# Project description

For this web-app project I would like to use Python3, Flask, Jinja as templating language. The web-app is run only on Linux. Codename for this project is "ConfigHub".

Goal of this web-app is to manage be a configuration management and deployment tool for network devices. The web-app should read a pre-defined directory structure: <node family> -> <node class> -> <node name>. Inside <node name> there would be an additional file structure detailed below. <node family> is placed in the <root folder> folder.

The project should be a frontend to a file structure that can be used in cli to manually generate config from Ansible playbooks that is stored in the subfolder of <node name>.

This folder structure is meant to store and manage jinja2 templates, yml files, inventory files, and ansible playbooks for configurations for network equipment.

The web-app must support login with a user database. Each action of the user should be logged. If the user does an action that commits to the git repo , the user credentials should be used. The user login system must be prepared to use AD LDAP in the future. So the web app must have a configuration file were one can select if one is to use local user db, or AD LDAP.

## Description of "Prepare configuration" page

The work-flow of the web-app is that first we are presented with the "Prepare configuration page" - At its very first display there would be nothing displayed except for the title of the page and  "Sync with gitlab" button. Pressing this button would at first run clone the specified remote git repository down to the <root folder>. This root folder should be at a seperate location than the web-app. e.g. /opt/NetworkConfigGenerator. This location should be specified in a .env file in the web-app folder. The link to the remote git repo is also specified in the .env file together with the token needed to access the repo.

After the repo is cloned. If the "sync with gitlab" button is pressed again, any changes to the repo should be added and committed, then the repo should be pulled, and then pushed. If any errors, a link should be displayed under the button, to a page were the error can be displayed in full.

Please look at "Prepare configuration page" to see the layout of this view.

When the filestructure is synced, the web-app should read the structure and be prepared to display it as the user selects the different items on the different levels.

If I select an item on the "<node family>" level, the other levels should show the first item at each level. If the user then selects a different item on the next level "<node class>", then "<node names>" for that "<node class>" directory should be displayed. Again the first of "<node names>" should be selected by default.

The <template name>.yml files  of "<node name>"/vars should be  shown in the "<jinja template>" column in the "Prepare configuration page". There should always be a corresponding <template name>.j2 template file in <root folder>/template/<node family>/<node class>/. If this file lacks the web-app should display a warning for each file missing.

The web app should remember the users selection if the user switches to a different view. The user can only select one item in the columns "<node family>, <node class>, <node name>". But the user can select one or more items in the "<jinja template>" column. If so, the web app should display the .yml files in the column of "variables for template .ymls" for each of the selected items in the column <jinja templates>. The content of <jinja templates> is populated from the filenames in the <node name>/vars/*.yml, if there is a corresponding .j2 file in the template folder of <root folder>/template/<node family>/<node class>/. Again, if this is not so, the web app should display a warning for each missing template.

If the user wants to edit the data of the variable, the user can click the data part of the variable, and be able to type in a new string in the data variable field. The .yml file on disk should then be updated. From this view the user may not edit the variable name. Only the data. The configuration should be updated live when the user selects or edit any times. The configuration should be stored in the <node name>/preview/ folder. The configuration header should display the date time it was generated in a human readable format. It should read from a file in <node family> which style of commenting it should use.

When the user is happy with selected templates, and their corresponding .yml files, that now contains the right data. The user can press the "Prepare to deploy" button. The user will then be taken to the "Prepare to deploy" page.

## Description of "Prepare to deploy" page

Please refer to the section of "Prepare to deploy page" for the layout. This page have three functions, sectioned into three parts.

First part is to display the generated config. This config is loaded from the <node name>/preview folder.

Second part is to run the verification scripts and display status message, and any error message.

Third part is to run ansible which is used as our deployment engine, and to display status messages from it, and the network equipment. When deployment is run, logging as defined in section "Directory structure of <node name>" should be done.

Would be preferable if the status text in the output part from ansible is updated live for the user after the deploy button is pressed.

## Description of "Manage templates and variables" page

If the "Add new" or the "edit symbol" in the template name item is pressed in the <jinja template> column in the "Prepare configuration page", the user is directed to the "Manage templates and variables page" were the user can edit the .j2 template file, and the .yml file.

If the user selected "Add new" in the previous page, the <jinja2 template> string is made into a text field which is selected, ready for the user to type in a filename. The user must just type in the first part of the name. not the suffix. If the user do write in a suffix. eg. .j2 or .yml, or any other .XXX. This is removed. So the web-app verifies that the file is stored with the correct filename of <template name>.j2 and <template name>.yml

So when the  user press' the button "save", the user should be asked if he/she really wants to make this change. If so , the <template name>.j2 is saved to <root folder>/template/<node family>/<node class>/ , and the <template name>.yml is saved to the folder <node name>/vars.

The gitlab status symbol on the "Prepare configuration page" should be changed to a yellow ! - Indicating  that there is unsynced content in the file structure.

## Directory structure of <node name>

- inventory
  - inventory file in the Ansible file format.
- vars/
  - all of the variable files in .yml format
- preview/
  - The generated configuration file. Used same filename. Should only contain one file at all times.
- logs/
  - deployment_date_time/
    - Deployment logs.
    - Config backup of <node name> before change.

    - Deployment config.
- verification/
  - verification python scripts that take in <hostname> <mgmt_ip> <variable to verify>
  - <filename same as verification variable name in yml file>
    - e.g. if variable name is verify_ip, the python script is named verify_ip.py
- Generated Ansible playbook file.

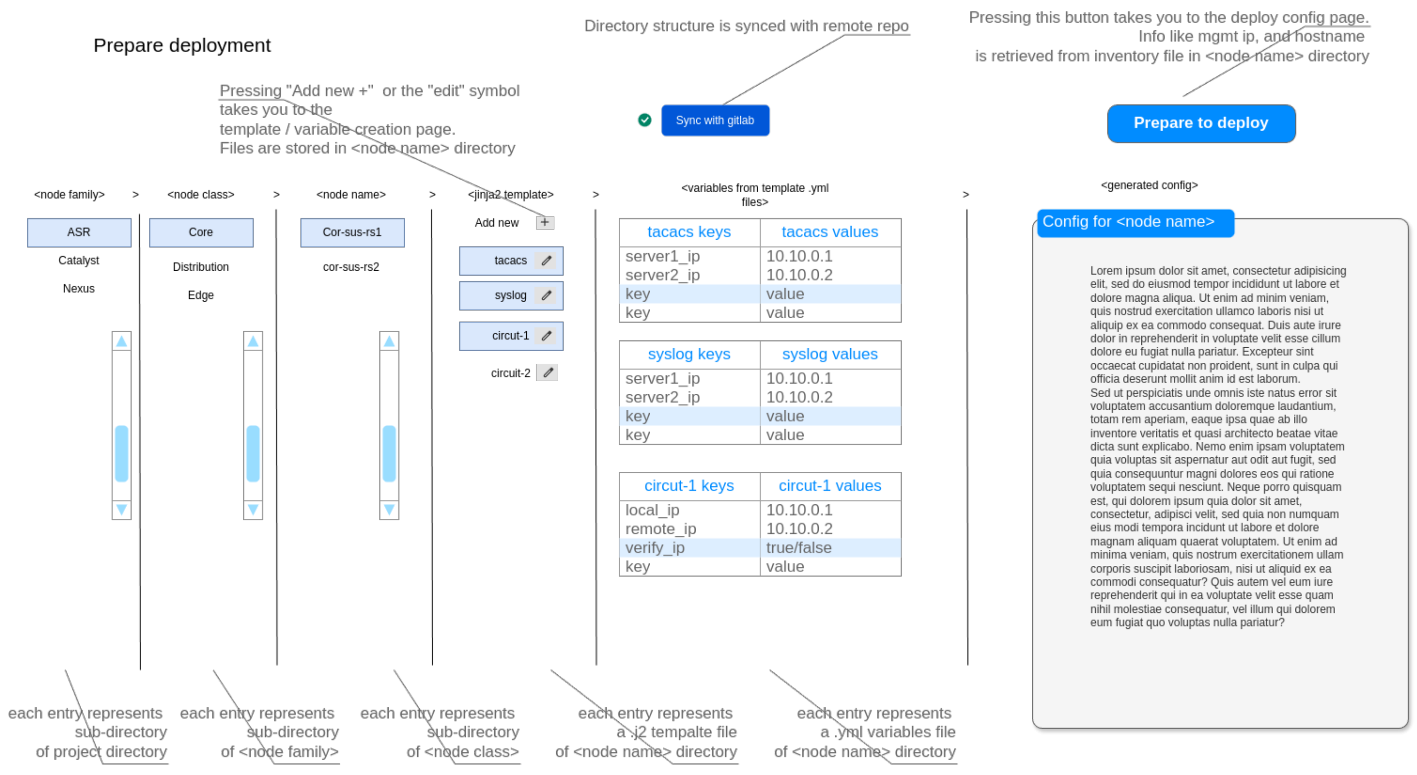
## Directory structure of the <root folder>/template

The template folder is placed at <root folder>/template/<node family>/<node class>/ - e.g. so the templates are grouped in <node family> and <node class>

<node family> is the model family of the equipment, like ASR, or Catalyst, or Nexus, and the <node class>, is the three layer network architecture of "Core", "Distribution", or "Edge". To both of <node family>, or <node class> there could be additional folders.

This template folder mirror the <node name> folder structure. <node name> is to refer to the <root folder>/template structure for its templates since this is common for the <node family>/<node class>/ grouping.

## Prepare configuraton page



Directory structure is synced with remote repo

Pressing this button takes you to the deploy config page.
Info like mgmt ip, and hostname
is retrieved from inventory file in <node name> directory

Pressing "Add new +" or the "edit" symbol
takes you to the
template / variable creation page.
Files are stored in <node name> directory

| tacacs keys | tacacs values |
|---|---|
| server1_ip | 10.10.0.1 |
| server2_ip | 10.10.0.2 |
| key | value |
| key | value |

| syslog keys | syslog values |
|---|---|
| server1_ip | 10.10.0.1 |
| server2_ip | 10.10.0.2 |
| key | value |
| key | value |

| circut-1 keys | circut-1 values |
|---|---|
| local_ip | 10.10.0.1 |
| remote_ip | 10.10.0.2 |
| verify_ip | true/false |
| key | value |

Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.
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each entry represents
sub-directory
of project directory

each entry represents
sub-directory
of <node family>

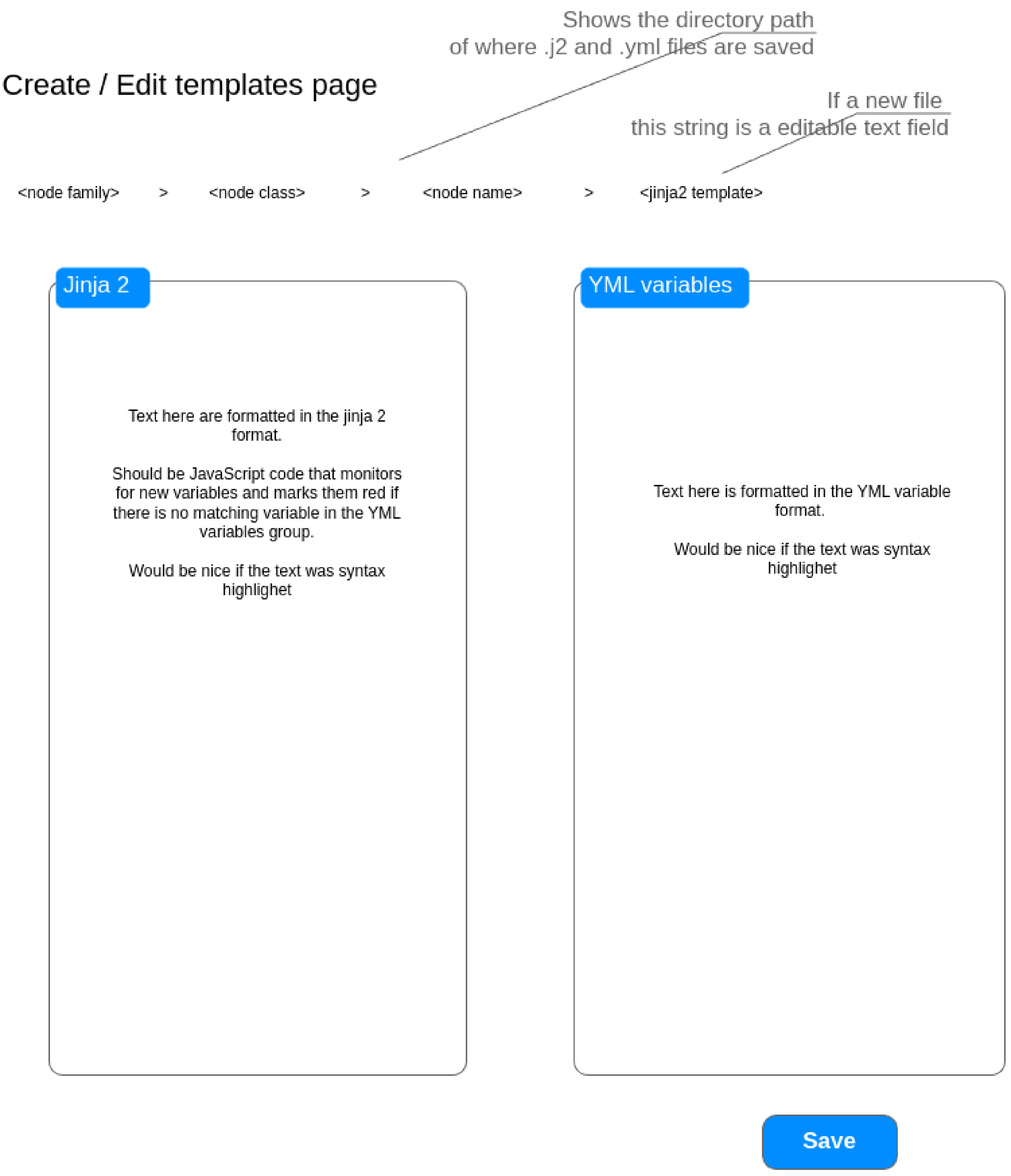
each entry represents
sub-directory
of <node class>

each entry represents
a j2 tempalte file
of <node name> directory

each entry represents
a .yml variables file
of <node name> directory

## Manage templates and variables page

## Create / Edit templates page



Shows the directory path of where .j2 and .yml files are saved

If a new file this string is a editable text field

<node family> > <node class> > <node name> > <jinja2 template>

Text here are formatted in the jinja 2 format.

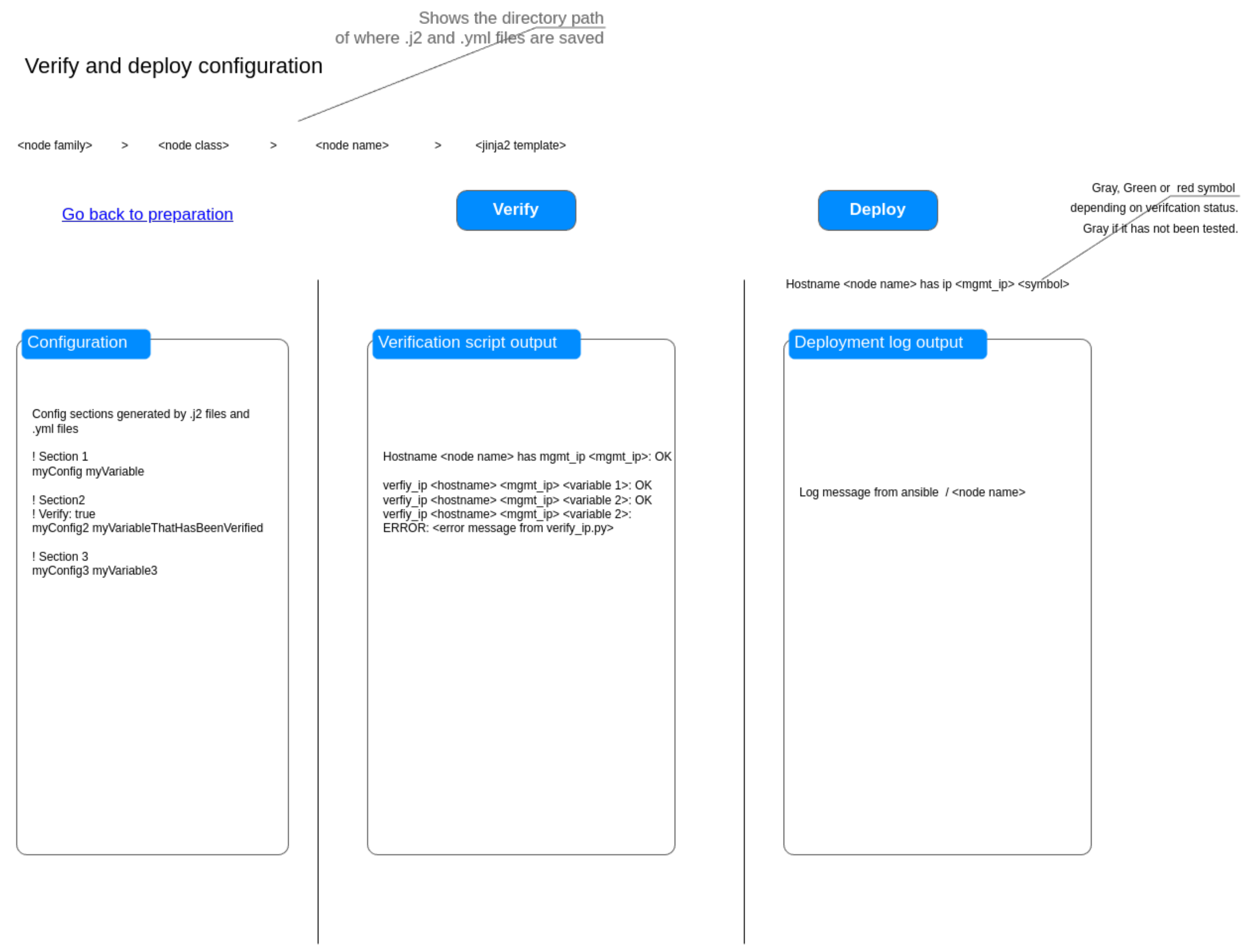
Should be JavaScript code that monitors for new variables and marks them red if there is no matching variable in the YML variables group.

Would be nice if the text was syntax highlighet

Text here is formatted in the YML variable format.

Would be nice if the text was syntax highlighet

## Prepare to deploy page


Shows the directory path
of where .j2 and .yml files are saved
Verify and deploy configuration
<node family> > <node class> > <node name> > <jinja2 template>
Go back to preparation
Verify
Deploy
Gray, Green or red symbol
depending on verifcation status.
Gray if it has not been tested.
Configuration
Verification script output
Deployment log output

Hostname <node name> has ip <mgmt_ip> <symbol>

```
Config sections generated by .j2 files and
.yml files

! Section 1
myConfig myVariable

! Section2
! Verify: true
myConfig2 myVariableThatHasBeenVerified

! Section 3
myConfig3 myVariable3
```

```
Hostname <node name> has mgmt_ip <mgmt_ip>: OK

verfiy_ip <hostname> <mgmt_ip> <variable 1>: OK
verfiy_ip <hostname> <mgmt_ip> <variable 2>: OK
verfiy_ip <hostname> <mgmt_ip> <variable 2>:
ERROR: <error message from verify_ip.py>
```

```
Log message from ansible / <node name>
```

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