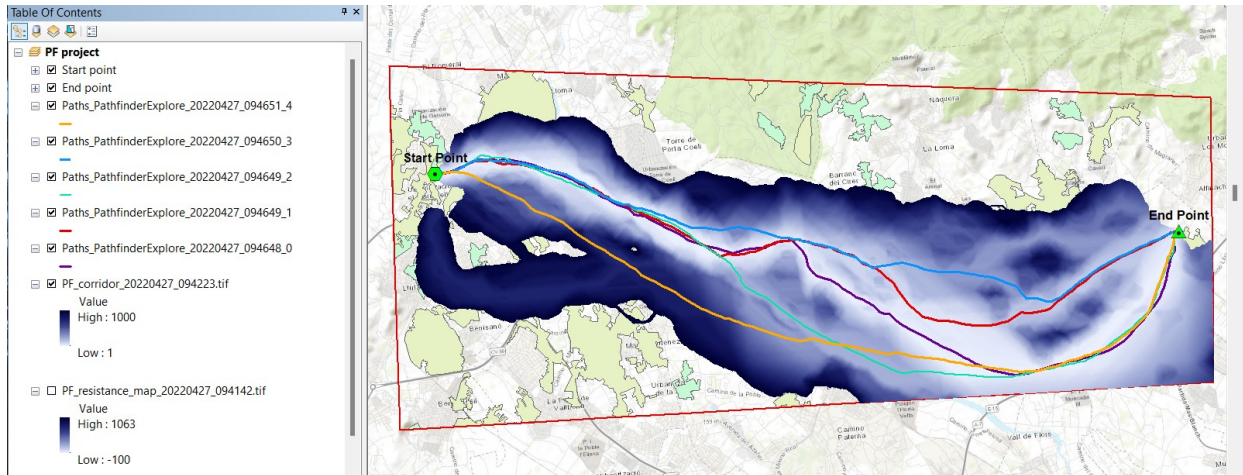
Instead of generating the Resistance Map, Corridor and Path(s) one by one, the user can generate them all together in sequence. This can be done by using the *Calculate All* option in the *Results* menu.



We can now input all the parameters in a single tool.



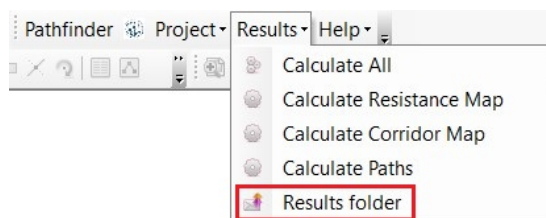
Notice that all the results are now generated by a single process and become visible in the Map after the process is complete.

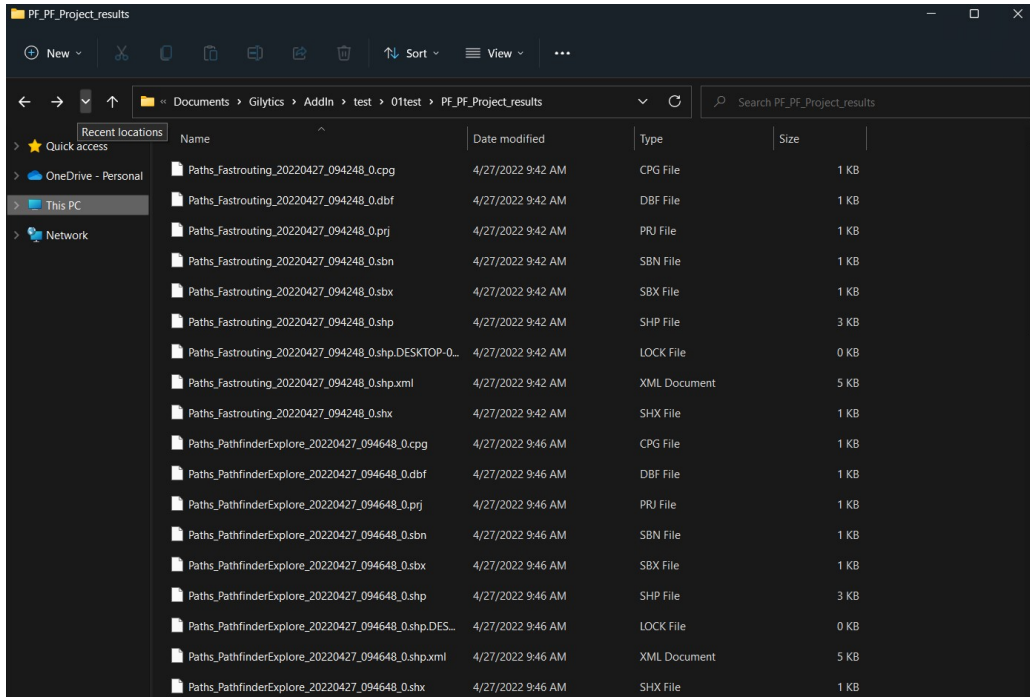


Results folder

The calculated results are saved to a local disk folder with a time stamp in the file name, so multiple versions can be generated without overwriting each other.

With the *Results folder* menu option, the user can open the location of the result files to manage them. For instance, if some results were not added to the Map or have been removed from the project, they can be added later from this folder.





Note

If layer parameters like the ring/buffer sizes of resistances are changed, all the results should be recalculated to match these changes. If only the Start or End points are changed, it is not necessary to recalculate the Resistance Map.

Note

The results are stored in the results folder with a timestamp in the file name, showing when they were generated. If you want to keep a history of the parameters used to create each result, it is advisable to save CSV files with these parameters as well.

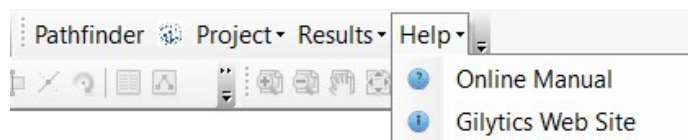
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For more help, please [contact Gilytics](#).

Help Menu

If you have questions about the addin usage or want to know more about Gilytics, you can use the *Help* menu.

In this menu you can find links to this [online manual](#) and the [Gilytics Web Site](#) .



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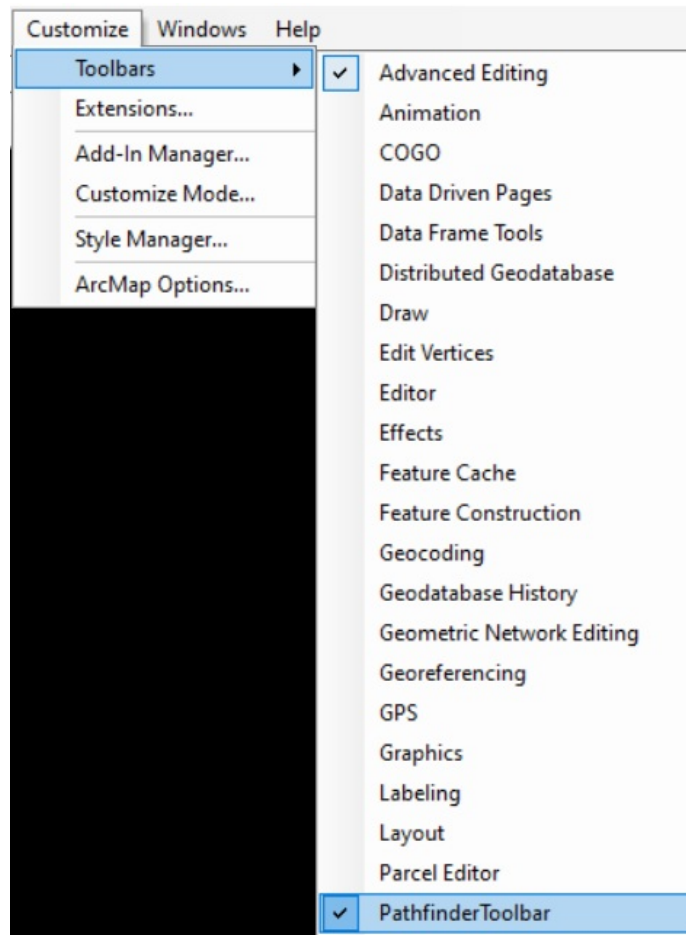
Support and FAQ

These are some troubleshooting tips you may find useful.

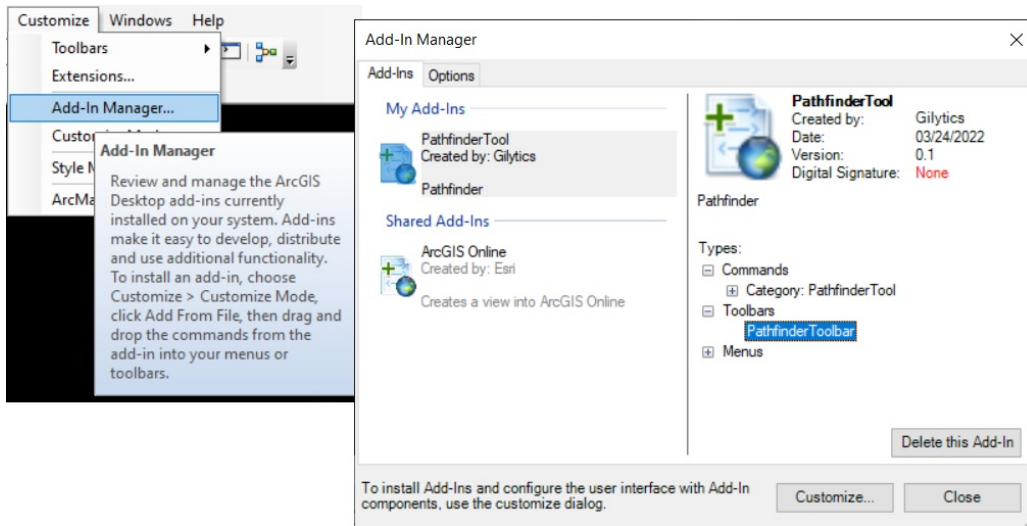
Installation issues

I don't see the Pathfinder toolbar after installing the addin

First, check if the addin has been correctly installed. You can do this by using the Customize menu and checkint the Toolbars. Maybe the Pathfinder Toolbar is off and you just need to activate it.

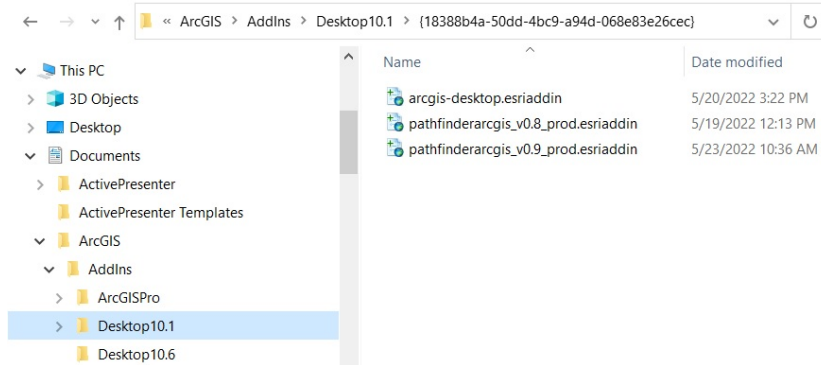


You can also check the installed addin components in *Customize/Addin Manager*.



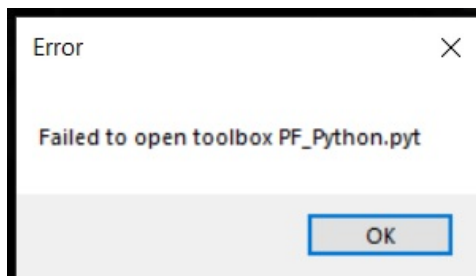
If the addin is not installed, it probably means it was copied to the wrong location. Verify that the addin file was copied to your local user ArcGIS documents folder. If you are using a non-local installation of ArcGIS (e.g. via Citrix), you will need to contact your IT administrator to perform the installation for you. The .esriaddin file can be manually copied to the correct location if needed.

If you have had older versions of ArcGIS installed, the addin maybe copied to an older version's folder, but that doesn't seem to be a problem if you use a newer version.



Error opening tool: clean up

I get an error like this when trying to open a tool



(You will need to click on OK several times until the error dialog finally closes).

If this happens with the Export tool after deleting project, maybe the configuration has not been correctly removed. If your ArcMap document is named "MyMap.mxd", see if there is a file named "PF_MyMap_config.dat" in the same folder as the .mxd document. Remove the .dat file and try opening the Export tool again.

Large datasets

I get an error, or the process takes forever, if I try to export a large dataset

Pathfinder has an upload limit of 50MB per layer. If your project area contains a lot of data (many features, or features with a complex geometry), there might be problems when exporting or updating the project.

To solve this issue:

- Simplify the features or reduce the resolution of the raster data
- Divide the data into smaller sets, creating multiple layers

Long processes

Calculations take a long time and I don't know how long the process will take

Processing requests to Pathfinder might take some time depending on the data size and options chosen. Our server infrastructure scales automatically to accommodate more requests, but there might be some waiting time. Unfortunately, we don't have a mechanism to estimate this time.

ArcMap or computer closes

My ArcMap session or computer closed and I can't see if the process is finished

The effect of closing ArcMap or the computer when a process is still running depends on the kind of process:

- *Project Export*: If the process was canceled in ArcMap for some reason, the project creation may have happened in Pathfinder but may not be reflected in the ArcMap addin configuration. Try opening the "Export" tool again. If it opens, it means ArcMap is not aware that the project was created. In that case, manually remove the ArcGIS_* project in Pathfinder Web and try the "Export" command again.
- *Project Update*: If an update process is canceled, just try again.
- *Result calculations*: If a Calculate process is canceled, probably the result was finally generated but not downloaded to ArcMap. You can manually download the result from Pathfinder Web or try again.

Changes in Pathfinder Web

Can I change my project in Pathfinder Web?

After you export your ArcMap data to Pathfinder, you can access the exported project in the Pathfinder Web application using the same user credentials.

In principle, you can now perform any changes in the web application. However, if you do so, the ArcMap and the Pathfinder Web settings will not be synchronized any more:

- Until you perform an Update from ArcMap, the Pathfinder Web settings will dominate.
- When you perform an Update from ArcMap, the Pathfinder Web settings will be overwritten.

Recommended uses of Pathfinder Web for ArcMap addin users:

- Use analytics and reporting tools.
- Set parameters not available in the addin, like special raster resistance assignment. However, note that these settings will be overwritten if you Update this layer from the addin.
- Use the 3D View for presentations.
- Continue working with a project if the original ArcMap document is lost.

Non-recommended changes in Pathfinder Web if you want to keep the consistency with the ArcMap addin.

- Add or remove layers in Pathfinder Web.
- Change the buffer or resistance parameters of layers.

Deleting the Pathfinder project

If I use Project/Delete, will I lose my data and results?

If you don't need to perform any more calculations, or you want to start a project from scratch, you can just Delete the current Pathfinder project.

This operation will not change your ArcMap document. The results you previously calculated will stay in your local disk, in the results folder.

If you get errors after deleting the project, see the cleanup procedure above.

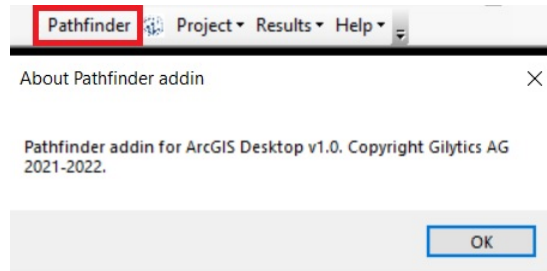
Debugging errors

I'm having errors/issues. How can I explain to you what is happening?

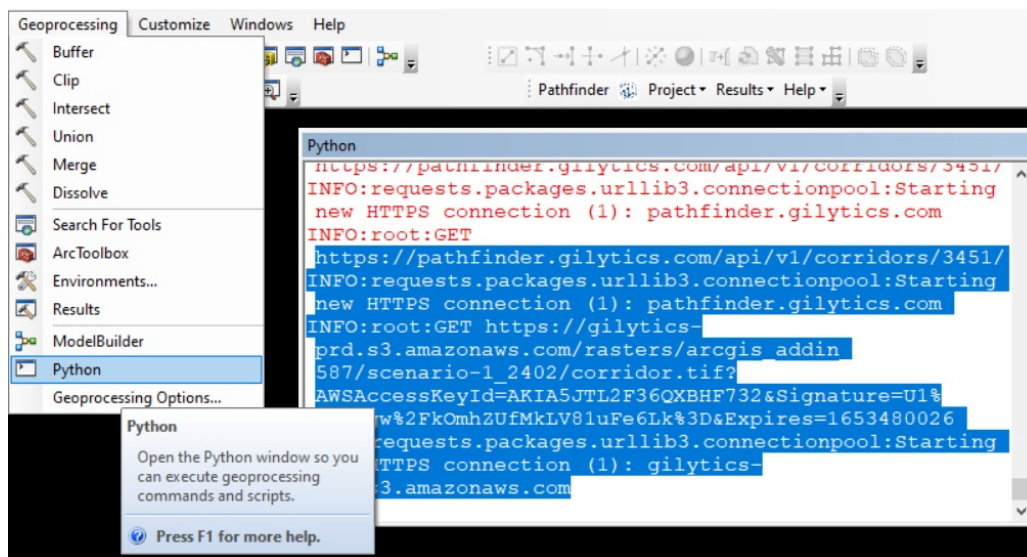
You can email your Gilytics account manager, contact Gilytics via our [web site](#) or use the online chat in Pathfinder Web.

This information will be useful for us to help you:

- Which version of the addin you are using (click on the Pathfinder button in the toolbar).



- A screen capture or (even better) a video showing how the error happens.
- Open the Python console and execute again the process causing the error. Then copy all the text displayed in the console and send it to us.



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