



Script to create a cluster

ONTAP Select

NetApp

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Script to create a cluster

You can use the following script to create a cluster based on parameters defined within the script and a JSON input file.

```
1 #!/usr/bin/env python
2 ##-----
3 #
4 # File: cluster.py
5 #
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7 #
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18 # terms
19 # no less restrictive than those set forth herein.
20 #
21 ##-----
22
23 import traceback
24 import argparse
25 import json
26 import logging
27
28 from deploy_requests import DeployRequests
29
30
31 def add_vcenter_credentials(deploy, config):
32     """ Add credentials for the vcenter if present in the config """
33     log_debug_trace()
34
35     vcenter = config.get('vcenter', None)
36     if vcenter and not deploy.resource_exists('/security/credentials',
37                                             'hostname', vcenter
38                                             ['hostname']):
39         log_info("Registering vcenter {} credentials".format(vcenter
40                                             ['hostname']))
```

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36     data = {k: vcenter[k] for k in ['hostname', 'username',
    'password']}
37     data['type'] = "vcenter"
38     deploy.post('/security/credentials', data)
39
40
41 def add_standalone_host_credentials(deploy, config):
42     """ Add credentials for standalone hosts if present in the config.
43     Does nothing if the host credential already exists on the
    Deploy.
44     """
45     log_debug_trace()
46
47     hosts = config.get('hosts', [])
48     for host in hosts:
49         # The presense of the 'password' will be used only for
    standalone hosts.
50         # If this host is managed by a vcenter, it should not have a
    host 'password' in the json.
51         if 'password' in host and not deploy.resource_exists
    ('/security/credentials',
52         'hostname', host['name']):
53             log_info("Registering host {} credentials".format(host
    ['name']))
54             data = {'hostname': host['name'], 'type': 'host',
55                     'username': host['username'], 'password': host
    ['password']}
56             deploy.post('/security/credentials', data)
57
58
59 def register_unkown_hosts(deploy, config):
60     ''' Registers all hosts with the deploy server.
61     The host details are read from the cluster config json file.
62
63     This method will skip any hosts that are already registered.
64     This method will exit the script if no hosts are found in the
    config.
65     '''
66     log_debug_trace()
67
68     data = {"hosts": []}
69     if 'hosts' not in config or not config['hosts']:
70         log_and_exit("The cluster config requires at least 1 entry in
    the 'hosts' list got {}".format(config))
71

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```

72     missing_host_cnt = 0
73     for host in config['hosts']:
74         if not deploy.resource_exists('/hosts', 'name', host['name']):
75             missing_host_cnt += 1
76             host_config = {"name": host['name'], "hypervisor_type":
host['type']}
77             if 'mgmt_server' in host:
78                 host_config["management_server"] = host['mgmt_server']
79                 log_info(
80                     "Registering from vcenter {mgmt_server}".format(
**host))
81
82                 if 'password' in host and 'user' in host:
83                     host_config['credential'] = {
84                         "password": host['password'], "username": host
['user']}
85
86                     log_info("Registering {type} host {name}".format(**host))
87                     data["hosts"].append(host_config)
88
89     # only post /hosts if some missing hosts were found
90     if missing_host_cnt:
91         deploy.post('/hosts', data, wait_for_job=True)
92
93
94 def add_cluster_attributes(deploy, config):
95     ''' POST a new cluster with all needed attribute values.
96         Returns the cluster_id of the new config
97     '''
98     log_debug_trace()
99
100     cluster_config = config['cluster']
101     cluster_id = deploy.find_resource('/clusters', 'name',
cluster_config['name'])
102
103     if not cluster_id:
104         log_info("Creating cluster config named {name}".format(
**cluster_config))
105
106     # Filter to only the valid attributes, ignores anything else
in the json
107     data = {k: cluster_config[k] for k in [
108         'name', 'ip', 'gateway', 'netmask', 'ontap_image_version',
'dns_info', 'ntp_servers']}
109
110     num_nodes = len(config['nodes'])

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111
112     log_info("Cluster properties: {}".format(data))
113
114     resp = deploy.post('/v3/clusters?node_count={}'.format
115 (num_nodes), data)
116     cluster_id = resp.headers.get('Location').split('/')[-1]
117
118     return cluster_id
119
120 def get_node_ids(deploy, cluster_id):
121     ''' Get the the ids of the nodes in a cluster. Returns a list of
122 node_ids.'''
123     log_debug_trace()
124
125     response = deploy.get('/clusters/{}/nodes'.format(cluster_id))
126     node_ids = [node['id'] for node in response.json().get('records')]
127     return node_ids
128
129 def add_node_attributes(deploy, cluster_id, node_id, node):
130     ''' Set all the needed properties on a node '''
131     log_debug_trace()
132
133     log_info("Adding node '{}' properties".format(node_id))
134
135     data = {k: node[k] for k in ['ip', 'serial_number',
136 'instance_type',
137                                     'is_storage_efficiency_enabled'] if k
138 in node}
139     # Optional: Set a serial_number
140     if 'license' in node:
141         data['license'] = {'id': node['license']}
142
143     # Assign the host
144     host_id = deploy.find_resource('/hosts', 'name', node[
145 'host_name'])
146     if not host_id:
147         log_and_exit("Host names must match in the 'hosts' array, and
148 the nodes.host_name property")
149
150     data['host'] = {'id': host_id}
151
152     # Set the correct raid_type
153     is_hw_raid = not node['storage'].get('disks') # The presence of a
154 list of disks indicates sw_raid

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```

150     data['passthrough_disks'] = not is_hw_raid
151
152     # Optionally set a custom node name
153     if 'name' in node:
154         data['name'] = node['name']
155
156     log_info("Node properties: {}".format(data))
157     deploy.patch('/clusters/{}/nodes/{}'.format(cluster_id, node_id),
158                 data)
159
160 def add_node_networks(deploy, cluster_id, node_id, node):
161     ''' Set the network information for a node '''
162     log_debug_trace()
163
164     log_info("Adding node '{}' network properties".format(node_id))
165
166     num_nodes = deploy.get_num_records('/clusters/{}/nodes'.format
167                                       (cluster_id))
168
169     for network in node['networks']:
170
171         # single node clusters do not use the 'internal' network
172         if num_nodes == 1 and network['purpose'] == 'internal':
173             continue
174
175         # Deduce the network id given the purpose for each entry
176         network_id = deploy.find_resource
177         ('/clusters/{}/nodes/{}/networks'.format(cluster_id, node_id),
178          'purpose', network[
179              'purpose'])
180
181         data = {"name": network['name']}
182         if 'vlan' in network and network['vlan']:
183             data['vlan_id'] = network['vlan']
184
185         deploy.patch('/clusters/{}/nodes/{}/networks/{}'.format
186                     (cluster_id, node_id, network_id), data)
187
188 def add_node_storage(deploy, cluster_id, node_id, node):
189     ''' Set all the storage information on a node '''
190     log_debug_trace()
191
192     log_info("Adding node '{}' storage properties".format(node_id))
193     log_info("Node storage: {}".format(node['storage']['pools']))

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191     data = {'pool_array': node['storage']['pools']} # use all the
        json properties
192     deploy.post(
193         '/clusters/{}/nodes/{}/storage/pools'.format(cluster_id,
        node_id), data)
194
195     if 'disks' in node['storage'] and node['storage']['disks']:
196         data = {'disks': node['storage']['disks']}
197         deploy.post(
198             '/clusters/{}/nodes/{}/storage/disks'.format(cluster_id,
        node_id), data)
199
200
201 def create_cluster_config(deploy, config):
202     ''' Construct a cluster config in the deploy server using the
        input json data '''
203     log_debug_trace()
204
205     cluster_id = add_cluster_attributes(deploy, config)
206
207     node_ids = get_node_ids(deploy, cluster_id)
208     node_configs = config['nodes']
209
210     for node_id, node_config in zip(node_ids, node_configs):
211         add_node_attributes(deploy, cluster_id, node_id, node_config)
212         add_node_networks(deploy, cluster_id, node_id, node_config)
213         add_node_storage(deploy, cluster_id, node_id, node_config)
214
215     return cluster_id
216
217
218 def deploy_cluster(deploy, cluster_id, config):
219     ''' Deploy the cluster config to create the ONTAP Select VMs. '''
220     log_debug_trace()
221     log_info("Deploying cluster: {}".format(cluster_id))
222
223     data = {'ontap_credential': {'password': config['cluster']
        ]['ontap_admin_password']}}
224     deploy.post('/clusters/{}/deploy?inhibit_rollback=true'.format
        (cluster_id),
225                 data, wait_for_job=True)
226
227
228 def log_debug_trace():
229     stack = traceback.extract_stack()
230     parent_function = stack[-2][2]

```



```

231     logging.getLogger('deploy').debug('Calling %s()' %
parent_function)
232
233
234 def log_info(msg):
235     logging.getLogger('deploy').info(msg)
236
237
238 def log_and_exit(msg):
239     logging.getLogger('deploy').error(msg)
240     exit(1)
241
242
243 def configure_logging(verbose):
244     FORMAT = '%(asctime)-15s:%(levelname)s:%(name)s: %(message)s'
245     if verbose:
246         logging.basicConfig(level=logging.DEBUG, format=FORMAT)
247     else:
248         logging.basicConfig(level=logging.INFO, format=FORMAT)
249     logging.getLogger('requests.packages.urllib3.connectionpool'
).setLevel(
250         logging.WARNING)
251
252
253 def main(args):
254     configure_logging(args.verbose)
255     deploy = DeployRequests(args.deploy, args.password)
256
257     with open(args.config_file) as json_data:
258         config = json.load(json_data)
259
260         add_vcenter_credentials(deploy, config)
261
262         add_standalone_host_credentials(deploy, config)
263
264         register_unknown_hosts(deploy, config)
265
266         cluster_id = create_cluster_config(deploy, config)
267
268         deploy_cluster(deploy, cluster_id, config)
269
270
271 def parseArgs():
272     parser = argparse.ArgumentParser(description='Uses the ONTAP
Select Deploy API to construct and deploy a cluster.')
273     parser.add_argument('-d', '--deploy', help='Hostname or IP address

```

```
    of Deploy server')
274     parser.add_argument('-p', '--password', help='Admin password of
Deploy server')
275     parser.add_argument('-c', '--config_file', help='Filename of the
cluster config')
276     parser.add_argument('-v', '--verbose', help='Display extra
debugging messages for seeing exact API calls and responses',
277                             action='store_true', default=False)
278     return parser.parse_args()
279
280 if __name__ == '__main__':
281     args = parseArgs()
282     main(args)
```

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