SMOKE TEST

Optimized PyTorch

Date Prepared: April 2020

Document Information

Project Name	**EPIC Accelerator Deployment & Integration Services**		
Project Owner		Document Version No	0.1
Quality Review Method			
Prepared By	Prasad Adireddi	Preparation Date	April 2020
Reviewed By		Review Date	

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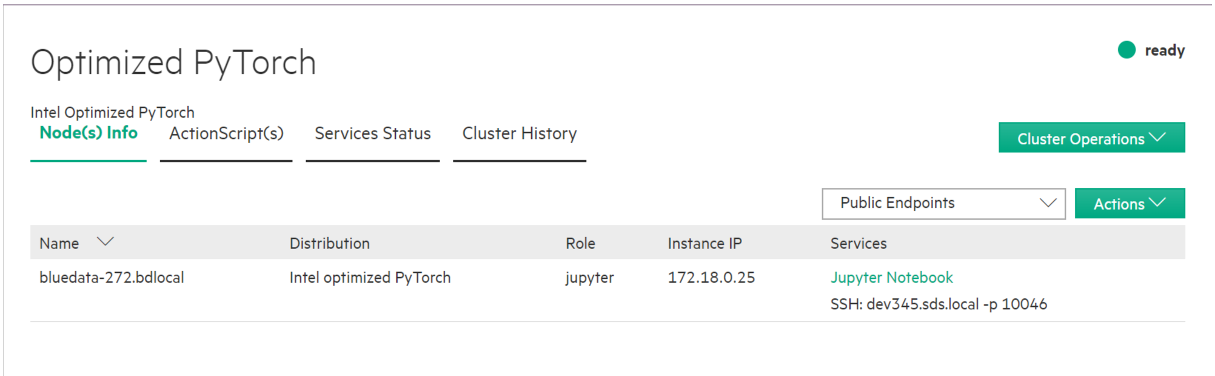
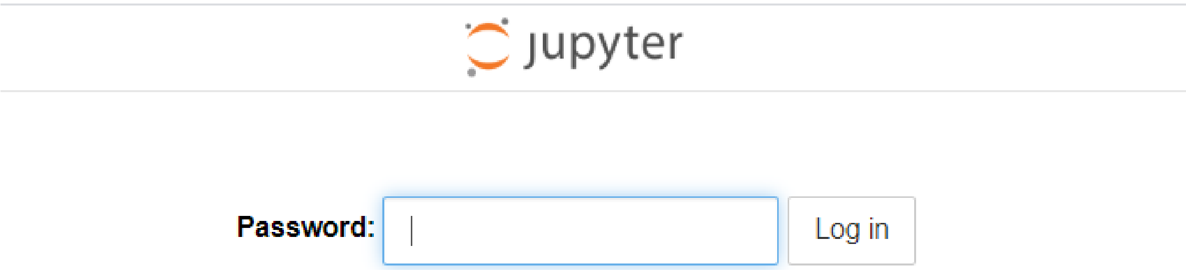
1 LOGIN TO JUPYTERHUB WEB UI

Login to the JupyterHub Web UI, using the following steps:

1. From the Cluster page under Services, click on **Jupyter Notebook**



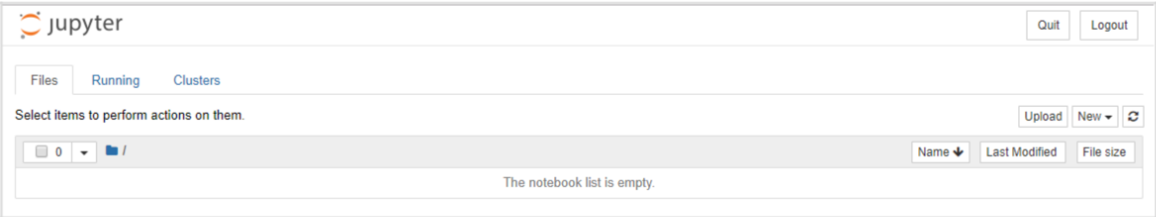
2. It will open-up a new tab with JupyterHub login page, login using your credentials



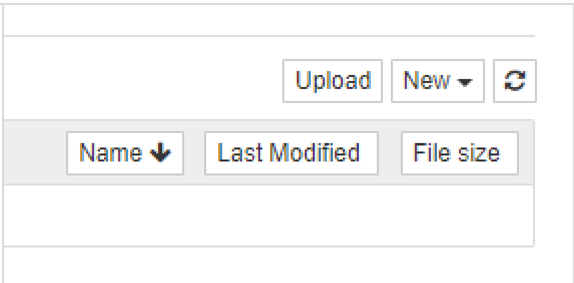
2 CREATE NOTEBOOK

To create a new notebook, in JupyterHub use the following steps:

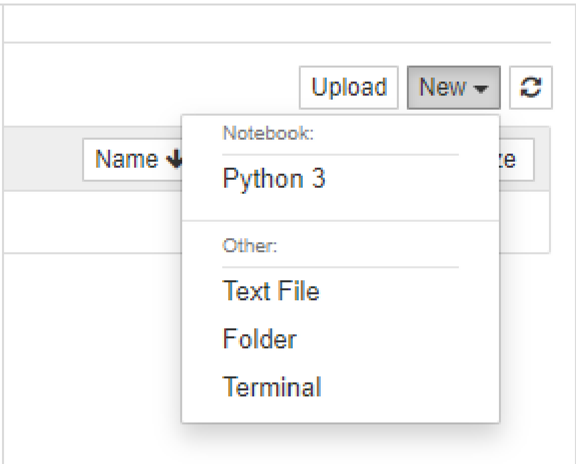
1. Once you log into JupyterHub, you will get the dashboard like below:



2. Click on **New** drop-down button, to create a new notebook



3. Select **Python3**, for upcoming tasks



3 REGRESSION WITH NEURAL NETWORKS

In this section, we are testing a Regression with Neural Networks example:

1. In Python3 notebook, add the following code in the code cell:

```
Import torch
from torch.autograd import Variable
import torch.nn.functional as F
import torch.utils.data as Data

import matplotlib.pyplot as plt
%matplotlib inline

import numpy as np
import imageio


torch.manual_seed(1)    # reproducible

x = torch.unsqueeze(torch.linspace(-1, 1, 100), dim=1)  # x data (tensor),
shape=(100, 1)
y = x.pow(2) + 0.2*torch.rand(x.size())                 # noisy y data
(tensor), shape=(100, 1)

# torch can only train on Variable, so convert them to Variable
x, y = Variable(x), Variable(y)

# view data
plt.figure(figsize=(10,4))
plt.scatter(x.data.numpy(), y.data.numpy(), color = "orange")
plt.title('Regression Analysis')
plt.xlabel('Independent varible')
plt.ylabel('Dependent varible')
plt.show()

# this is one way to define a network
class Net(torch.nn.Module):
    def __init__(self, n_feature, n_hidden, n_output):
        super(Net, self).__init__()
        self.hidden = torch.nn.Linear(n_feature, n_hidden)   # hidden layer
        self.predict = torch.nn.Linear(n_hidden, n_output)   # output layer

    def forward(self, x):
        x = F.relu(self.hidden(x))      # activation function for hidden layer
        x = self.predict(x)             # linear output
        return x
```

```
net = Net(n_feature=1, n_hidden=10, n_output=1)     # define the network
# print(net)  # net architecture
optimizer = torch.optim.SGD(net.parameters(), lr=0.2)
loss_func = torch.nn.MSELoss()  # this is for regression mean squared loss

my_images = []
fig, ax = plt.subplots(figsize=(12,7))

# train the network
for t in range(200):

    prediction = net(x)     # input x and predict based on x

    loss = loss_func(prediction, y)     # must be (1. nn output, 2. target)

    optimizer.zero_grad()   # clear gradients for next train
    loss.backward()         # backpropagation, compute gradients
    optimizer.step()        # apply gradients

    # plot and show learning process
    plt.cla()
    ax.set_title('Regression Analysis', fontsize=35)
    ax.set_xlabel('Independent variable', fontsize=24)
    ax.set_ylabel('Dependent variable', fontsize=24)
    ax.set_xlim(-1.05, 1.5)
    ax.set_ylim(-0.25, 1.25)
    ax.scatter(x.data.numpy(), y.data.numpy(), color = "orange")
    ax.plot(x.data.numpy(), prediction.data.numpy(), 'g-', lw=3)
    ax.text(1.0, 0.1, 'Step = %d' % t, fontdict={'size': 24, 'color':  'red'})
    ax.text(1.0, 0, 'Loss = %.4f' % loss.data.numpy(),
            fontdict={'size': 24, 'color':  'red'})
```

jupyter Untitled Last Checkpoint: in 4 minutes (unsaved changes)

File Edit View Insert Cell Kernel Widgets Help

Run Code

In [ ]:

```
import torch
from torch.autograd import Variable
import torch.nn.functional as F
import torch.utils.data as Data

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    def forward(self, x):
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```

2. Click on Run, to view the output