

Submission Interfaces

Like the menu and panel plugin types, the submission plugins are written in [Python 3](#). Each submission plugin is executed directly by the plugin system so, for example, you can use Python to automate the building of parameters, pre-fill default values, or adapt to changes the user makes.

The best place to start when creating a new submission plugin is to copy an existing one that's closest to what you intend to make. For the purposes of this documentation we'll start from scratch and create a new plugin for making proxy images using [imagemagick](#).

The process is as follows:

1. Add the submission type.
2. Add a new page for the input path field.
3. Add parameters.
4. Override defaults for fields in the Qube Basics page.
5. Set the command template.

1. Add the submission type

The first thing to do is tell the UI we're adding a new submission plugin, we do this by calling the built-in function `add_submission_type()`. For this example we use the following parameters:

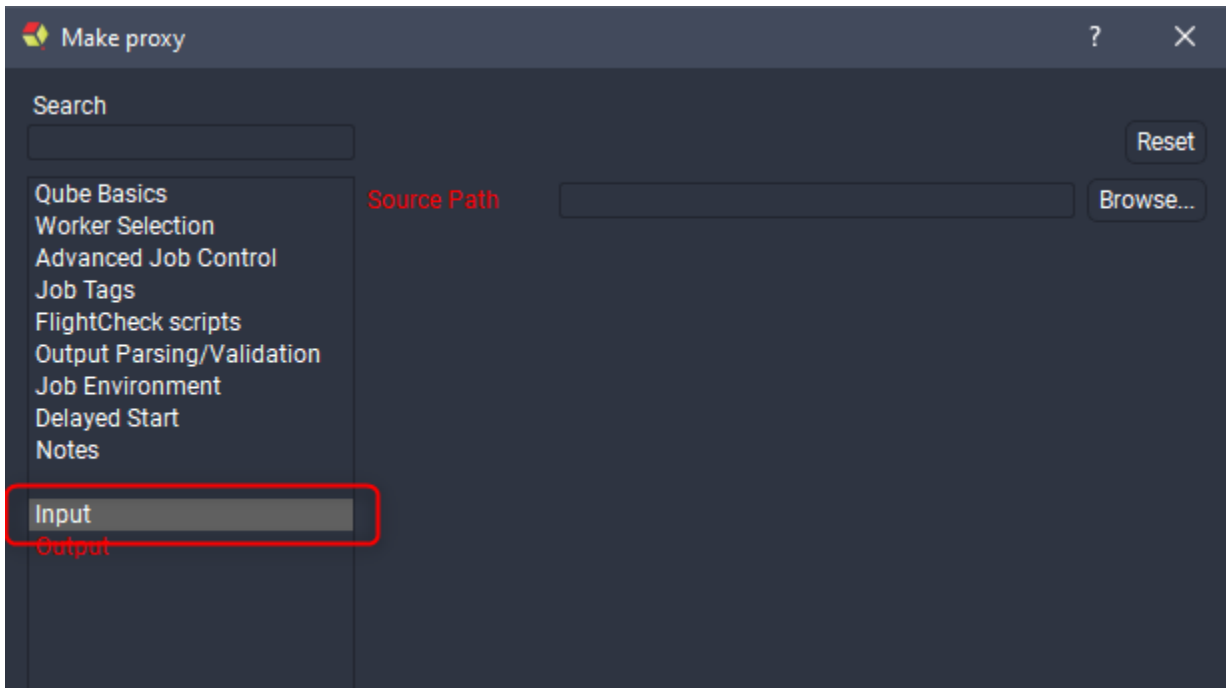
```
# Create a new submission type
add_submission_type('Make proxy',
                    short_name='Make Proxy',
                    type="makeProxy",
                    has_range=False,
                    can_batch=False,
                    thread_control='all',
                    prototype="cmdline",
                    group="Pipeline")
```

Argument	Type	Default	Comment
type	string		The type identifier for this submission plugin. The type identifier is used, among other reasons, to determine a job's submission type which allows the UI to open the correct submission dialog upon job resubmission.
prototype	string	cmdline	The Qube! submission prototype.
short_name	string		An alternative, shorter name for the submission plugin type, used when UI space is tight.
has_range	boolean	False	Whether the plugin should display range related fields in the Qube Basics page.
thread_control	string		An empty string or "false" hides the Threads per instance and Instances use all cores fields from the Qube Basics page. Any other value that is not "all" will hide the Instances use all cores field only.
can_pad_frames	boolean	False	A value of True will include a Frame Padding field in the Qube Basics page.
can_batch	boolean	False	Allows generation of partitions or chunks in the submitted job.
pre_show_validate	Python function	on_pre_show_validate	This Python function is called before pre_dialog and should return a boolean that determines whether the submission dialog should be shown.
pre_dialog	Python function	on_pre_dialog	This Python function is called immediately before the submission dialog is shown.
post_dialog	Python function	on_post_dialog	This Python function is called after the job is created and the submission dialog is closed but before submission.
post_submit	Python function	on_post_submit	This Python function is called after the job is submitted.
install	Python function	install	This Python function is called when selecting the corresponding menu item in the File->Install App UI menu.

2. Add a new page for the input path field

Use pages to group related fields together. We add pages by calling `add_page()` with a single argument, the page's name.

```
add_page("Input")
```



3. Add parameters

After you add a page it becomes current, every field that follows is added to that page until you add a new one. We'll add a Source Path field using `add_field()`.

```
add_field("Source Path",
          type="path",
          required=True,
          destination="package.sourcePath")
```

A description of all supported field types and their arguments is included at the end of this page so we'll just go over the arguments used in this example here. The first argument is always the name of the parameter and is generally shown along side the parameter in the submission dialog. The `type` argument is optional but recommended, it explicitly specifies what kind of parameter this is, such as a text field, a list or in this case a directory path (if we wanted a file path we'd use 'filename' as the parameter type). The `required` argument, when True, stops the user from submitting their job until the parameter has a valid value in the submission dialog. The `destination` argument tells the UI to store the value of the parameter in the submitted Qube! job in the specified position, in our example we store the *Source Path* in the job package. After submitting the job we can retrieve the value like this:

```
>>> my_job = qb.jobinfo(id=103307)[0]
>>> print(my_job['package']['sourcePath'])
/film/rotk/cv28_k1/2d/comp/3_01/1920x1080
>>>
```

You can also view it in the *Job Package* section of the *Job Internals* panel inside Qube! UI.

Let's keep going and make a parameter for the output path.

```
add_page("Output")

add_field("Destination Path",
          type="path",
          required=True,
          destination="package.destinationPath")
```

First we make a new page for our output parameters. The *Destination Path* parameter is nearly identical to our *Source Path* parameter so we skip explaining it and move on.

```
add_field("ProxyScale",
          default=50,
          min=1,
          max=100,
          required=True,
          destination="package.proxyScale")
```

We now add a parameter to specify the scale of the proxy as a percentage, this parameter is also required but since it also has a default (50%) we don't need to fill it manually, as long as we're happy with a 50% proxy that is. Notice that we haven't specified the parameter type, the UI infers that this is a integer spin box from the fact that we have *min* / *max* arguments and their values are integers. If no type can be inferred by the arguments the UI will use a single line text field (*string* type), this would have been the case for our source/destination path parameters if we hadn't explicitly set the type to *path* .

```
add_field("File Pattern",
          type="string",
          default="*.exr",
          required=True,
          destination="package.filePattern")
```

Our last field is a simple single line text field that allows the user to specify a file glob for the images to be resized, we set it's default to **.exr* .

3. Override defaults for fields in the Qube Basics page

For our proxy submission type we only want a single worker processing the images so we need to override some preexisting values controlling this.

```
set_field(page="Qube Basics", name="Farm Concurrency CPUs", value=1)
set_field(page="Qube Basics", name="Farm Concurrency Max", value=1)
set_field(page="Qube Basics", name="Retries", value=0)
set_field(page="Qube Basics", name="Retry Delay", value=0)
```

To set existing fields we use their page and parameter names and pass in a new value. Note that both page and parameter names are case sensitive.

4. Set the command template.

```
# Set the command template
set_command_template('mkdir -p %(Source Path)s/proxy; /usr/local/bin/magick mogrify
-path %(Destination Path)s -resize %(ProxyScale)s%% %(Source Path)s/%(File Pattern)s')
```

The command template is where we specify the commands to be run on a Qube! worker during job execution. Firstly, for those new to Python you can create a string variable like this:

```
>>> my_dictionary = {}
>>> my_dictionary['name'] = 'Joe'
>>> my_dictionary['place'] = 'Rylstone'
>>> my_string = 'Hello %(name)s, have you been to %(place)s?' % my_dictionary
>>> print(my_string)
Hello Joe, have you been to Rylstone?
>>>
```

The command template works in the same way, where the parameter names act as the keys to the dictionary. In our example command template we make a new directory and then run *magick* to resize the images.

Supported Parameter types

Common arguments

Argument	Python Type	Default	Comment
name	str		The name of the parameter is used both as the label next to the parameter in the submission dialog and to refer to it elsewhere in the plugin. The name argument is required.
type	str	string	The type of parameter, can be one of (bool, int, float, string, text, path, filename, list, combo, combo_file, combo_path, table, datetime, selectorString).
required	bool	False	Whether the parameter must be set with a valid value before submission.
destination	str		Where to store the value in the job, for example <i>package.mayaExecutable</i> .
arg	str		The command line argument associated with the parameter.
default	Parameter type specific		A pre-filled value.
enabled	bool	True	Whether the value is editable or grayed out.
quote	bool	False	Whether the value of the parameter should be surrounded by double quotes.
set_on_resubmit	bool	True	When resubmitting a job the parameter's value is set to that of the value of the job being resubmitted.
separator	str	,	When a parameter has several values such as list selections this string is used as the separator.
arg_value_separator	str	[a single space]	The string used to separate the parameter's <i>arg</i> with its value. For example if the command line argument needs to be in the form <i>myArg=myValue</i> the <i>arg_value_separator</i> should be =.
suppress_path_conversion	N/A	N/A	If this argument is set then the value (if it's a <i>path</i> or <i>filename</i> parameter) will not be surrounded by QB_CONVERT_PATH().
on_change	Python function taking 0 arguments		The given function is called whenever the value of this parameter or any parameters in it's watch_list change.
watch_list	list of str		A list of references to other parameters in this plugin. The page name and parameter names are separated by two colons, for example ["Qube Basics::Threads per instance", "Qube Basics::Instances use all cores"].

string

A simple single line text field.

Argument	Python Type	Default	Comment
editable	bool	True	Whether the user can change the value of the parameter.

text

A multi line text field.

bool

A checkbox.

Argument	Python Type	Default	Comment
bool_map_true	str	True	The string value used for the parameter's value when the checkbox is checked. For example you can set this to things like <i>on</i> , <i>1</i> , <i>yes</i> , etc.
bool_map_false	str	False	The string value used for the parameter's value when the checkbox is unchecked. For example you can set this to things like <i>off</i> , <i>0</i> , <i>no</i> , etc.

int

A integer spinbox.

Argument	Python Type	Default	Comment
min	int	-2147483648	The minimum value for the spinbox.
max	int	2147483647	The maximum value for the spinbox.

float

A floating point spinbox.

Argument	Python Type	Default	Comment
min	float	-1.79769e+308	The minimum value for the spinbox.
max	float	1.79769e+308	The maximum value for the spinbox.

combo

A drop down menu, allows for a single selection from a list of items.

Argument	Python Type	Default	Comment
items	list of str		The list of available choices in the combo.
editable	bool	False	If True, the user can type in a custom value. If False, the user can only choose from the given items.

path

A single line text field with a browse button that opens a file dialog to select a directory path.

Argument	Python Type	Default	Comment
use_native_separators	bool	False	If True, the path will use platform specific directory separators, ie / on Linux and macOS, \ on Windows.

combo_path

The same as the path parameter type but also allows for selection of paths from a *combo*.

Argument	Python Type	Default	Comment
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use_native_separators	bool	False	If True, the path will use platform specific directory separators, ie / on Linux and macOS, \ on Windows. If False / is used on all platforms.
items	list of str		A list of paths to show in the combo.

filename

A single line text field with a browse button that opens a file dialog to select a file path.

Argument	Python Type	Default	Comment
use_native_separators	bool	False	If True, the path will use platform specific directory separators, ie / on Linux and macOS, \ on Windows. If False / is used on all platforms.

combo_file

The same as the filename parameter type but also allows for selection of file paths from a *combo*.

Argument	Python Type	Default	Comment
use_native_separators	bool	False	If True, the path will use platform specific directory separators, ie / on Linux and macOS, \ on Windows. If False / is used on all platforms.
items	list of str		A list of paths to show in the combo.

list

A list box where the user can select either a single or multiple values.

Argument	Python Type	Default	Comment
items	list of str		The items to display in the list.
multi_select	bool	True	Whether the user can select multiple items in the list, or just one.

table

A table of values of given dimensions that the user can enter values.

Argument	Python Type	Default	Comment
dimension	(int, int)	(0, 2)	The initial number of rows and columns in the table.

datetime

A date and time selection parameter.

selectorString

A *selectorString* parameter uses a Python function to generate a list of strings, take this example from the *Worker Selection* page (found in *python/99_qube_parameters.py* in the standard plugin path on your system).

```
def uniqueNoEmpty(l):
    regex = re.compile("^\\s*$")
    return list(set([i for i in l if not regex.search(i)]))

def hostsSelector():
    return uniqueNoEmpty([host['name'] for host in qb.hostinfo()])

...

add_field("Hosts",
          tooltip="Specify which workers will run this job.\nSelecting no workers
means that all workers "
              "are eligible.",
          destination="hosts",
          selector=hostsSelector)
```

Here we create a Python function that takes no arguments and returns a list. We use the Qube! Python API module *qb* to find all Qube! workers and return that. Here's how that looks on my Qube! network after clicking the corresponding . . . button.

The screenshot shows the 'Make proxy' dialog box with the 'Worker Selection' tab selected. The 'Hosts' section is highlighted with a red box, showing a list of workers: Franks-Mac.local, Hitch.local, Poseidon, Loki, and qubedev-centos82-01. Each worker has a checkbox and a three-dot menu button. The 'Groups' section is empty. Below the 'Hosts' section are fields for 'Omit Hosts', 'Omit Groups', 'Priority Cluster', 'Host Order' (set to '+host.processors.avail'), 'Requirements', 'Reservations', and 'Restrictions'. At the bottom, there are 'Template' and 'Command line' sections with text input fields, and 'Submit' and 'Cancel' buttons.

Argument	Python Type	Default	Comment
opttype	str		If the opttype is radio the selectorString will use radio buttons instead of checkboxes, meaning that only a single value can be selected.

selector	Python function taking 0 arguments and returning a list of str		A Python function that returns the list of items to use in the selector.
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