New York University Computer Science Department
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Assignment 8: Final Project Support Documentation

Refactoring and Module Loading Fixes

The below module loading errors may occur when running the project3 code passing the l3routing.prop config file. See below for a list of instructions on how to fix this.

To fix the above errors, do the following to refactor the code and resolve the above module loading errors:

Note: this assumes that all three directories: project3, openflow, floodlight-plus are at the same level.

1. Navigate to the openFLow directory and change the directory path to /src/wics/cs/sdn/apps/ from src/brown/cs/sdn/apps/

2. For all files in sub-directories of /src/brown/sdn/apps/ change the package names to edu.wisc.cs.sdn.apps... (maintain the rest of the package that follows "apps" (for all instances, "brown" should be replaced with "wisc").

3. Navigate to the floodlight-plus directory, in /src/main/resources/META-INF/services/ open the file called
    net.floodlightcontroller.core.module.IFloodlightModule in an editor and change the following from:

    edu.brown.cs.sdn.apps.sps.ShortestPathSwitching
    edu.brown.cs.sdn.apps.util.ArpServer

    to:

edu.wisc.cs.sdn.apps.sps.ShortestPathSwitching
edu.wisc.cs.sdn.apps.util.ArpServer

NOTE: these Java source files should have their package names updated (see step #2 above)

4. Add the following to the net.floodlightcontroller.core.module.IFloodlightModule that was edited in step #3 above

edu.wisc.cs.sdn.apps.l3routing.L3Routing

5. Navigate to the floodlight-plus directory and run "ant" to compile this code. The

floodlight.jar file should get generated and placed inside the "target" directory

6. Navigate to the openflow directory, and open the build.xml file and make sure the relative paths to the floodlight-plus/target directory are properly configured to the correct relative paths (there are three locations for this change)

7. Run "ant" in the root level of the openflow directory. In the bin directory, you should see the shortestPathSwitching.class file with the new package and directory structure. The FloodlightWithApps.jar file gets generated in this openflow root directory.

8. In the project3 directory, open the build.xml file and make sure the path to floodlight-plus is properly configured (in three places)

9. Copy the /openflow/src/edu/wisc/cs/sdn/apps/sps/ (NOTE: only the /sps/ sub-directory and its contents), which contains the ShortestPathSwitching.java file into the /project3/src/edu/wisc/cs/sdn/apps/ directory.

10. Run "ant" in the root level of the project 3 directory. The FloodlightWithApps.jar file gets generated in this project3 root directory

11. Inside the project3 root directory, run the program with the command: java -jar FloodlightWithApps.jar -cf l3routing.prop

After performing the above steps, you should see the following output when running the program with the command: java -jar FloodlightWithApps.jar -cf l3routing.prop

```
$ java -jar FloodlightWithApps.jar -cf l3routing.prop
20:30:36.021 INFO [n.f.c.m.FloodlightModuleLoader:main] Loading modules from file l3routing.prop
20:30:36.208 INFO [n.f.c.i.Controller:main] Controller role set to MASTER
20:30:36.211 INFO [n.f.c.i.Controller:main] Flush switches on reconnect -- Disabled
20:30:36.219 INFO [ArpServer:main] Initializing ArpServer...
20:30:36.219 INFO [L3Routing:main] Initializing L3Routing...
20:30:48.397 INFO [n.f.l.i.LinkDiscoveryManager:main] Setting autoportfast feature to OFF
20:30:48.688 INFO [ArpServer:main] Starting ArpServer...
20:30:48.688 INFO [L3Routing:main] Starting L3Routing...
20:30:48.802 INFO [o.s.s.i.c.FallbackCCProvider:main] Cluster not yet configured; using fallback local configuration
20:30:48.802 INFO [o.s.s.i.SyncManager:main] [32767] Updating sync configuration ClusterConfig [allNodes={32767=Node [hostname=localhost, port=6642, no
deId=32767, domainId=32767]}, authScheme=NO_AUTH, keyStorePath=null, keyStorePassword is unset]
20:30:49.133 INFO [o.s.s.i.r.RPCService:main] Listening for internal floodlight RPC on localhost/127.0.0.1:6642
20:30:49.208 INFO [n.f.c.i.Controller:main] Listening for switch connections on 0.0.0.0/0.0.0.0:6633
```

The code should be built and run Mininet VM locally.

The FinalProject_VBoxSoftware_Instructions.pdf document contains instructions on how to access the Mininet VM from a local computer. The instructions in the FinalProject_VBoxSoftware_Instructions.pdf document were performed on Windows 10.

Build and run the code in the VM

1. Login into the VM, open a terminal and navigate to the openflow/ directory. Run the "ant" command to build the project. The FloodlightWithApps.jar file should be generated:

2. To start Floodlight, run the command: "java -jar FloodlightWithApps.jar -cf loadbalancer.prop":

3. Open a second terminal and navigate to the openflow/ directory. To start mininet, use the command "sudo ./run_mininet,py single,3":