

Working with Images

In all our spatial products you can bring in images of various kinds, many formats are supported in our software.

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Bringing in Images

You can bring in an image by browsing to it with the **Open** button in the quick access toolbar, or just dragging it onto the scene:



Once you bring it, depending on what type of image it is, a dialogue will come up asking you to specify the type of image file it is, otherwise it will just immediately display on the screen:

Open 'wfpf.jfif' as	×
All spatial Files Layer file Shape Files Mapinfo Tab/Mif Files Kml/Kmz Files Gpx Files LandXml Files Autocad DWG/DXF Files (Flat) Autocad DWG/DXF Files (By level) Microstation design Files (Bat)	Microstation design Files (CSV Files Apache Avro Files XYZ Files Las/Laz Files Spatial VU Files Spatial VU Grid Files Surpac point files Surpac string files Surpac DTM files
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Registering an Image

To georeference an image to an exact location in space you can use the **Register Image** tool described in the <u>*Register Image Guide*</u>.

Colour Bands

All of the colours that humans perceive can be created by mixing the three additive primary colours: red, green and blue. Human vision is a system that is able to detect these three wavelengths or 'bands'. Our brains combine this data detected by our eyes into a single colour image. This is also the basis of colour imaging.

Colour images are actually made up of three values, one each for the amount of red, green and blue light that entered the camera for each pixel. This means a '3-band' image is needed to display a colour image.



RGB (red, green, and blue) refers to a system for representing the colors to be used on a computer display. Red, green, and blue can be combined in various proportions to obtain any color in the visible spectrum. Levels of R, G, and B can each range from 0 to 100 percent of full intensity. Each level is represented by the range of decimal numbers from 0 to 255 (256 levels for each color).

Query Image Stats

When an image has been brought in you can also query some stats relating to it that will give you the number of colour bands associated with the image, the height, width etc. This is done in the **Data** tab of the Layer Properties dialogue:



Layer Properties	- 20141105-flare-171-304 1.jpeg	×
General		
Data	Layer type: Image Files	\sim
Styling	Settings	
Text		
Thematics	Image File Base Folder:	
Links	Image File/Folder: C:\Users\MarkDiamond\OneDrive - PrimeThought Software Solutions CC\TestIr	
Projection	Bands:	
Input Transform	Query Image Stats	
Event Scripts		
Editing		
All Properties		
	Autoload Fit on Autoload Dynamic Load	
		~
Colour Palette		
ОК	Apply Cancel	

Layer Properties	- 20141105-flare-171-304 1.jpeg	×
General		
Data	Layer type: Image Files	\sim
Styling	Settings	
Text		
Thematics	Image File Base Folder:	
Links	Image File/Folder: C:\Users\MarkDiamond\OneDrive - PrimeThought Software Solutions CC\TestIr	
Projection	Bands:	
Input Transform	Query Image Stats	
Event Scripts	Path Bands Width Height Description Projection	
Editing	▶ C:\Users\Mar 3 2048 1152 C:\Users\Mar	
All Properties		
	Autoload Fit on Autoload Dynamic Load Connections Choose predefined connection settings	~
Colour Palette		
ОК	Apply Cancel	

This image has 3 bands as we can see (Red, Green, Blue). An image can have more than 3 bands and often when it has 4 bands, the 4th band is a transparency, this type of band is referred to as 'Alpha'.

We can choose which bands to display, for example I will choose to only show band 1, by entering in 1 by the **Bands** field, this will give me a monochrome image (if this field is left blank it will just assume the default display of bands):

General							
Data	Layer type: In	nage Files					
Styling	Settings						
Text							
Thematics	Image File Ba	se Folder:					
Links	Image File/Fo	lder: C:\L	lsers\MarkDiamond	OneDrive	- PrimeThought	Software Solution	ns CC\TestIr
Projection	Bands:	1					
Input Transform	Query Ir	mage Stats					
Event Scripts	Path	Bands	Width	Н	leight	Description	Projection
Editing	▶ C:\Users	Mar	3	2048	1152	C:\Users\Mar	
All Properties							
Colour Palette	Autoload Connections	Fit on Auto	oload 🗌 Dynami	c Load settings:			

I can then press **Apply** to see what this looks like on my image:

Layer Properties - 20141105-flare-171-304 1.jpeg							×	
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Data	Layer	type: Image File	5					~
Styling	Setti	ngs						
Text		s sile provi soluti						
Thematics	Imag	ge File Base Fold	er:					
Links	Imag	ge File/Folder:	C:\Users\Mark	Diamond \OneDri	ve - PrimeThought	Software Solution	ns CC\TestIr	
Projection	Band	ls:	1					
Input Transform		Query Image Sta	its					
Event Scripts		Path	Bands	Width	Height	Description	Projection	
Editing	Þ	C:\Users\Mar	3	204	3 1152	C:\Users\Mar		
All Properties								
Autoload Fit on Autoload Dynamic Load Connections Choosepredefined connectionsettings								~
Colour Palette								
ОК		Apply	Cancel					

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	20141105	-flare-171-304 1.jpeg
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You can also choose the order of display of the bands, so for example I will put the ordering as 1,2,3 (the default display is 3,2,1), this will make my image a negative:

Layer Properties	- 20)141	105-flare-171-30)4 1.jpeg					>
General									
Data	Lay	yer t	type: Image Files	1					\sim
Styling	s	ettir	ngs						
Text			cile Deser Calife						
Thematics	11	mag	e File Base Foide	er:					
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Projection	В	and	s:	1,2,3					
Input Transform			Query Image Sta	ts					
Event Scripts			Path	Bands	Width	Height	Description	Projection	
Editing		۱.	C:\Users\Mar	3	2048	1152	C:\Users\Mar		
All Properties									
Autoload Fit on Autoload Dynamic Load Connections Choosepredefined connection settings							~		
Colour Palette									
ОК	Į		Apply	Cancel					

Spa	tialXL										3	*	×
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	1 🕅 🕿 🗶 I	5 📐 🔆 👰	9 📮 🐂 💈	\$ \$ \$ 4 X	0 Selected	। 🗣 🧮 🍕							
Main	View							-	Layers	~		푸	×
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	13 451	- 2	107.693; 2 537.656	· · · · · · · · · · · · · · · · · · ·	J 👁 -90.0	0, 0.00, 0.00							

What you can also do is query some further stats about the image which will bring up a graph showing the range of the colour band values, to get this, right click on the row in the grid and click **Stats**:

Layer Properties	- 20141105-flare-171-304 1.jpeg	×					
General							
Data	Layer type: Image Files	\sim					
Styling	Settings						
Text							
Thematics	Image File Base Folder:						
Links	Image File/Folder: C:\Users\MarkDiamond\OneDrive - PrimeThought Software Solutions CC\TestIr						
Projection	Bands:						
Input Transform	Query Image Stats						
Event Scripts	Path Bands Width Height Description Projection						
Editing	▶ C:\Users\Mar 3 2048 1152 C:\Users\Mar						
All Properties	Stats						
Autoload Fit on Autoload Dynamic Load Connections Choosepredefined connection settings							
Colour Palette							
OK	Apply Cancel						



The horizontal scale is the colour value for each band, and this value is the amount of red, green and blue light in each band. The vertical scale is the number of pixels containing that colour value for each band.

Theming on Colour Bands

Often when working in GIS you can get some images that are only one band such as TIF images showing world population data. These images display only one band, so the colour is monochromatic, and they will have pixels with a value indicating some attribute such as the number of people in that pixel area. A pixel with the value zero will display as black and will display lighter on a greyscale towards white with higher values.

Using our tools we can display and analyse these images meaningfully.

As an example here, I will bring in a TIF file I got from the WorldPop site showing population density data for Uganda, this data is shown in 100m by 100m pixels:



You can see as I've brought it in, that it is mainly a black square and not very useful to me. Zero values are black and so there is a lot of places where there are 0 people per 100m block.

The first thing we will do is query the image stats to see how the data looks:



Layer Properties	- uga ppp 2020.tif X
General	
Data	Layer type: Image Files ~
Styling	Settings
Text	
Thematics	
Links	Image File/Folder: C:\Users\MarkDiamond\PrimeThought Software Solutions CC\Derek Diamond - I
Projection	Bands:
Input Transform	Query Image Stats
Event Scripts	Path Bands Width Height Description Projection
Editing	▶ C:\Users\Mar 1 6515 6856 C:\Users\Mar GEOGCS["WGS
All Properties	
Colour Palette	Autoload Fit on Autoload ✓ Dynamic Load Max Dynamic Records: 20 000 ♀ Connections Choosepredefined connection settings ✓
ОК	Apply Cancel

Firstly, we can see here there is just one colour band in the image, we will query further by right clicking and then going to **Stats**:

Layer Properties	- uga ppp 2020.tif	×
General		
Data	Layer type: Image Files	\sim
Styling	Settings	
Text		
Thematics	Image File Base Folder:	
Links	Image File/Folder: C:\Users\MarkDiamond\PrimeThought Software Solutions CC\Derek Diamond - I	
Projection	Bands:	
Input Transform	Query Image Stats	
Event Scripts	Path Bands Width Height Description Projection	
Editing	C:\Users\Mar 1 6856 C:\Users\Mar GEOGCS["W	GS
All Properties	Stats	
Colour Palette	Autoload Fit on Autoload Dynamic Load Max Dynamic Records: 20 000 Connections Choose predefined connection settings	↓
ОК	Apply Cancel	



We can see from this that most of the pixels have a low value of population density, the population per 100m being shown on the horizontal scale and the number of pixels being shown on the vertical scale. This will cause the image to just show mostly as black.

In order to make this image more meaningful we can use our theming tools. Go to **Thematics** in the Layer Properties and create a new theme:

Layer Properties	- uga ppp	2020.tif							×
General	Themes	Colours	Thickness/Size	Heat Map	Images	ImageSizes	Charts	Scene Tips	
Data	Current	Theme:	Default						
Styling	Display	from Sca	le:	0 📥	to:		0 📥		
Text	Load ba	ased on S	cale:	w Theme	Make	Current	••		
Thematics	Theme	Name							
Links	 Defau 	lt					x		
Projection			The	D			-71		
Input Transform			Theme Name:	Pop/100m		_	_1		
Event Scripts					ОК	Cance	el 🛛		
Editing									
All Properties									
Colour Polotto									
			_						
ОК	Д	pply	Cancel						

Layer Properties	- uga ppp	2020.tif							×
General	Themes	Colours	Thickness/Size	Heat Map	Images	ImageSizes	Charts	Scene Tips	
Data	Current	Theme:	Pop/100m						9
Styling	Display	from Sca	le:	0 -	to:	600.000	000 📥		
Text	Load ba	sed on S		w Theme	Make	Current	••••		
Thematics	Thoma	Name							
Links	Default	t							
Projection	Pop/1	.00m							
Input Transform									
Event Scripts									
Editing									
All Properties									
Colour Palette									
OK	A	pply	Cancel						

Now, go to the **Colours** tab and drop down on **Colour Column** and you will see there are a number of columns in the data you can theme on, but the one that we are interested in is **Band 1**:

Layer Properties	- uga ppp	o 2020.tif										2	×
General	Themes	Colours	Thid	kness/Size	Heat Map	Images	ImageSizes	Charts	Scene 1	Tips			
Data													
Styling	Colou	ır Column:		1						*	\times	T	
Text				Name	Linked Na	ame /	Agggregation	Expres	ssion				
Thematics	Colour	based on	T.	RBC	RBC	1	1 0 C	RBC					
Links	Cho	oseUniqu	Þ.	Band_1				Band_	1				
Links				Path				Path		<u> </u>			,
Projection	1	/alue		Bands				Bands					
Input Transform	*			PixelsX				Pixels)	(
Event Scripts				PixelsY				Pixels'	(
Editing				Description	1			Descri	ption				
All Desperation				Projection				Projec	tion				
All Properties													
Colour Palette													
ОК		Apply	×						:]			

Now, go to the **Colour based on number ranges** tab since we will be colouring on a number range, then choose **Best Fill** to get the best range of values for the display of your data, if you want more values than the default 5 in the range, then change this to the desired amount in **Autofill values** and then click **Best Fill**:

Layer Properties	- uga ppp	o 2020.tif								×
General	Themes	Colours	Thickness/Size	Heat Map	Images	ImageSizes	Charts	Scene Tips		
Data									_	
Styling	Colou	ır Column:	Band_1					*	X	
Text						_				
Thematics	Colour	based on	text values Co	lour based o	n number	ranges				
Links	Map 7	ype: Line	ar 🗸 Flip	o Colours	Format:	0,0	∽ Autof	ill values: 5	-	
Projection	N	/alue			Colo	ur				Auto Fill
Input Transform				No Va	alue 🗆]				Best Fill
Event Scripts										Clear
Editing										Sort Asc
All Properties										Cart Dag
										Sort Dsc
										Datamine
Colour Palette										
ОК	4	\pply	Cancel							

Layer Properties	- uga ppi	o 2020.tif								×
General	Themes	Colours	Thickness/Size	Heat Map	Images	ImageSizes	Charts	Scene Tips		
Data										
Styling	Colou	ır Column:	Band_1					Ŧ	\times	
Text										
Thematics	Colour	based on	text values Co	lour based o	n number	ranges				
Links	Map 1	Type: Line	ar 🗸 Flip	Colours	Format:		 Autor 	fill values: 5	-	
Projection	1	/alue			Colo	ur				Auto Fill
Input Transform	•				0	144, 238, 14	14			Best Fill
Event Scripts					0.6	166, 190, 11	.5			Clear
Editing	_				1.2	188, 142, 86	5			Cathler
All Properties	-				2.4	210, 95, 57				SOIT ASC
	*			No Va	alue]			_	Sort Dsc
									- 1	Datamine
Colour Palette										
ОК]	Apply	Cancel							

You can change the colours and numbers as desired; I am happy with this so I will leave it and click **OK**:



As you can see now we have a much more meaningful picture, we can now tick off the zero values since we are not interested in them:



To get rid of this outlining border we can simply set our border thickness as zero in the Layer Properties:





We can now analyse the data in this image nicely and tick on and off the values we do and don't want to see, for example here I ticked on only those places with a population of more than 2.4 people per 100 meters:



To see the underlying places on the map better we can also make the image more transparent in the Layer Properties:

Layer Properties	s - uga ppp 2020.tif	×
General	Description: uga ppp 2020.tif	
Data	Display Layer (Will render on Map, otherwise just holds data)	Reload
Styling	Display from Scale: 0 🔹 to: 6 000 000 🜩	
Text	Transparency: - +	
Thematics	🖉 Selectable 🖉 Snapable 📄 Editable 🖓 Include in legend 📄 Background layer	
Links	Read Only Data Read Only	
Projection	🗹 Publish 🛛 Publish Readonly 🗹 Publish Data Readonly	
Input Transform	Mnemonic Display	
Event Scripts	Image: Change Clear	
Editing		
All Properties		
Colour Palette		
ОК	Apply Cancel	



Loading Multiple Images

In bringing in images it is also possible to bring through multiple images at once in one layer. For example, if I go to the Layer Properties of this image I brought in, you can see the file path for the image:





Layer Properties	- 20141105-flare-171-304 1.jpeg	<
General		
Data	Layer type: Image Files ~	
Styling	Settings	
Text		
Thematics	Image File Base Folder:	
Links	Image File/Folder: C:\Users\MarkDiamond\OneDrive - PrimeThought Software Solutions CC\TestIr	
Projection	Bands:	
Input Transform	Query Image Stats	
Event Scripts		
Editing		
All Properties		
	Autoload Fit on Autoload Dynamic Load Connections Choosepredefined connection settings:	
Colour Palette		
ОК	Apply Cancel	

If the folder this image is in contains other images that I would also like to load, I can just put in the file path to that folder in the **Image File Base Folder** field:

Layer Properties	- 20141105-flare-171-304 1.jpeg	×
General Data	Layer type: Image Files	~
Styling	Settings	
Text	Image Eile Base Felder: Cullinge Med Dispand Ope Drive Drive They get Cofficient Collige Collige to	
Thematics	Image File Base Folder: C: Users Warkblamond Unebrive - Prime mought Software Solutions CC (resur	
Links	Image File/Folder:	
Projection	Bands:	
Input Transform	Query Image Stats	
Event Scripts		
Editing		
All Properties		
	Autoload Fit on Autoload Dynamic Load Connections Choose predefined connection settings	~
Colour Palette		
ОК	Apply Cancel	

I can then click OK and all the images in that file will be loaded:



In this example the folder only had one other image and so two images are now loaded and can be seen in the scene. If I query image stats, I can also see the two images listed and their respective stats:

Layer Properties	- 2	0141	105-flare-171-30)4 1.jpeg					×
General	_								
Data	La	ayert	type: Image Files	3					\sim
Styling	F	Settir	ngs						
Text			s sile passa sa lala		D:		0.0		
Thematics		Imag	e File Base Folde	er: C: Users Mark	Diamond (OneDr	ve - Prime i nought	Software Solution	is CC\TestIr	
Links		Imag	e File/Folder:						
Projection		Band	s:						
Input Transform			Query Image Sta	its					
Event Scripts			Path	Bands	Width	Height	Description	Projection	
Editing		÷	C:\Users\Mar	3	204	3 1152	C:\Users\Mar		
All Properties			C:\Users\Mar	4	20	200	C:\Users\Mar		
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	5	Z Au	itoload 🗌 Fit (on Autoload 🗌	Dynamic Load				
		Conr	ections Choos	epredefined con	nectionsetting	5			\sim
Colour Palette									
				-					
ОК			Apply	Cancel					

Draping Images onto Surfaces

You can drape an image file such as an ECW file onto a surface so that it shows in 3D with elevations.

First of all, you need a surface. You then right click on that surface layer and go to Properties.



Then, go to Styling > Surfaces:

Layer Properties	- New	Surface							×
General	Basic	: Images	and Icons	Line Images	Grid objects	Surf	faces		
Data	Drap	e Images							
Styling	Drag	a column h	neader here	e to group by t	that column				Q
Text		Name	Bas	se Point	Vx		Vy	 Scale	Projection WKT
Thematics					1			1	
Projection									
Input Transform									
Event Scripts									
Editing									
All Properties									
Colour Palette									
ОК		Apply		Cancel					

Right click in the blank area and select "Add":

Layer Properties	- New	Surface							×
General	Basic	Images	and Icons	Line Images	Grid objects	Surface	es		
Data	Drape	e Images							
Styling	Drag	a column h	eader here	e to group by t	hat column				Q
Text	N	lame	Bas	se Point	Vx	Vy		Scale	Projection WKT
Thematics									
Projection									
Input Transform				≡ ⁺ A	dd				
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Editing				Xĸ	emove				
All Properties				🥜 o	lear				
				🖻 E	xport				
Colour Palette									
ОК		Apply		Cancel					

Browse to the location of the image file that you want to drape, then click {Open}:

Organise	▼ New folder		≣	• 🔳 💡
	Name	Status	Date modified	Туре
I	Dopani - 000269.ecw	Ø A	2025/02/17 14:10	ECW File
	File name: Mopani - 00	0269.ecw	✓ Image files (*.jpg;	*.jpeg;*.png;*. ~
			Open	Cancel

The image will then be loaded and you can then click {OK}:

Layer Properties - New Surface X									
General	Basi	c Images a	and Icons	Line Images	Grid objects	Surf	faces		
Data	Drag	pe Images							
Styling	Drag a column header here to group by that column \mathcal{P}								
Text		Name	Bas	se Point	Vx		Vy	Scale	Projection WKT
Thematics	►	Mopani - 00)0233	3000 -26450	1000 0 0		1000 0 0	0	
Projection									
Input Transform									I
Event Scripts									
Editing									
All Properties									
									I
									I
									I
Colour Palette									
ОК		Apply		Cancel					

The image has now been successfully draped onto the surface:





The image you are draping will need to have location data with it so it can be draped correctly, some files like ECW files already have this within them. Other file formats might have an additional file that comes with them that has the location data and as long as that additional file is in the same folder location of where you are loading the image from then it will plot correctly.

If the image file you have loaded does not have location data with it then you will see this by the fact that the "Base Point" field has all 0 values:

Layer Properties - New Surface X									
General	Basi	c Images and Ic	ons Line Images	Grid objects	Surfaces]			
Data	Drag	pe Images							
Styling	Drag a column header here to group by that column								
Text		Name	Base Point	Vx	Vy		Scale	Projection WKT	
Thematics	•	Mopani - 0002	-33000 -26450	1000 0 0	1000	0 0	0		
Projection									
Input Transform									
Event Scripts									
Editing									
All Properties									
Colour Palette									
ОК		Apply	Cancel						

In the case where your image does not have location data with it you will need to first register the image using the "Register Image" tool found in the "Tools" tab of your spatial product:



For data on how to use the Register Image too please refer to the <u>user guide</u> on it.

Once the image is registered, you can then load the image and do the draping as above.

Finally, you are able to also set a scale for your draped image, in the "Scale" field, so that it only loads and displays on your surface at a certain scale of the map; this is useful for if you are zoomed out far from the surface and you don't need the whole image to be loaded and displayed and it can then display only when zoomed in close enough, this will improve performance.



Layer Properties - New Surface									
General	Bas	ic Images	and Icons	Line Images	Grid objects	Surf	aces		
Data	Dra	pe Images							
Styling	Drag a column header here to group by that column \mathcal{P}								
Text		Name	Bas	se Point	Vx		Vy	Scale	Projection WKT
Thematics	+	Mopani - 00	00233	3000 -26450	1000 0 0		1000 0 0	9280	
Projection									
Input Transform									
Event Scripts									
Editing									
All Properties									
Colour Palette						_			
ОК		Apply		Cancel					

In this screenshot you can see I zoomed out far to a scale of 50,000 and so this has gone past the cut-off point of 9,280 that I set for my scale and so the image will not display at that scale:



What you can also do is load multiple images to drape and give each it's own scale that it will display at, for example you may choose a lower resolution image to display at a far out scale and only use the high resolution image at a closer scale:

Layer Properties - New Surface X									
General	Basi	c Images a	and Icons	Line Images	Grid objects	Surfaces			
Data	Dra	pe Images				-			
Styling	Drag a column header here to group by that column \mathcal{P}								
Text		Name		Base Point	Vx	Vy	,	Scale	Projection WKT
Thematics	•	Mopani - 00	0269.ecw	-33000 -264	5 1000 0 0	10	00 0 0	9280	
Projection		Mopani - Lower Res		-33000 -264	5 1000 0 0	10	1000 0 0 100000		
Input Transform									
Event Scripts									
Editing									
All Properties									
Colour Palette									
ОК		Apply		Cancel					

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