# Tool for User Account creation with SSH Keys

## Table of Contents:

## Tools Used:

- ❖ AWS EC2 Instance
- ❖ Docker and Docker compose
- ❖ Ansible-AWX
- ❖ Trello's REST API

## Architecture:

Below is a brief on the architecture of the tool.

1. The tool is running on an Ubuntu 20.04.3 LTS EC2 instance of AWS cloud.

2. Docker services with Docker compose have been installed to run the multi container application using Ansible-AWX

3. Ansible-AWX provides a GUI for the admins to run the task as well as check the job logs in the case Troubleshooting is required for failed cases.

4. Trello Board is used by the administrators/Hiring managers when a user account has to be created with SSH keys.
5. The admin/hiring managers would create a card on the "To Do" list with the **username** in the title of the card.
6. The Ansible playbook is scheduled to run every 60 min and when the task triggers the list would be moved to the Doing board on Trello.
7. Once the user and keys are created, the list would be moved to the Done board and the private key would be updated on the description section of the Card.

Below is an high level architecture indicating the communication between the components:
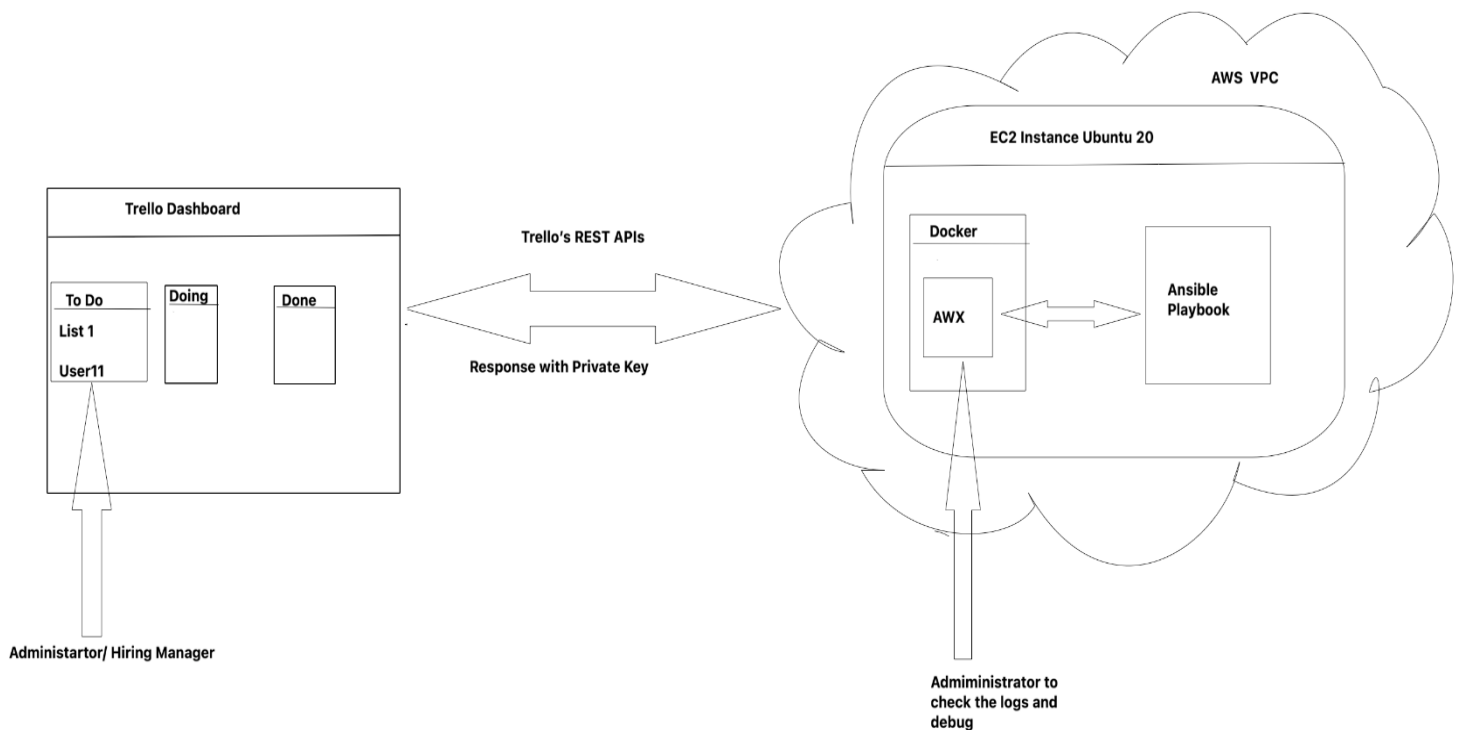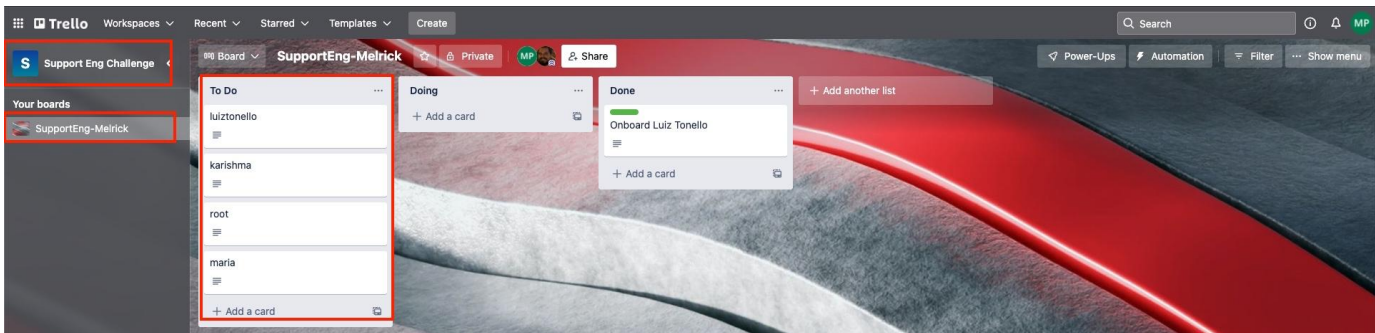
# Usage:

Below are the steps to be followed by an Administrator or Hiring Manager to create a user account with SSH Keys.

1. Log in to the Trello Portal and select the **Onboarding** Work space.

2. Select the **Create User** Board and add a card under the "**To Do**" list.

   In the screenshot below, workspace is Support Eng Challenge and Board name is **SupportEng-Melrick**
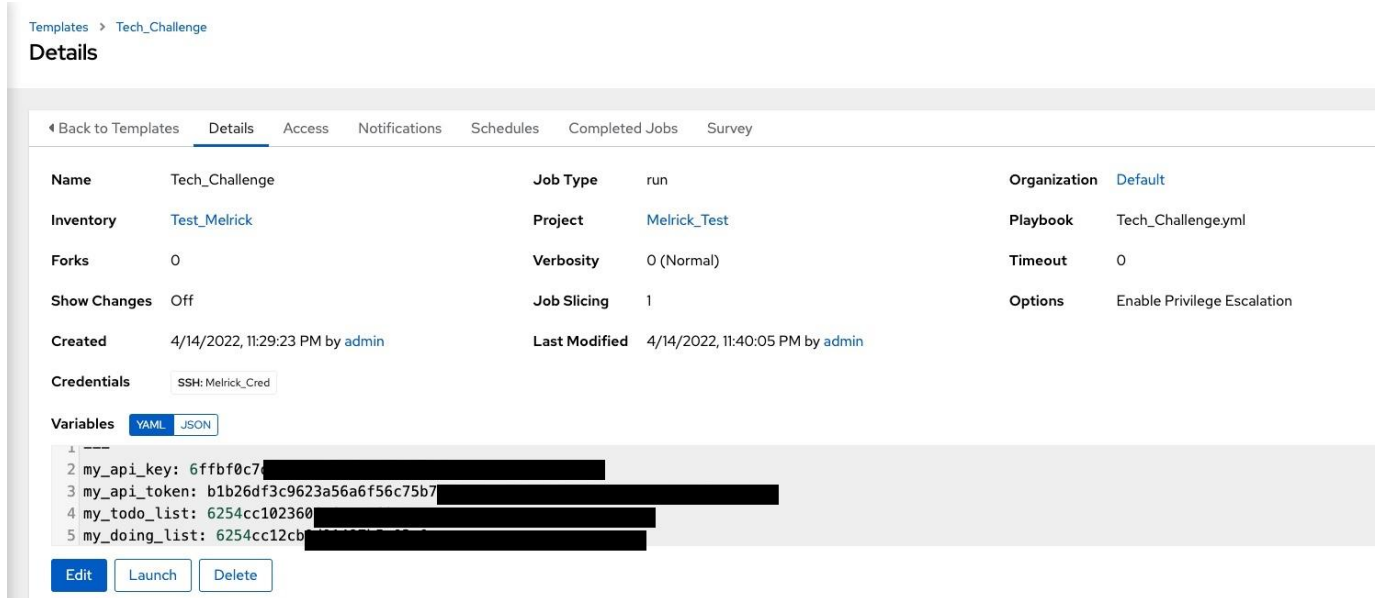


3. As shown in the screenshot above, 4 users have been added to the To Do list.

   **luiztonello**
   **karishma**
   **root**
   **maria**

Note: Only the username to be created should be added on the title of the card. Additional details like joining date and full name can be added on the description of the card.

4. The task of creating user accounts with SSH keys is automated on Ansible AWX template **Tech_Challenge** and scheduled to run every 60 minutes.

1 ---
2 my_api_key: 6ffbf0c7█████████████████████
3 my_api_token: b1b26df3c9623a56a6f56c75b7█████████████████
4 my_todo_list: 6254cc102360█████████████
5 my_doing_list: 6254cc12cb███████████████

5. When the ansible playbook is triggered as per the schedule, it moves the card to the Doing list and starts creating the user accounts with SSH keys.

6. The card will be moved to the **Done** list once the playbook runs without any errors and successfully creates users and keys.
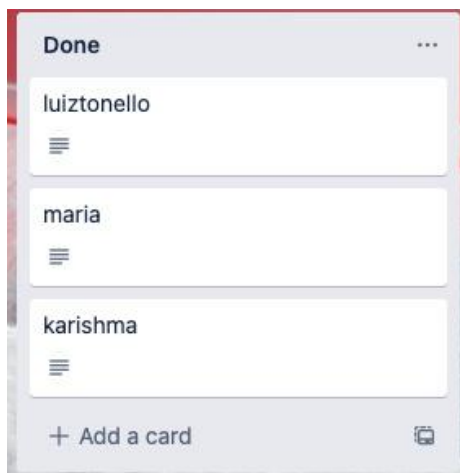


7. If you open the card on the **Done** list, you would see the private key on the description of the card.

## luiztonello

in list Done

## Description  Edit

-----BEGIN OPENSSH PRIVATE KEY-----
b3BlbnNzaC1rZXktdjEAAAAABG5vbmUAAAAEbm9uZQAAAAAAAAABAAABlwA
AAAdzc2gtcn
NhAAAAAwEAAQAAAYEA2rp+xJA8J2XOFe04wKPlgwrl0Jwo1wfCJ96ZbWcs+fF
L3oknLZi7
obouUJw95kaMQEb9CKCgfio1VKkFlTabW3SQ4oUkAU9PDP5GPG09ypla7UzK
SMjVaPrEOK
k1UD9qLH3RhlLDCHu3TOPE2myTuqsT0QryEkLP7913pPrYBwc/UENIr1cO66Mc
PeSdcQrr
szvLGmw5vva8ADe85C5QPHvlCuNfFCdd7cnQrP3j2vyxMesiZiH6MM0QWW77
vhrhtGRvkh
DMBEL3FnxEk5JH4uV5AlOl4P3lV8Q54epP9qRl+ghiRicqGk8XZDX21lx3ozVqw
sDFNeCJ
JFw+qsFdDfvSp98ftekZUwqpuRtjZKrn7N6u7PTMvhLGji669PUoc2dESlnvt9cV
kptsSo
tkXrCuEtgw4rBrH6JHK3EpYcaG9wllShouK0Lk+vgcVVGCOIFWZSsXiXcWnmD7
qYrO2C/5
8e+72/Q5Cocvkww2py5Fmn51opqGFp6KPB3VsoOVAAAFkA++ABEPvgARAAA
AB3NzaC1yc2
EAAAGBANq6fsSQPCdlzhXtOMCjylMK5dCcKNcHwifemW1nLPnxS96JJy2Yu6G
6LICcPeZG

Show full description.

8. It is noticed that the card for user "**root**" is in the **Doing** list with an error "user root is currently used by process 1" , which indicates that the user cannot be created.
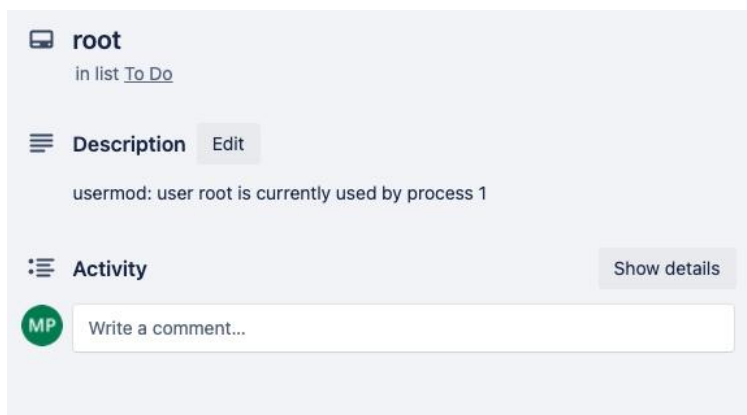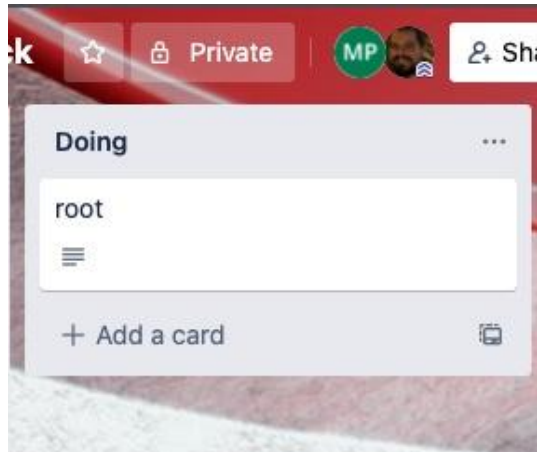
# Functionality:

Below is a brief on the functionality of the task used to create the user and the SSH keys.

- Poll the To Do list on the Trello board to get the username for account creation using Trello REST API.

```
- name: Poll to do lists from trello board
  uri:
    url: "https://api.trello.com/1/lists/{{ my_todo_list }}/cards?key={{ my_api_key }}&token={{ my_api_token }}"
    method: GET
  register: cards_in_trello
```

- Make sure that the user group "employees" is present.

```
- group:
    name: employees
    state: present
  name: "Add group user to node if not present"
```

- Using the **ansible.builtin.user** function, the user is created with an SSH key pair. Return of this function is registered to be used in the steps to follow.

```yaml
- name: create user
  ansible.builtin.user:
    comment: "{{ item.name }}"
    createhome: true
    group: employees
    home: "/home/{{ item.name }}"
    name: "{{ item.name }}"
    generate_ssh_key: yes
    ssh_key_type: rsa
  with_items: "{{ cards_in_trello.json }}"
  ignore_errors: yes
  register: created_users
```

- Based on the return from the previous steps, the cards will be sorted to move either to **Done** or **Doing** list using Trello REST APIs.

```yaml
- name: "Move the failed user cards to doing list"
  when: item.0.name == item.1.name and item.0.rc| default(0) != 0
  uri:
    url: "https://api.trello.com/1/cards/{{ item.1.id }}?key={{ my_api_key }}&token={{ my_api_token }}&desc={{ item.0.msg | default('some issue creating user') | urlencode }}&idList={{ my_doing_list }}"
    method: PUT
  with_together:
  - "{{ created_users.results }}"
  - "{{ cards_in_trello.json }}"

- name: "Move the successfully created user cards to done list"
  when: item.0.name == item.1.name and item.0.rc| default(0) == 0
  uri:
    url: "https://api.trello.com/1/cards/{{ item.1.id }}?key={{ my_api_key }}&token={{ my_api_token }}&desc={{  lookup('file', item.0.ssh_key_file ) | urlencode }}&idList={{ my_done_list }}"
    method: PUT
  with_together:
  - "{{ created_users.results }}"
  - "{{ cards_in_trello.json }}"
```

# Inference:

1. It has been observed that the cards are moved as per the requirement between the list and the private key is returned to the card.

2. On the docker container where the task is running, the user would be created along with the SSH key pair (under ~/.ssh/id_rsa).

```
bash-4.4# cd /home
bash-4.4#
bash-4.4#
bash-4.4# ls -lh
total 16K
drwx------ 3 karishma    superstar 4.0K Apr 14 18:14 karishma
drwx------ 3 Karishma    superstar 4.0K Apr 15 09:43 Karishma
drwx------ 3 luiztonello superstar 4.0K Apr 14 18:10 luiztonello
drwx------ 3 maria       superstar 4.0K Apr 14 18:10 maria
```

```
bash-4.4# ls -lh
total 8.0K
-rw------- 1 luiztonello superstar 2.6K Apr 14 18:10 id_rsa
-rw-r--r-- 1 luiztonello superstar  578 Apr 14 18:10 id_rsa.pub
bash-4.4#
bash-4.4#
bash-4.4# pwd
/home/luiztonello/.ssh
```

3. Admin can access the Ansible AWX tool from the browser using http://<Public_IP_Host>/ and validate the Jobs to debug/troubleshoot any failed tasks or audit the tasks.

# Backlogs and Improvements:

1. Private key can be Attached to the card instead of returning on the description, if the latest version of Ansible is used.

| body_format 🔗 | Choices: | The serialization format of the body. When set to `json`, `form-multipart`, or `form-urlencoded`, encodes the body argument, if needed, and automatically sets the Content-Type header accordingly. |
|---|---|---|
| string | • form-urlencoded | As of `2.3` it is possible to override the `Content-Type` header, when set to `json` or `form-urlencoded` via the headers option. |
| added in 2.0 of ansible.builtin | • json | The 'Content-Type' header cannot be overridden when using `form-multipart` |
| | • raw ← | `form-urlencoded` was added in v2.7. |
| | | `form-multipart` was added in v2.10. |
| | • form-multipart | |

2. If a user account creation request is added to the To Do list for an user who already exists, the account will be created replacing the existing keys.

Need to work on possibilities to avoid this, maybe by pre-validating the existing user list on the host.

3. Improvements to the task by adding capabilities to Create Groups, Move user accounts between the groups and also Deleting user accounts/groups along with SSH keys.

4. Alerting system on Ansible-AWX to notify the Admin (e-mail, slack etc) on failure of task or job completion.

5. Instead of Scheduled tasks, explore possibilities of integrating Trello with Ansible- AWX through Webhooks for instant automation of the task.

# References:

1. Deploying Ansible-AWX on docker container

   https://linoxide.com/how-to-install-ansible-awx-on-ubuntu-20-04/

2. Usage of Trello REST API's.

   https://developer.atlassian.com/cloud/trello/guides/rest-api/authorization/

3. Search API call to get the List UUID and hardcode it on the Ansible-AWX template.

   https://developer.atlassian.com/cloud/trello/rest/api-group-search/

4. Ansible official documentations for modules used in the Ansible Playbook.

   https://docs.ansible.com/ansible/latest/collections/ansible/builtin/user_module.html
   https://docs.ansible.com/ansible/latest/user_guide/playbooks_variables.html
   https://docs.ansible.com/ansible/latest/collections/ansible/builtin/uri_module.html