Dynamic Attributes

This project revolves around making components in a system more flexible. Imagine you have different types of components like *screws* and *LEDs*. These components have various details like *material, size, color, voltage,* and more. The catch is, each type of component has different details unique to them.

Traditionally, systems force all components to fit into the same set of details, which doesn't work well. So, we're introducing a system where users can add and adjust details for each component as they need.

Advantages:

1. **Get Specific with Component Details:**

Users can now be very precise about what makes each component special. This means better and more accurate descriptions for each one.

1. **Keep Component Names Simple:**

Instead of complicated names, we can use simpler names for components. The extra details are taken care of by our system, making everything clearer.

1. **Find Components Easily:**

Searching for components becomes a breeze. You can use all sorts of details to find exactly what you need.

Dynamic Attributes in API:

Dynamic attributes is implemented as **key, value pair** which uses elasticsearch. It has **one-to-many** mapping with the Metadata Model.

```
class Attribute(ElasticSearchBase):
    """
    Represents an attribute of a component.

    This class inherits from `ElasticSearchBase` and provides a method for performing an Elasticsearch search
    based on a specified search key. It returns a set of matching names.

    Args:
        search_key (str): The key to search for.

    Returns:
        set[str]: A set of matching names.
    """

    __tablename__: str = "attributes"
    __allow_unmapped__ = True

    key = Column(String(50), nullable=False)
    value = Column(String(200))

    metadata_id = Column(GUID(), ForeignKey("metadatas.id"), nullable=False)
```

Uses:

New searching system is backwards compatible. User searching for a component need to enter the name of the component in the search bar. For improving the searching results for more accurate results, user can make use of attributes searching feature by following a simple **syntax** :

```
component_name key:value
```

- Each search query must contain **component_name**
- **component_name** and the attributes must be separated by a single *(space)* character.
- An **attribute** consists of a key and a value connected with a single :*(colon)* character.
- **Key** can be used stand alone but must be followed by a single :*(colon)* character.

- **Value** can be used stand alone but must be preceded by a single :*(colon)* character.

- **Using key:value pair**

  User can search with any number of **key:value** pairs.

```
component_name key1:value1 key2:value2 key3:value3...
```

1. **Using only key**

   If user wants to search only those components which has a specific **key** defined in it, it can be done in the following way:

```
component_name key1: key2: key3:...
```

1. **Using only value**

If user wants to search only those components which has a specific **value** defined in it, it can be done in the following way:

```
component_name :value1 :value2 :value3...
```

1. **Using combination**

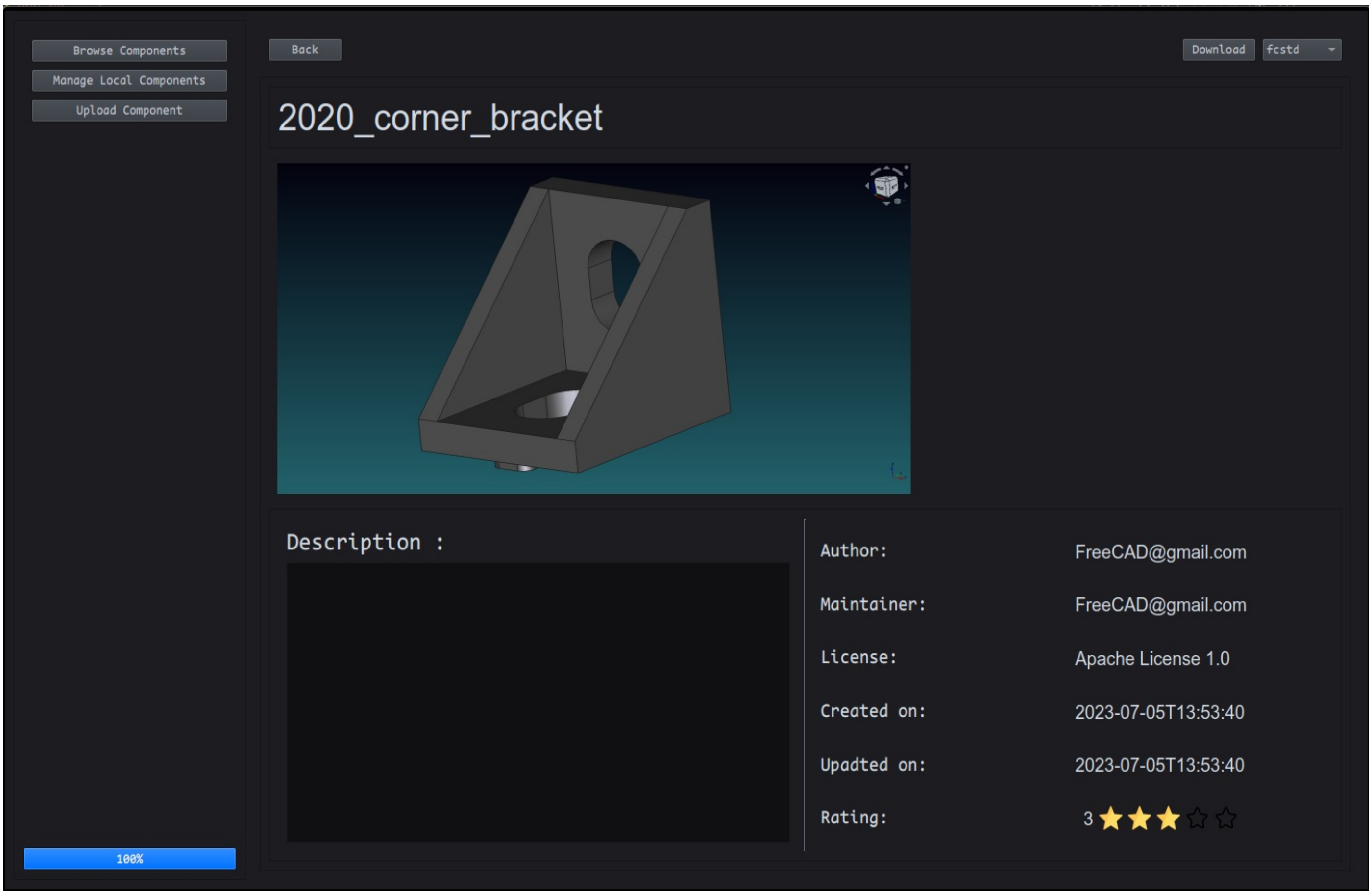
A combination of **key:value** pairs and **keys** and **values** alone can be used simply by combining the syntax.

```
component_name key1:value1 key2:value2 key3:value3 :value4 :value5 key4: key5: value6 key:6...
```

*The order of attributes **key:value, key:** & **:value** does not matter and has no effect on the results.*

UI changes:

Before:



2020_corner_bracket

Description :

Author: FreeCAD@gmail.com

Maintainer: FreeCAD@gmail.com

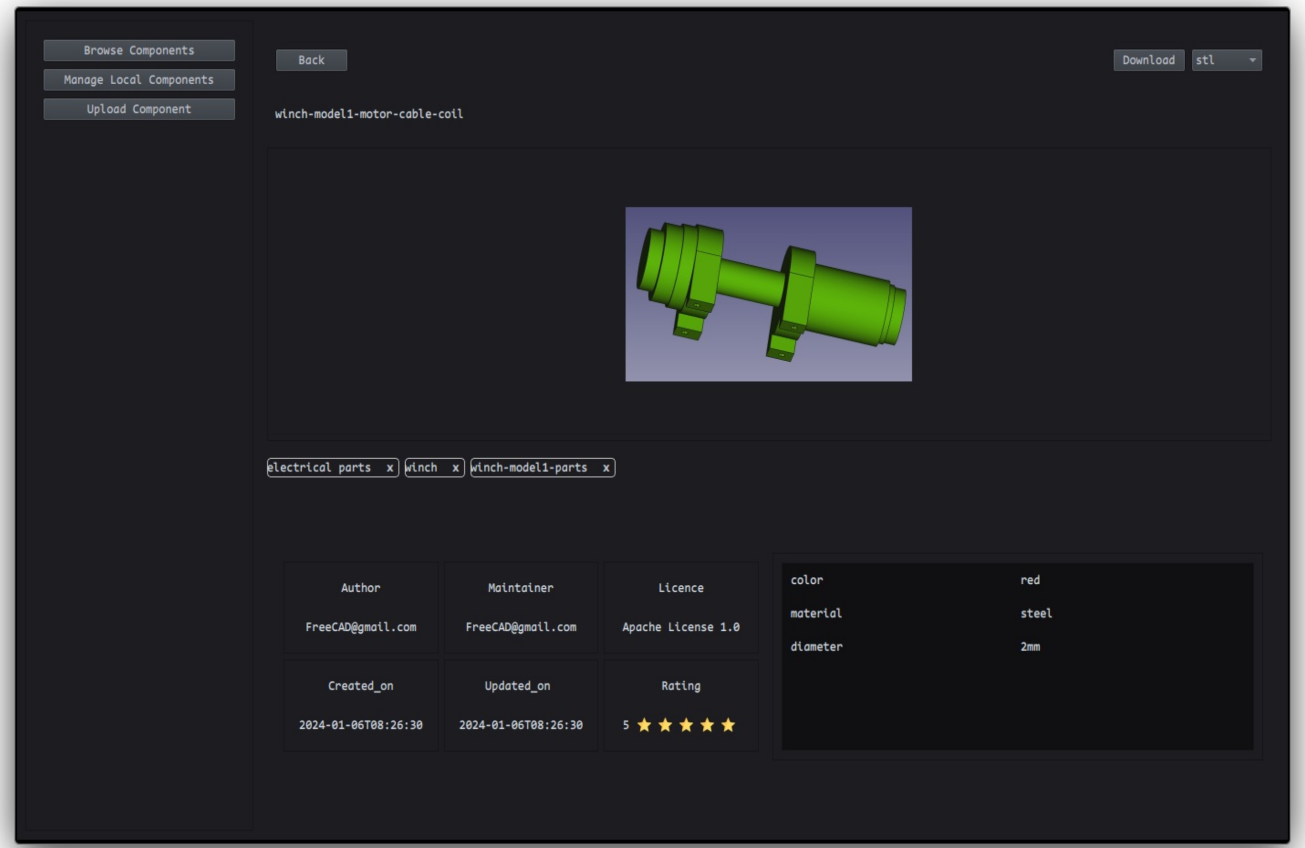
License: Apache License 1.0

Created on: 2023-07-05T13:53:40

Updated on: 2023-07-05T13:53:40

Rating: 3 ★★★☆☆

After:



winch-model1-motor-cable-coil

Author	Maintainer	Licence
FreeCAD@gmail.com	FreeCAD@gmail.com	Apache License 1.0
Created_on	**Updated_on**	**Rating**
2024-01-06T08:26:30	2024-01-06T08:26:30	5 ★★★★★

color	red
material	steel
diameter	2mm

Old User Interface VS New User Interface

1. The thumbnail is small, centre aligned and is with a scrollable widget so that more thumbnail can be accommodated easily.
2. The size of the description box of thumbnail is resized and made small to save necessary space.
3. The format of the meta data is changed in a manner that it is more space efficient with better visuals.
4. A scrollable area is added for the dynamic attributes.
5. The tags of the component are now listed in the detailed UI.