



DevOps Exercise with NetApp + Ansible Tower

Hands-on Book

Cloud Business Unit
NetApp Korea

Module 1: NetApp HCI 에서 VM 생성하기

Tasks 별 주요 절차 :

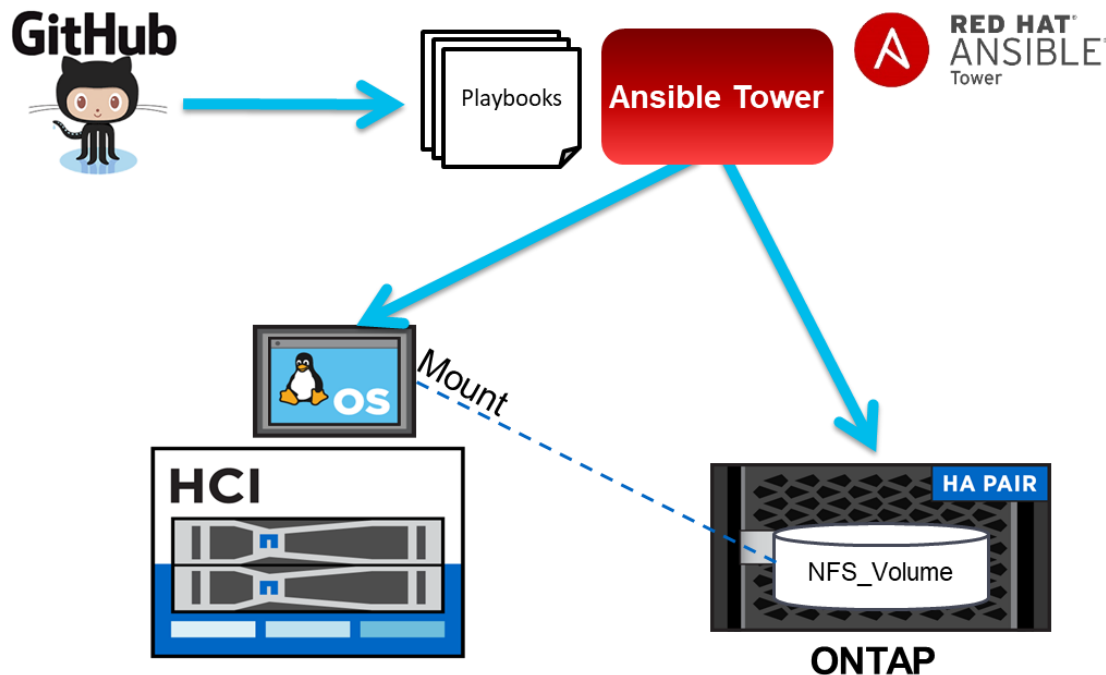
- Task 1 : NetApp HCI 에서 VM 생성하기
- Task 2 : ONTAP 에서 NFS 볼륨 생성하기
- Task 3 : VM 에서 NFS 마운트 수행하기

사전 준비 사항

금번 테스트를 진행하기 위해서는 아래와 같은 사항들이 준비 되어야 합니다.

- Ansible Tower Access 계정
- VM 에 할당할 IP 주소
- 사용할 ONTAP 주요 정보들 확인 (Cluster IP, Admin 계정, SVM, Data LIF 정보)

Ansible Tower 를 통해 VM 생성, NFS 볼륨 생성, NFS 볼륨 마운트 등의 총 3 개의 Task 를 모두 자동화 구현합니다.



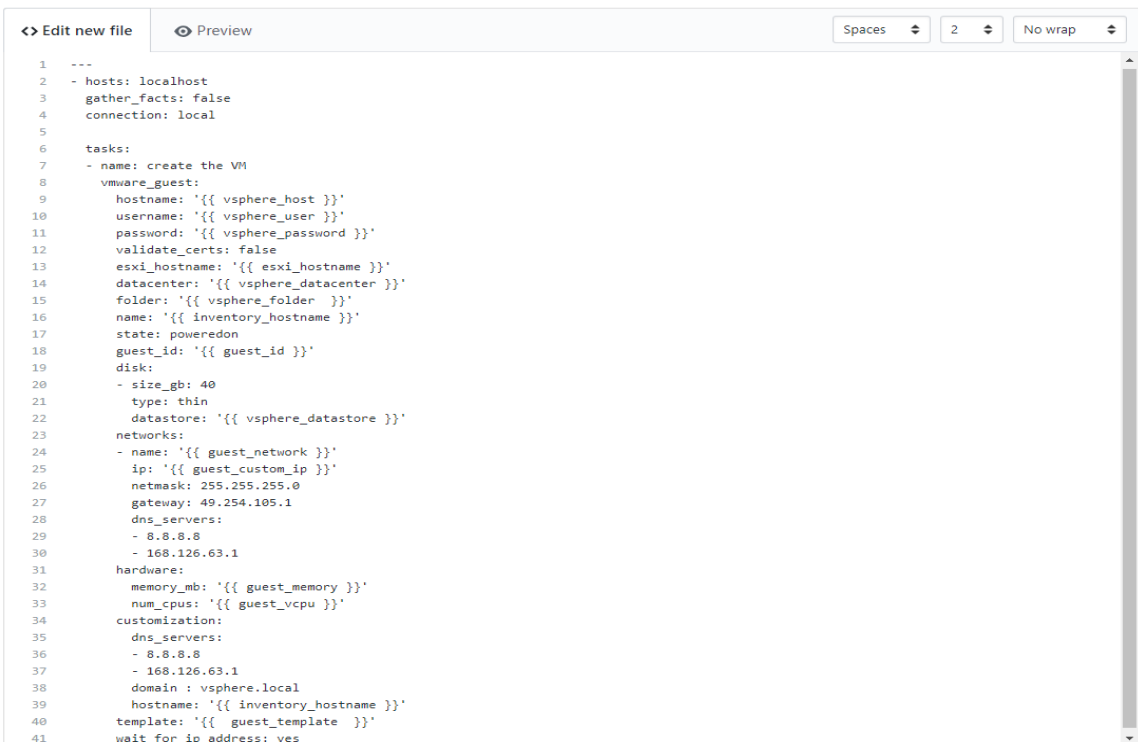
구현 시 아래 정보들을 참고하며, 특히 **Name Rule** 에 따라 구현해야 합니다.

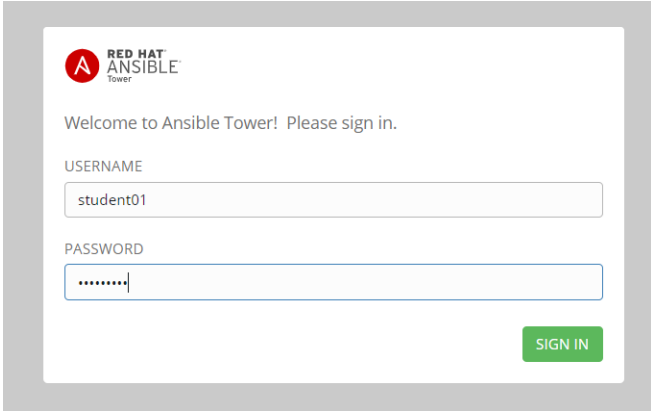
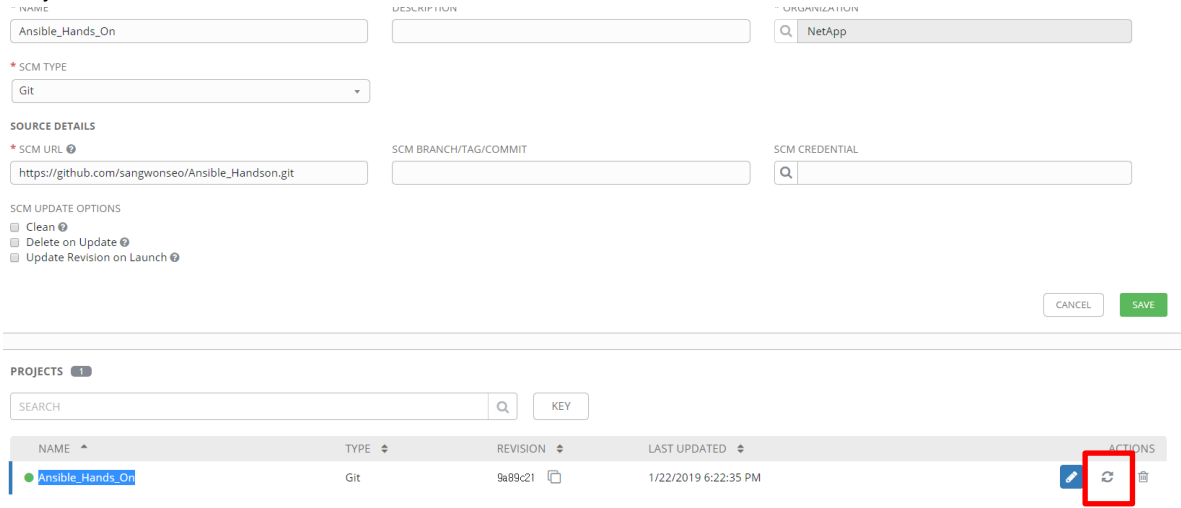
환경 상세 정보.

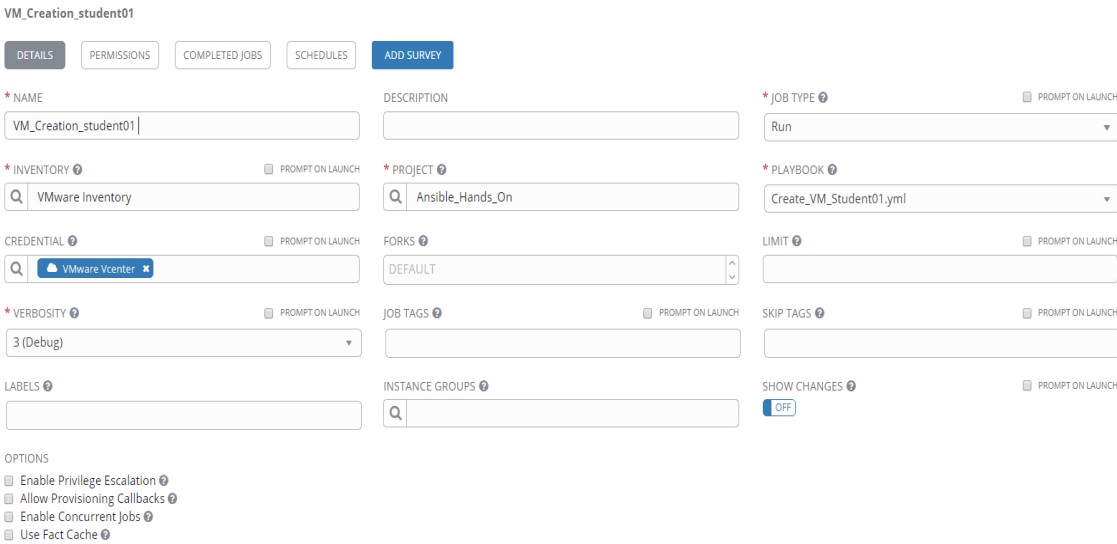
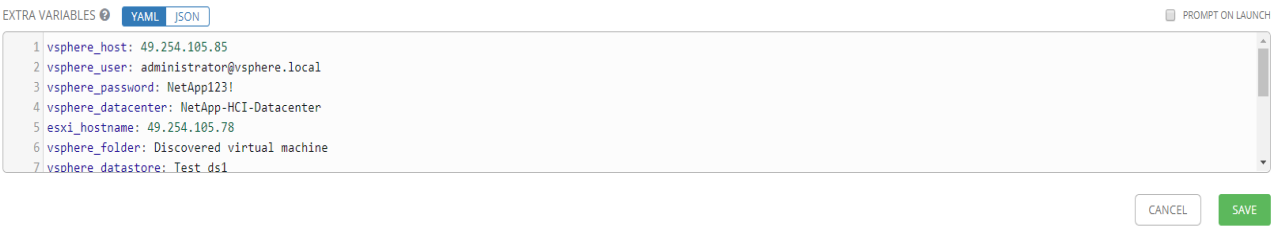
자원	IP	Account	Password	Name Rule
Ansible Tower	49.254.105.65	Student(number)	Netapp123	
Vcenter on HCI	49.254.105.85	administrator@vsphere.local	NetApp123!	
VM on HCI	개별할당	root	NetApp123!	Centos_Student(number)
esxi_hostname	개별할당			
GitHub Repo	https://github.com/sangwonseo/Ansible_Handson.git			
ONTAP Cluster	49.254.105.140	admin	Netapp123	
ONTAP SVM				Ansible_Handson
SVM Data LIF	49.254.105.223			Ansible_Handson_data
NFS Volume	49.254.105.233			NFSvol_Student(number)

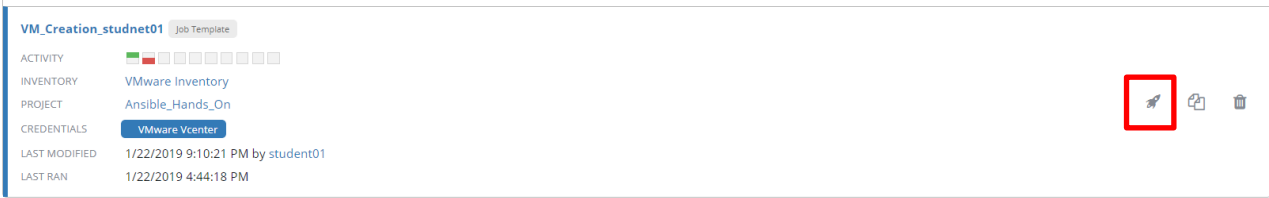
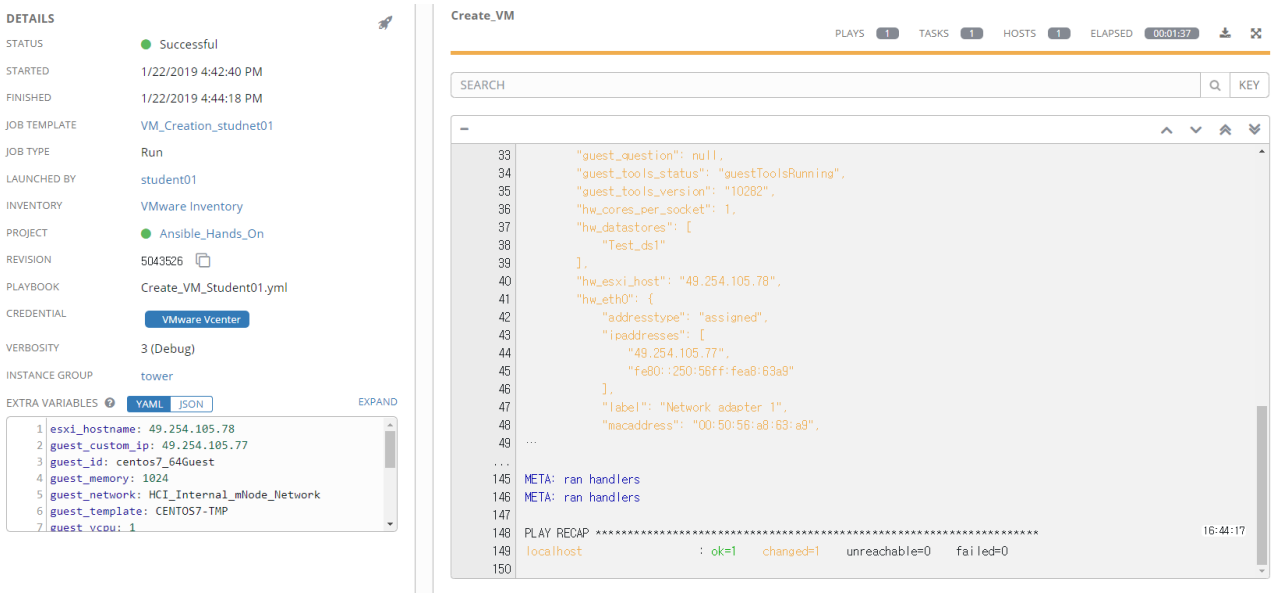
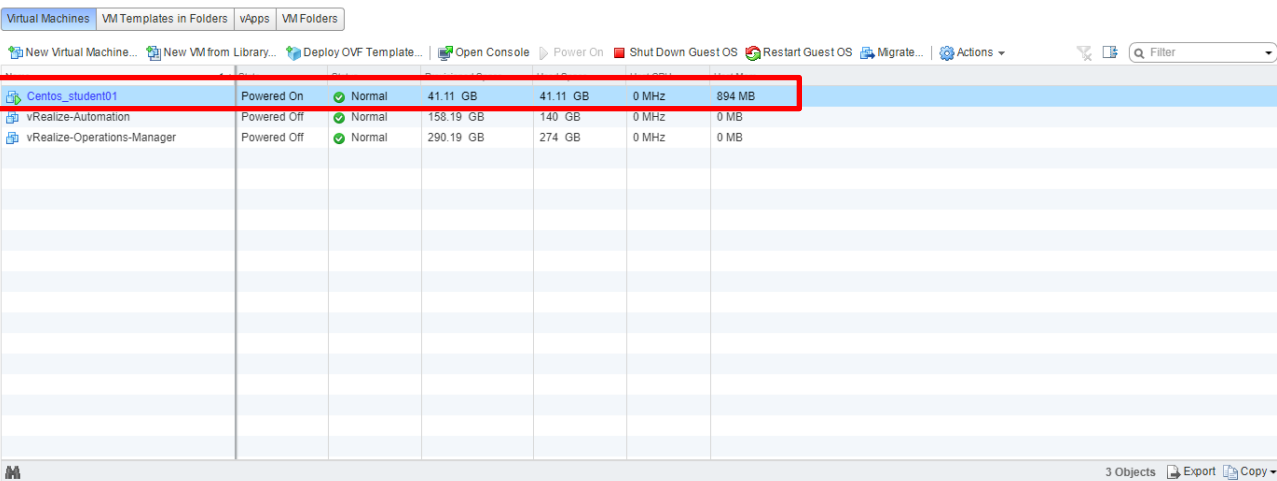
Task 1: NetApp HCI 에서 VM 생성하기

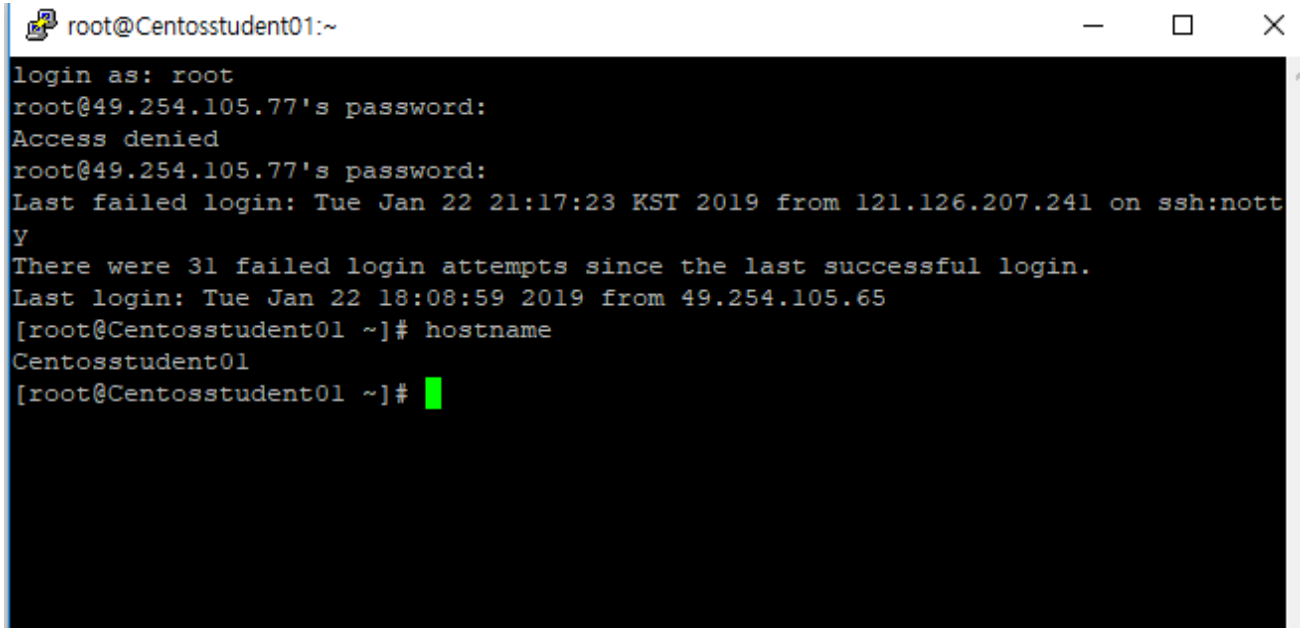
이번 Task 에서는 NetApp HCI 의 Vcenter 를 통해 VM 을 자동 배포한다.

Step	Action
1-1	<p>GitHub Repository 에 VM 생성을 위한 YAML 파일을 신규 작성 또는 업로드</p> <p>Ansible_Handson / VM_Creation_student01 or cancel</p>  <pre> 1 --- 2 - hosts: localhost 3 gather_facts: false 4 connection: local 5 6 tasks: 7 - name: create the VM 8 vmware_guest: 9 hostname: '{{ vsphere_host }}' 10 username: '{{ vsphere_user }}' 11 password: '{{ vsphere_password }}' 12 validate_certs: false 13 esxi_hostname: '{{ esxi_hostname }}' 14 datacenter: '{{ vsphere_datacenter }}' 15 folder: '{{ vsphere_folder }}' 16 name: '{{ inventory_hostname }}' 17 state: poweredon 18 guest_id: '{{ guest_id }}' 19 disk: 20 - size_gb: 40 21 type: thin 22 datastore: '{{ vsphere_datastore }}' 23 networks: 24 - name: '{{ guest_network }}' 25 ip: '{{ guest_custom_ip }}' 26 netmask: 255.255.255.0 27 gateway: 49.254.105.1 28 dns_servers: 29 - 8.8.8.8 30 - 168.126.63.1 31 hardware: 32 memory_mb: '{{ guest_memory }}' 33 num_cpus: '{{ guest_vcpu }}' 34 customization: 35 dns_servers: 36 - 8.8.8.8 37 - 168.126.63.1 38 domain : vsphere.local 39 hostname: '{{ inventory_hostname }}' 40 template: '{{ guest_template }}' 41 wait_for_ip_address: yes </pre> <ul style="list-style-type: none"> GitHub Repo URL: https://github.com/sangwonseo/Ansible_Handson.git File name: VM_Creation_Student(number).yaml

Step	Action
1-2	<p>웹 브라우저에서 Ansible Tower 를 접속</p>  <p> <ul style="list-style-type: none"> Ansible Tower GUI IP : 49.254.105.65 Username: student(number) Password: Netapp123 </p>
1-3	<p>Project Source 업데이트</p>  <p>Project -> Ansible_Hands_On -> Action -> Sync 클릭</p>

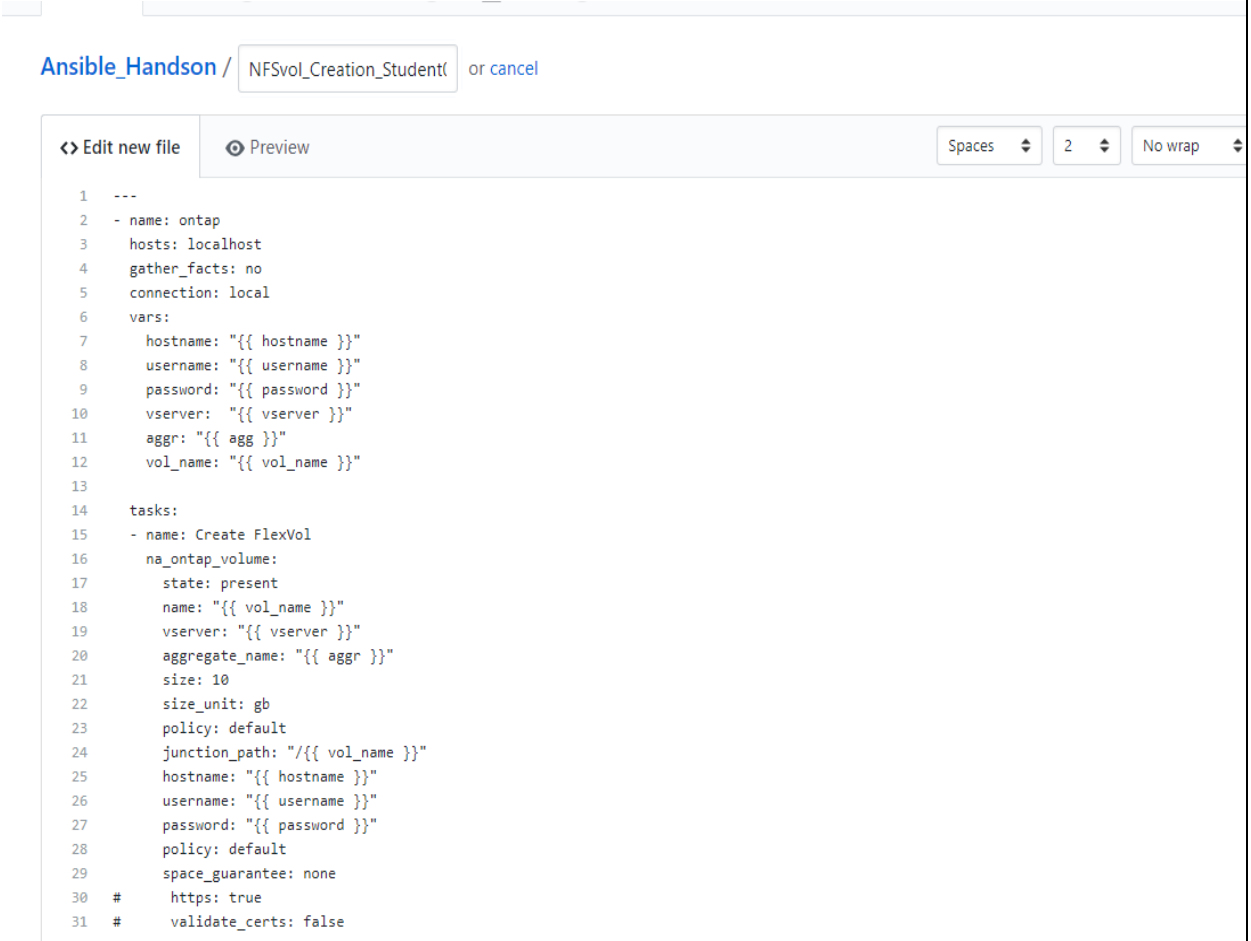
Step	Action
1-4	<p>신규 Template 생성</p> <p>Templates-> + 녹색 버튼-> Job Template 클릭</p>  <ul style="list-style-type: none"> ▪ Name: VM_Creation_student(number) ▪ Job Type: Run 선택 ▪ Inventory: VMware Inventory 선택 ▪ Credential: VMware Vcenter 선택 ▪ Verbosity: 3(Debug) 선택
1-5	<p>신규 Template Extra Variables 기입</p>  <ul style="list-style-type: none"> ▪ vsphere_host: 49.254.105.85 ▪ vsphere_user: administrator@vsphere.local ▪ vsphere_password: NetApp123! ▪ vsphere_datacenter: NetApp-HCI-Datacenter ▪ esxi_hostname: 개별할당 IP ▪ vsphere_folder: Discovered virtual machine ▪ vsphere_datastore: Test_ds1 ▪ inventory_hostname: Centos_student(number) ▪ guest_network: HCI_Internal_mNode_Network ▪ guest_custom_ip: 개별할당 IP ▪ guest_id: centos7_64Guest ▪ guest_memory: 1024 ▪ guest_vcpu: 1 ▪ guest_template: CENTOS7-TMP <p>기입 완료 후 Save 클릭</p>

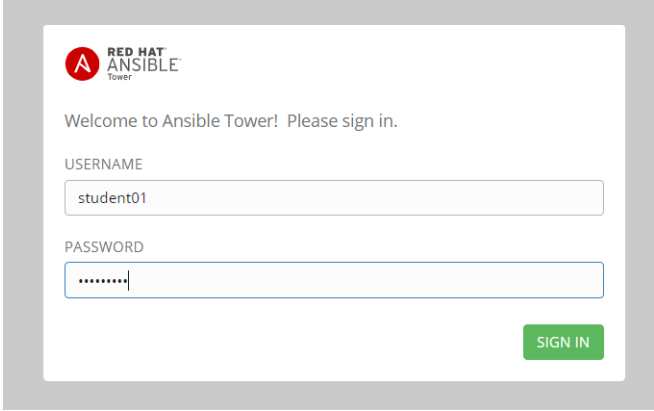
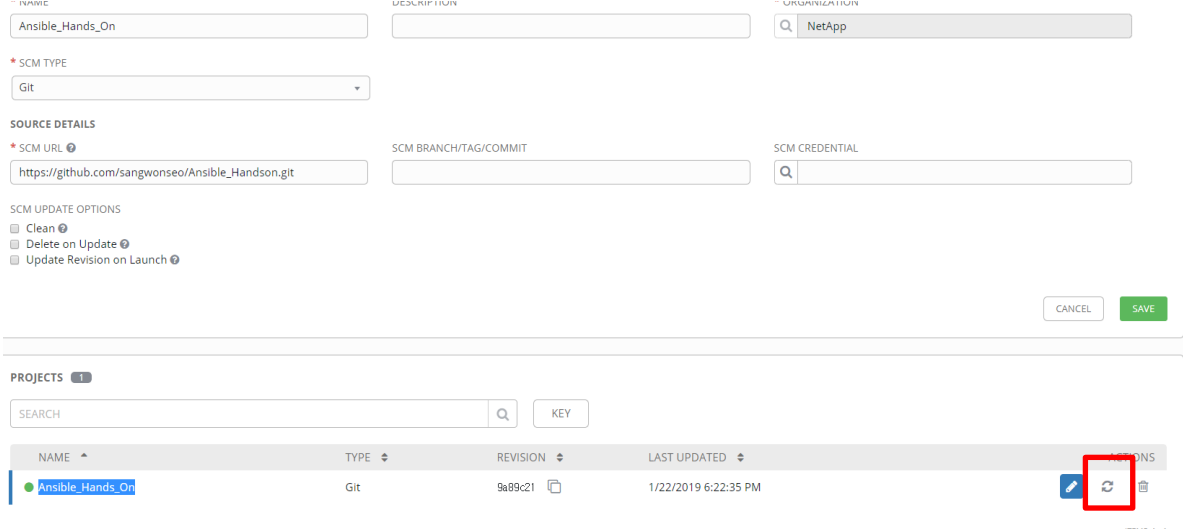
Step	Action
1-6	<p>생성 완료된 Template Start Job (로켓 이미지 클릭)</p>  <p>Jobs->VM_Creation_studnet(number)클릭, Job Status 확인</p> 
1-7	<p>Vcenter 에서 신규 생성된 VM 확인 (Discovered virtual machine 폴더 클릭)</p> 

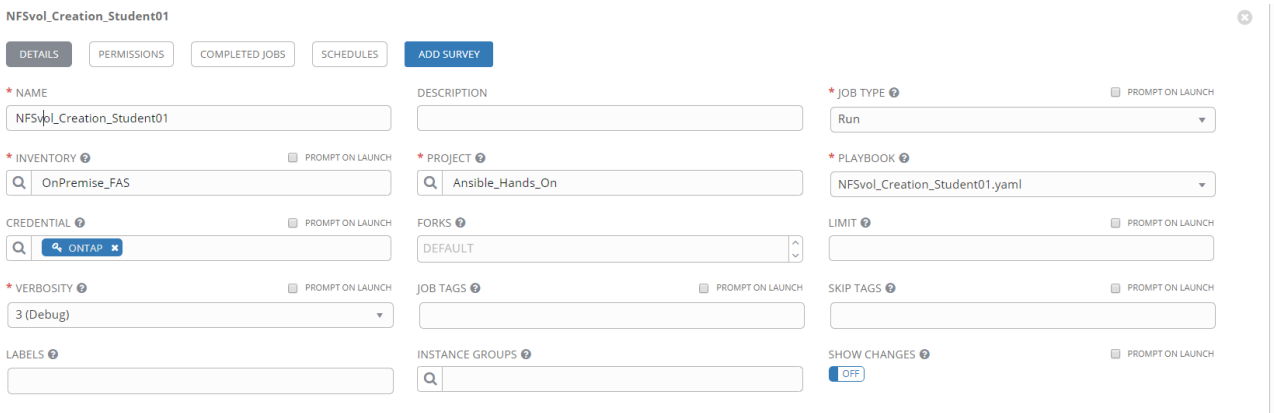
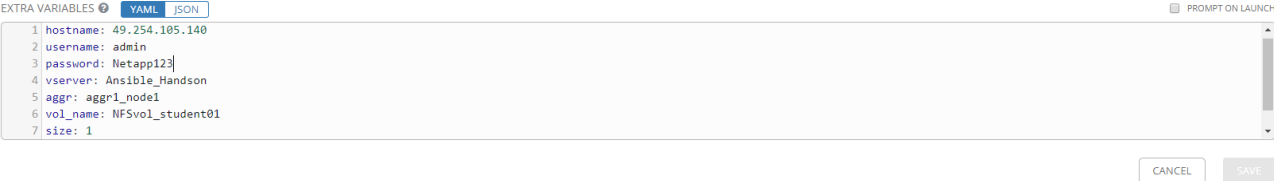
Step	Action
1-8	<div>해당 VM Putty 정상 접속 확인</div> <div>  <pre> root@Centosstudent01:~ login as: root root@49.254.105.77's password: Access denied root@49.254.105.77's password: Last failed login: Tue Jan 22 21:17:23 KST 2019 from 121.126.207.241 on ssh:notty There were 31 failed login attempts since the last successful login. Last login: Tue Jan 22 18:08:59 2019 from 49.254.105.65 [root@Centosstudent01 ~]# hostname Centosstudent01 [root@Centosstudent01 ~]# </pre> </div> <div> <ul style="list-style-type: none"> ▪ Host IP: 개별 할당 ▪ Account : root ▪ Password: NetApp123! ▪ Hostname 확인 </div>

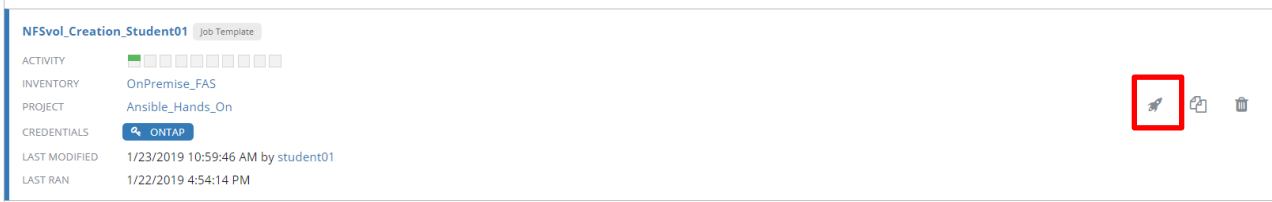
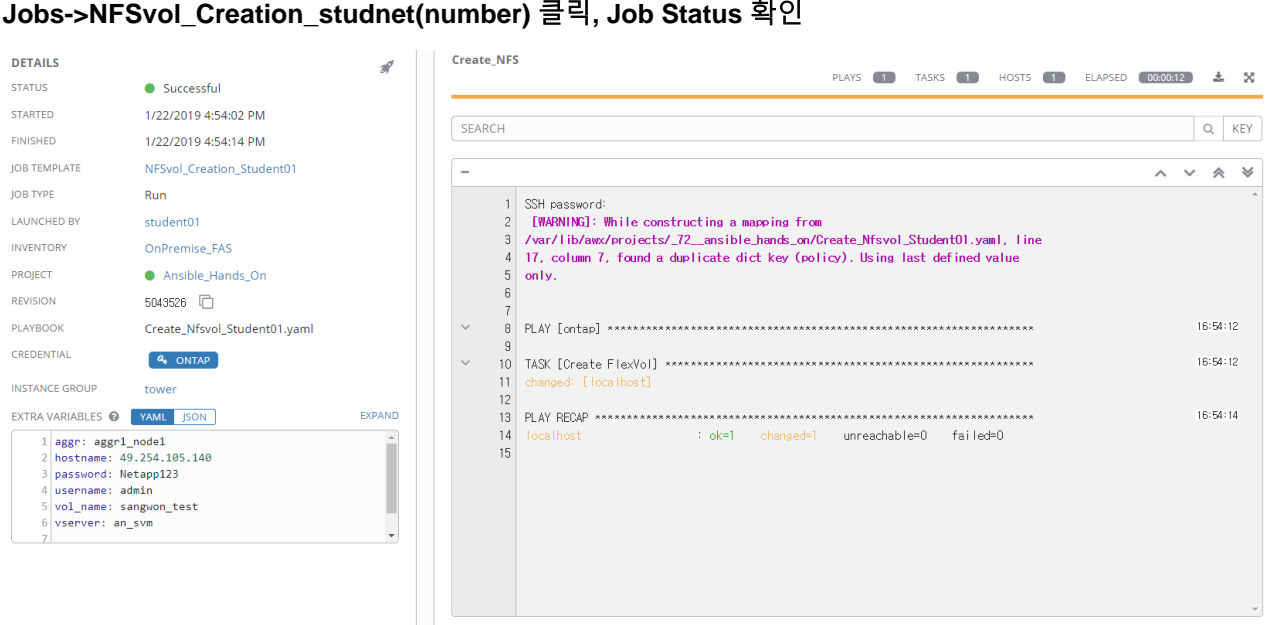
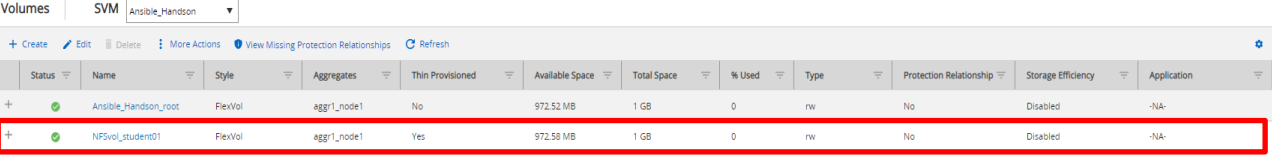
Task 2: ONTAP 에서 NFS 볼륨 생성하기

이번 Task 에서는 ONTAP 내의 NFS 볼륨을 신규 생성한다.

Step	Action
2-1	<p>GitHub Repository 에 VM 생성을 위한 YAML 파일을 신규 작성 또는 업로드</p>  <pre> 1 --- 2 - name: ontap 3 hosts: localhost 4 gather_facts: no 5 connection: local 6 vars: 7 hostname: "{{ hostname }}" 8 username: "{{ username }}" 9 password: "{{ password }}" 10 vserver: "{{ vserver }}" 11 aggr: "{{ aggr }}" 12 vol_name: "{{ vol_name }}" 13 14 tasks: 15 - name: Create FlexVol 16 na_ontap_volume: 17 state: present 18 name: "{{ vol_name }}" 19 vserver: "{{ vserver }}" 20 aggregate_name: "{{ aggr }}" 21 size: 10 22 size_unit: gb 23 policy: default 24 junction_path: "/" 25 hostname: "{{ hostname }}" 26 username: "{{ username }}" 27 password: "{{ password }}" 28 policy: default 29 space_guarantee: none 30 # https: true 31 # validate_certs: false </pre> <ul style="list-style-type: none"> ▪ GitHub Repo URL: https://github.com/sangwonseo/Ansible_Handson.git ▪ File name: NFSvol_Creation_Student(number).yaml


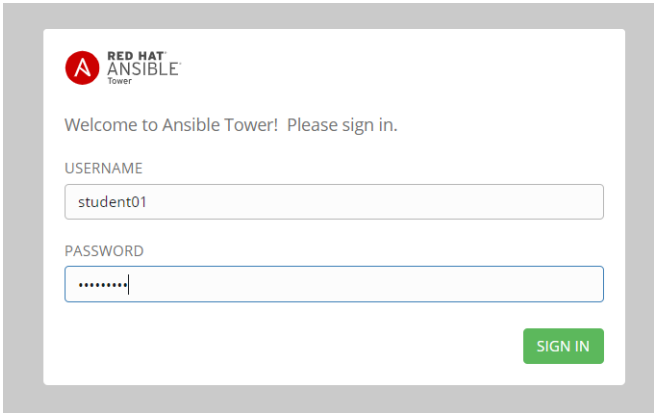
Step	Action
2-2	<p>웹 브라우저에서 Ansible Tower 를 접속</p>  <p>Ansible Tower login screen showing the sign-in form. The form includes fields for USERNAME (student01) and PASSWORD (masked with dots), and a SIGN IN button.</p> <ul style="list-style-type: none"> ▪ Ansible Tower GUI IP : 49.254.105.65 ▪ Username: student(number) ▪ Password: Netapp123
2-3	<p>Project Source 업데이트</p>  <p>Ansible Tower Project Source update screen. The form includes fields for PROJECT (Ansible_Hands_On), SCM TYPE (Git), SCM URL (https://github.com/sangwonseo/Ansible_Handson.git), SCM BRANCH/TAG/COMMIT, and SCM CREDENTIAL (NetApp). There are also checkboxes for SCM UPDATE OPTIONS (Clean, Delete on Update, Update Revision on Launch). A table below shows the project details for Ansible_Hands_On, including its type (Git), revision (9a89c21), and last updated time (1/22/2019 6:22:35 PM). A red box highlights the 'Sync' button in the Actions column of the table.</p> <p>Project -> Ansible_Hands_On -> Action -> Sync 클릭</p>

Step	Action
2-4	<p>신규 Template 생성</p> <p>Templates-> + 녹색 버튼-> Job Template 클릭</p>  <ul style="list-style-type: none"> Name: NFSvol_Creation_Student(number) Job Type: Run 선택 Inventory: OnPremise_FAS Credential: ONTAP Verbosity: 3(Debug) 선택
2-5	<p>신규 Template Extra Variables 기입</p>  <ul style="list-style-type: none"> hostname: 49.254.105.140 username: admin password: Netapp123 vserver: Ansible_Handson aggr: aggr1_node1 vol_name: NFSvol_student(number) size: 1 <p>기입 완료 후 Save 클릭</p>

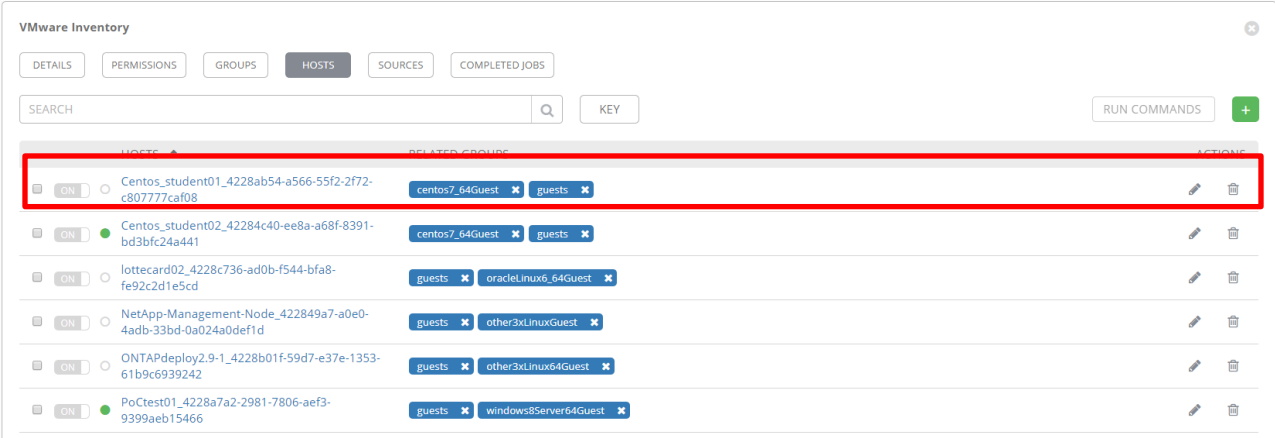
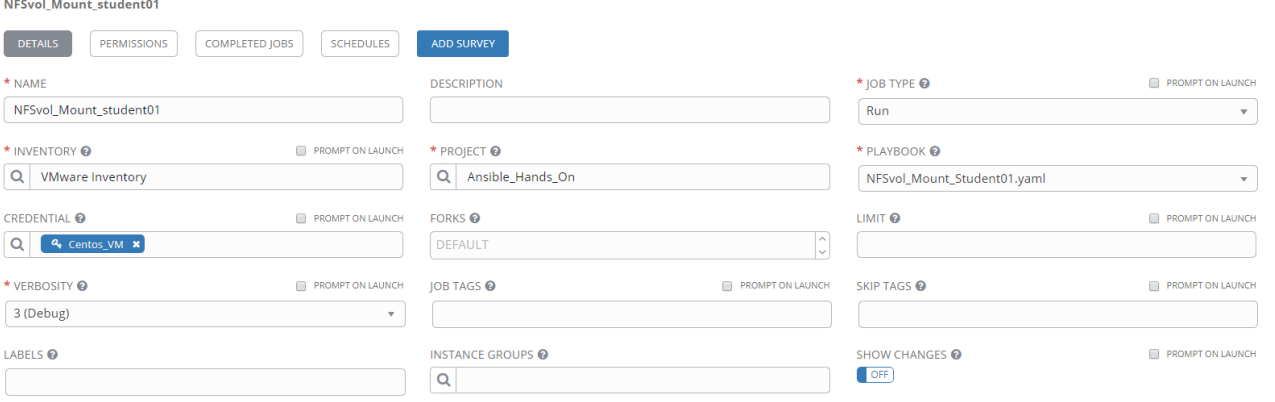
Step	Action
2-6	<p>생성 완료된 Template Start Job (로켓 이미지 클릭)</p>  <p>Jobs->NFSvol_Creation_studnet(number) 클릭, Job Status 확인</p> 
2-7	<p>ONTAP System Manager GUI 에서 신규 NFS 볼륨 생성 확인</p>  <ul style="list-style-type: none"> System Manger GUI IP: 49.254.105.140 Account : admin Password: Netapp123 Ansible_Handson SVM -> Volume -> NFSvol_student(number) 확인

Task 3: VM 에서 NFS 마운트 수행하기

이번 Task 는 이전 Task 에서 생성한 VM 과 NFS 볼륨을 마운트 수행 한다.

Step	Action
3-1	<p>GitHub Repository 에 VM 생성을 위한 YAML 파일을 신규 작성 또는 업로드</p> <p>Ansible_Handson / <input type="text" value="NFSvol_Mount_Student01"/>  or cancel</p> <div> <div><> Edit file</div> <div>Preview changes</div> <div>Spaces 2 No wrap</div> </div> <pre> 1 --- 2 - hosts: "{{ hosts }}" 3 tasks: 4 - name: Install NFS-UTILS package for Client Server 5 yum: name=nfs-utils state=present 6 7 - name: Verify mount directory exists 8 file: 9 path: /mnt/test 10 state: directory 11 12 - name: Mount nfs export 13 mount: 14 state: mounted 15 path: /mnt/test 16 src: "{{ address }}:/{{ volname }}" 17 fstype: nfs 18 </pre> <ul style="list-style-type: none"> ▪ GitHub Repo URL: https://github.com/sangwonseo/Ansible_Handson.git ▪ File name: NFSvol_Mount_Student(number).yaml
3-2	<p>웹 브라우저에서 Ansible Tower 를 접속</p> <div>  </div> <ul style="list-style-type: none"> ▪ Ansible Tower GUI IP : 49.254.105.65 ▪ Username: student(number) ▪ Password: Netapp123

Step	Action										
3-3	<div><h3>Project Source 업데이트</h3><div><div>NAME</div><div>Ansible_Hands_On</div></div><div><div>DESCRIPTION</div><div></div></div><div><div>ORGANIZATION</div><div>NetApp</div></div></div> <div><div>SCM TYPE</div><div>Git</div></div> <div><div>SOURCE DETAILS</div><div><div>SCM URL</div><div>https://github.com/sangwonseo/Ansible_HandsOn.git</div></div><div><div>SCM BRANCH/TAG/COMMIT</div><div></div></div><div><div>SCM CREDENTIAL</div><div></div></div></div> <div><div>SCM UPDATE OPTIONS</div><div><div><input type="checkbox"/> Clean</div><div><input type="checkbox"/> Delete on Update</div><div><input type="checkbox"/> Update Revision on Launch</div></div></div> <div><div>CANCEL</div><div>SAVE</div></div> <div><div>PROJECTS 1</div><div><div>SEARCH</div><div>KEY</div></div><table><thead><tr><th>NAME</th><th>TYPE</th><th>REVISION</th><th>LAST UPDATED</th><th>ACTIONS</th></tr></thead><tbody><tr><td>Ansible_Hands_On</td><td>Git</td><td>9a89c21</td><td>1/22/2019 6:22:35 PM</td><td><div><div></div><div></div><div></div></div></td></tr></tbody></table><div>Project -> Ansible_Hands_On -> Action -> Sync 클릭</div></div>	NAME	TYPE	REVISION	LAST UPDATED	ACTIONS	Ansible_Hands_On	Git	9a89c21	1/22/2019 6:22:35 PM	<div><div></div><div></div><div></div></div>
NAME	TYPE	REVISION	LAST UPDATED	ACTIONS							
Ansible_Hands_On	Git	9a89c21	1/22/2019 6:22:35 PM	<div><div></div><div></div><div></div></div>							
3-4	<div><h3>VMware Inventory 업데이트</h3><div>INVENTORIES / VMware Inventory / SOURCES</div></div> <div><div>VMware Inventory</div><div><div>DETAILS</div><div>PERMISSIONS</div><div>GROUPS</div><div>HOSTS</div><div>SOURCES</div><div>COMPLETED JOBS</div></div><div><div>SEARCH</div><div>KEY</div></div><div><div>SYNC ALL</div><div></div></div><table><thead><tr><th>SOURCES</th><th>TYPE</th><th>ACTIONS</th></tr></thead><tbody><tr><td>HCL_VMware</td><td>VMware vCenter</td><td><div><div></div><div></div><div></div></div></td></tr></tbody></table><div>ITEMS 1 - 1</div><div>Inventories-> VMware Inventory-> Sources -> Sync 클릭</div></div>	SOURCES	TYPE	ACTIONS	HCL_VMware	VMware vCenter	<div><div></div><div></div><div></div></div>				
SOURCES	TYPE	ACTIONS									
HCL_VMware	VMware vCenter	<div><div></div><div></div><div></div></div>									

Step	Action
3-5	<p>Task 1 에서 생성된 VM 의 Inventory Host Name 확인</p>  <p>Inventories-> VMware Inventory-> Hosts -> Host name 확인</p>
3-6	<p>신규 Template 생성</p> <p>Templates-> + 녹색 버튼-> Job Template 클릭</p>  <ul style="list-style-type: none"> Name: NFSvol_Mount_student(number) Job Type: Run 선택 Inventory: VMware Inventory Credential: Centos_VM Verbosity: 3(Debug) 선택

Step	Action
3-9	<p>해당 VM 터미널 접속 후 NFS 볼륨 마운트 확인</p> <pre> login as: root root@49.254.105.77's password: Last login: Wed Jan 23 11:37:19 2019 from 49.254.105.65 [root@Centosstudent01 ~]# [root@Centosstudent01 ~]# [root@Centosstudent01 ~]# df -k Filesystem 1K-blocks Used Available Use% Mounted on /dev/mapper/centos-root 36805060 3502908 33302152 10% / devtmpfs 490816 0 490816 0% /dev tmpfs 507912 0 507912 0% /dev/shm tmpfs 507912 7848 500064 2% /run tmpfs 507912 0 507912 0% /sys/fs/cgroup /dev/sdal 1038336 173016 865320 17% /boot tmpfs 101584 12 101572 1% /run/user/42 tmpfs 101584 0 101584 0% /run/user/0 49.254.105.223:/NFSvol_student01 996160 192 995968 1% /mnt/test [root@Centosstudent01 ~]# </pre> <ul style="list-style-type: none"> ▪ Host IP: 개별 할당 ▪ Account : root ▪ Password: NetApp123! ▪ df -k 명령어 수행

수고 많으셨습니다.