Write SDN Controller

计算机网络 CS339

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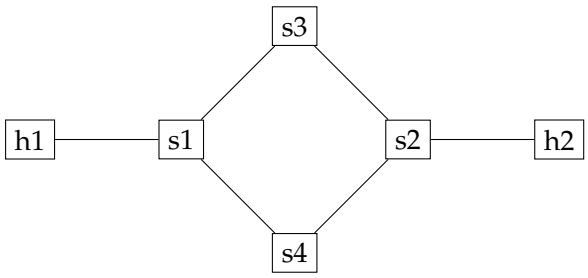
目录

Ryu provides software components with well defined API's that make it easy for developers to create new network management and control applications.

1 建立网络

Set up the following network first:



使用给出的示例代码。

Listing 1: loopnet.py

```
#!/usr/bin/python
"""Sample Code"""
from mininet.topo import Topo
from mininet.net import Mininet
from mininet.node import OVSBridge, OVSSwitch, OVSKernelSwitch
from mininet.node import CPULimitedHost
from mininet.node import RemoteController
from mininet.link import TCLink
from mininet.util import dumpNodeConnections
from mininet.log import setLogLevel, info
from mininet.cli import CLI
from sys import argv
def Test():
    "Create network and run simple performance test"
    net = Mininet( switch=OVSSwitch,host=CPULimitedHost, link=TCLink,
    autoStaticArp=False, controller=RemoteController)
    switch1 = net.addSwitch('s1')
    switch2 = net.addSwitch('s2')
    switch3 = net.addSwitch('s3')
    switch4 = net.addSwitch('s4')
    host1 = net.addHost('h1', cpu=.25)
    host2 = net.addHost('h2', cpu=.25)
    net.addLink(host1, switch1, bw=10, delay='5ms', loss=0, use_htb=True)
    net.addLink(host2, switch2, bw=10, delay='5ms', loss=0, use_htb=True)
    net.addLink(switch1, switch3, bw=10, delay='5ms', loss=0, use_htb=True)
    net.addLink(switch1, switch4, bw=10, delay='5ms', loss=0, use_htb=True)
    net.addLink(switch2, switch3, bw=10, delay='5ms', loss=0, use_htb=True)
    net.addLink(switch2, switch4, bw=10, delay='5ms', loss=0, use_htb=True)
    c1 = net.addController('c1', controller=RemoteController, ip="127.0.0.1",
     port=6653)
    net.build()
    c1.start()
    s1, s2, s3, s4 = net.getNodeByName('s1', 's2', 's3', 's4')
    s1.start([c1])
    s2.start([c1])
    s3.start([c1])
    s4.start([c1])
```

```
    net.start()
    info( "Dumping host connections\n" )
    dumpNodeConnections(net.hosts)
    h1, h2 = net.getNodeByName('h1', 'h2')
    CLI(net)
    net.stop()
if __name__ == '__main__':
    # setLogLevel( 'debug' )
    setLogLevel('info')
    Test()
```

2 定时切换

Write an RYU controller that switches paths (h1-s1-s3-s2-h2 or h1-s1-s4-s2-h2) between h1 and h2 every 5 seconds.

3

Write an RYU controller that uses both paths to forward packets from h1 to h2.

4

Write an RYU controller that uses the first path (h1-s1-s3-s2-h2) for routing packets from h1 to h2 and uses the second path for backup. Specifically, when the first path experiences a link failure, the network should automatically switch to the second path without causing packet drop. (hint: consider using `OFPGT_FF` (FF is short for "fast failover") to construct a group table)