

Screen shots

NOTE: RTI on MAC . I have virtual memory issue and I couldn't figure it out how to fix this however, it doesn't bother running program. It still runs fine but looks just messy.

```

Terminal 1: pyro2 — python3 OperatorSubscriber.py — 122x26
n, please visit http://community.rti.com/kb/osx510
[D0000]CREATE Participant[D0000|ENABLE] DDS_Transport_Shmem_create_recvrresource_rrxA:failed to initialize shared memory resource segment for key 0x401de1
[D0000]CREATE Participant[D0000|ENABLE] DDS_Transport_Shmem_create_recvrresource_rrxA:It is possible that your system's shared memory settings are not sufficient to run RTI Connext DDS. For a more in-depth explanation of the problem and solution, please visit http://community.rti.com/kb/osx510
[D0000]CREATE Participant[D0000|ENABLE] DDS_DomainParticipantPresentation_reserve_participant_index[D0000]CREATE Participant[D0000|ENABLE] DDS_DomainParticipantPresentation_reserve_participant_index[D0000]CREATE Participant[D0000|ENABLE] DDS_DomainParticipantParticipant_reserve_index_entryports:enable reserve participant index[D0000]CREATE Participant[D0000|ENABLE] DDS_DomainParticipantParticipant_reserve_index_entryports:Unusable shared memory transport. For a more in-depth explanation of the possible problem and solution, please visit http://community.rti.com/kb/osx510.
MessageType Route Vehicle Traffic Stop# #stop TimeBetweenStops Fill% Timestamp
Position Express1 Bus12 Normal 1 4 2.0 1 05:13:31
Position Express1 Bus13 Normal 1 4 2.0 15 05:13:31
Position Express2 Bus21 Light 1 6 2.25 16 05:13:31
Position Express2 Bus22 Light 1 6 2.25 57 05:13:31
Position Express1 Bus11 Normal 1 4 2.0 4 05:13:31
Position Express2 Bus23 Normal 1 6 3.0 61 05:13:31
Position Express1 Bus12 Normal 2 4 2.0 18 05:13:33
Position Express1 Bus13 Light 2 4 1.5 18 05:13:33
Position Express1 Bus11 Normal 2 4 2.0 15 05:13:33
Position Express1 Bus21 Light 2 6 2.25 45 05:13:34
Position Express2 Bus22 Heavy 2 6 4.5 12 05:13:34
Position Express2 Bus23 Normal 2 6 3.0 45 05:13:34
Position Express1 Bus11 Normal 3 4 2.0 12 05:13:35

Terminal 2: pyro2 — python3 pass.py Express2 3 2 — 80x26
rrxA:It is possible that your system's shared memory settings are not sufficient to run RTI Connext DDS. For a more in-depth explanation of the problem and solution, please visit http://community.rti.com/kb/osx510
[D0000]CREATE Participant[D0000|ENABLE] DDS_Transport_Shmem_create_recvrresource_rrxA:failed to initialize shared memory resource segment for key 0x401de1
[D0000]CREATE Participant[D0000|ENABLE] DDS_Transport_Shmem_create_recvrresource_rrxA:It is possible that your system's shared memory settings are not sufficient to run RTI Connext DDS. For a more in-depth explanation of the problem and solution, please visit http://community.rti.com/kb/osx510
[D0000]CREATE Participant[D0000|ENABLE] DDS_DomainParticipantPresentation_reserve_participant_index_entryports:enable reserve participant index[D0000]CREATE Participant[D0000|ENABLE] DDS_DomainParticipantParticipant_reserve_index_entryports:Unusable shared memory transport. For a more in-depth explanation of the possible problem and solution, please visit http://community.rti.com/kb/osx510.
3
2

Terminal 3: pyro2 — python3 launcher.py — 121x32
serve participant index
[D0000]CREATE Participant[D0000|ENABLE] DDS_DomainParticipant_reserve_participant_index_entryports:Unusable shared memory transport. For a more in-depth explanation of the possible problem and solution, please visit http://community.rti.com/kb/osx510.
Threads initialized
Thread Bus11 initialized
Thread Bus12 initialized
Thread Bus13 initialized
Thread Bus21 initialized
Thread Bus22 initialized
Thread Bus23 initialized
All thread has started

operateBus called
operateBus called
operateBus called
operateBus called
operateBus called
operateBus called
Bus12 published a position message at stop #1 on route Express1 at 05:13:31 Normal
Bus13 published a position message at stop #1 on route Express1 at 05:13:31 Normal
Bus21 published a position message at stop #1 on route Express2 at 05:13:31 Light
Bus22 published a position message at stop #1 on route Express2 at 05:13:31 Light
Bus11 published a position message at stop #1 on route Express1 at 05:13:33 Normal
Bus23 published a position message at stop #1 on route Express1 at 05:13:33 Normal
Bus12 published a position message at stop #2 on route Express1 at 05:13:33 Normal
Bus11 published a position message at stop #2 on route Express1 at 05:13:33 Light
Bus13 published a position message at stop #2 on route Express1 at 05:13:33 Normal
Bus21 published a position message at stop #2 on route Express2 at 05:13:34 Light
Bus22 published a position message at stop #2 on route Express2 at 05:13:34 Heavy
Bus23 published a position message at stop #2 on route Express2 at 05:13:34 Normal
Bus11 published a position message at stop #3 on route Express1 at 05:13:35 Normal

Terminal 4: pyro2 — python3 pass.py Express1 4 — 80x32
uton, please visit http://community.rti.com/kb/osx510
[D0000]CREATE Participant[D0000|ENABLE] DDS_Transport_Shmem_create_recvrresource_rrxA:failed to initialize shared memory resource segment for key 0x401de1
[D0000]CREATE Participant[D0000|ENABLE] DDS_Transport_Shmem_create_recvrresource_rrxA:It is possible that your system's shared memory settings are not sufficient to run RTI Connext DDS. For a more in-depth explanation of the problem and solution, please visit http://community.rti.com/kb/osx510
[D0000]CREATE Participant[D0000|ENABLE] DDS_DomainParticipantPresentation_reserve_participant_index_entryports:enable reserve participant index[D0000]CREATE Participant[D0000|ENABLE] DDS_DomainParticipantParticipant_reserve_index_entryports:Unusable shared memory transport. For a more in-depth explanation of the possible problem and solution, please visit http://community.rti.com/kb/osx510.
[D0000]CREATE Participant[D0000|ENABLE] DDS_DomainParticipantPresentation_reserve_participant_index_entryports:enable reserve participant index[D0000]CREATE Participant[D0000|ENABLE] DDS_DomainParticipantParticipant_reserve_index_entryports:Unusable shared memory transport. For a more in-depth explanation of the possible problem and solution, please visit http://community.rti.com/kb/osx510.
3
4
Waiting for the bus...
Express1
1
4
Getting on Bus12 at 05:13:31, Normal, 3 stop left
Arriving at stop #2, at 05:13:33, Normal 2 stops left

```


pyro2 — python3 OperatorSubscriber.py — 122x26

```

Position Express1 Bus22 Normal 1 6 3.0 56 05:13:49
Position Express1 Bus12 Normal 2 4 2.0 34 05:13:51
Position Express1 Bus13 Light 2 4 1.5 28 05:13:51
Position Express1 Bus22 Normal 2 4 2.0 72 05:13:51
Position Express2 Bus22 Normal 2 6 3.0 67 05:13:52
Position Express1 Bus12 Normal 4 2.0 18 05:13:53
Position Express1 Bus12 Heavy 3 4 3.0 75 05:13:53
Position Express1 Bus13 Normal 3 4 2.0 72 05:13:53
Position Express2 Bus23 Normal 2 6 3.0 12 05:13:54
Position Express2 Bus21 Normal 6 6 3.0 92 05:13:54
Accident Express1 Bus11 4 05:13:55
Position Express1 Bus11 Normal 4 4 12.0 84 05:13:55
Position Express2 Bus22 Light 3 6 2.25 72 05:13:55
Position Express1 Bus13 Normal 4 4 2.0 85 05:13:55
Accident Express2 Bus21 1 05:13:57
Position Express1 Bus12 Normal 4 4 2.0 63 05:13:56
Position Express2 Bus23 Normal 3 6 3.0 22 05:13:57
Position Express2 Bus21 Normal 1 6 13.0 72 05:13:57
Accident Express1 Bus13 1 05:13:57
Position Express1 Bus13 Normal 1 4 12.0 95 05:13:57
Position Express2 Bus22 Normal 5 6 3.0 59 05:13:58
Position Express1 Bus12 Normal 4 6 3.0 53 05:13:58
Position Express2 Bus22 Normal 5 6 3.0 59 05:13:58
Position Express1 Bus12 1 05:13:58
Position Express1 Bus12 Normal 1 4 12.0 59 05:13:58
Position Express2 Bus22 Normal 5 6 3.0 53 05:14:00
Position Express2 Bus23 Light 4 6 2.25 24 05:14:00

```

pyro2 — bash — 80x26

```

_rrrEA:It is possible that your system's shared memory settings are not sufficient to run RTI Connext DDS. For a more in-depth explanation of the problem and solution, please visit http://community.rti.com/kb/ossx10
[D0000]CREATE Participant[00000|ENABLED] DDS_Transport_Shmem_create_recvrresource _rrrEA:Failed to initialize shared memory resource segment for key 0x401dd0
[D0000]CREATE Participant[00000|ENABLED] DDS_DomainParticipant_reserve_participant_index _rrrEA:It is possible that your system's shared memory settings are not sufficient to run RTI Connext DDS. For a more in-depth explanation of the problem and solution, please visit http://community.rti.com/kb/ossx10
[D0000]CREATE Participant[00000|ENABLED] DDS_DomainParticipantPresentation_reserv e_participant_index_entryports:enable reserve participant index
[D0000]CREATE Participant[00000|ENABLED] DDS_DomainParticipant_reserve_participant_index_entryports:Unusable shared memory transport. For a more in-depth explanation of the possible problem and solution, please visit http://community.rti.com/kb/ossx10
Waiting for the bus...
Express2
3
2
Getting on Bus23 at 05:13:37. Normal, 6 stop left
Arriving at stop #5, at 05:13:43, Normal 6 stops left
Arriving at stop #6, at 05:13:46, Normal 3 stops left
Arriving at stop #1, at 05:13:49, Heavy 2 stops left
Arriving at stop #2, at 05:13:54, Normal 1 stops left
Arriving at stop #4, at 05:14:00, Light 0 stops left
(base) Bumjins-MacBook-Pro:pyro2 bumjinpark$ 

```

pyro2 — python3 launcher.py — 121x32

```

Bus22 published a position message at stop #5 on route Express2 at 05:13:44 Light
Bus22 published a position message at stop #6 on route Express1 at 05:13:44 Normal
Bus22 published a position message at stop #6 on route Express2 at 05:13:44 Normal
Bus12 published a position message at stop #4 on route Express1 at 05:13:47 Normal
Bus12 published a position message at stop #4 on route Express1 at 05:13:49 Normal
Bus23 published a position message at stop #4 on route Express2 at 05:13:49 Heavy
Bus22 published a position message at stop #4 on route Express2 at 05:13:49 Normal
Bus12 published a position message at stop #2 on route Express1 at 05:13:50 Normal
Bus12 published a position message at stop #2 on route Express1 at 05:13:53 Light
Bus12 published a position message at stop #2 on route Express1 at 05:13:51 Normal
Bus22 published a position message at stop #2 on route Express2 at 05:13:52 Normal
Bus11 published a position message at stop #3 on route Express1 at 05:13:53 Normal
Bus12 published a position message at stop #3 on route Express1 at 05:13:53 Heavy
Bus13 published a position message at stop #3 on route Express1 at 05:13:53 Normal
Bus23 published a position message at stop #2 on route Express2 at 05:13:54 Normal
Bus22 published a position message at stop #2 on route Express2 at 05:13:54 Normal
Bus11 published a position message at stop #4 on route Express1 at 05:13:55 Normal
Bus22 published a position message at stop #4 on route Express1 at 05:13:55 Light
Bus13 published a position message at stop #4 on route Express1 at 05:13:55 Normal
Bus12 published a position message at stop #3 on route Express2 at 05:13:56 Normal
Bus22 published a position message at stop #3 on route Express2 at 05:13:56 Light
Bus13 published a position message at stop #3 on route Express2 at 05:13:57 Normal
Bus22 published a position message at stop #3 on route Express2 at 05:13:58 Light
Bus12 published a accident message at stop #4 on route Express1 at 05:13:58
Bus22 published a position message at stop #4 on route Express1 at 05:13:58 Normal
Bus22 published a position message at stop #5 on route Express2 at 05:14:00 Normal
Bus23 published a position message at stop #4 on route Express2 at 05:14:00 Light

```

pyro2 — bash — 80x32

```

_rrrEA:Failed to initialize shared memory resource segment for key 0x401dd0
[D0000]CREATE Participant[00000|ENABLED] DDS_Transport_Shmem_create_recvrresource _rrrEA:Failed to initialize shared memory resource segment for key 0x401dd0
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[D0000]CREATE Participant[00000|ENABLED] DDS_Transport_Shmem_create_recvrresource _rrrEA:It is possible that your system's shared memory settings are not sufficient to run RTI Connext DDS. For a more in-depth explanation of the problem and solution, please visit http://community.rti.com/kb/ossx10
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[D0000]CREATE Participant[00000|ENABLED] DDS_DomainParticipantPresentation_reserv e_participant_index_entryports:enable reserve participant index
[D0000]CREATE Participant[00000|ENABLED] DDS_DomainParticipant_reserve_participant_index_entryports:Unusable shared memory transport. For a more in-depth explanation of the possible problem and solution, please visit http://community.rti.com/kb/ossx10
Waiting for the bus...
Express2
3
4
Getting on Bus12 at 05:13:31. Normal, 3 stop left
Arriving at stop #2, at 05:13:33, Normal 2 stops left
Arriving at stop #3, at 05:13:35, Light , accident, 1 stops left
Arriving at stop #4, at 05:13:47, Normal 0 stops left
(base) Bumjins-MacBook-Pro:pyro2 bumjinpark$ 

```

pyro2 — python3 OperatorSubscriber.py — 122x26

```

Position Express1 Bus12 Normal 1 4 12.0 59 05:13:58
Position Express2 Bus22 Normal 5 6 3.0 53 05:14:00
Position Express2 Bus23 Light 4 6 2.25 24 05:14:00
Position Express2 Bus23 Normal 5 6 3.0 54 05:14:00
Position Express2 Bus22 Normal 6 6 3.0 69 05:14:00
Position Express2 Bus23 Light 6 6 2.25 6 05:14:00
Position Express2 Bus22 Normal 1 6 3.0 54 05:14:00
Position Express2 Bus23 Normal 1 6 3.0 84 05:14:00
Position Express1 Bus11 Normal 1 4 2.0 23 05:14:00
Position Express2 Bus22 2 05:14:00
Position Express1 Bus22 Normal 2 6 13.0 39 05:14:00
Position Express1 Bus12 Light 4 6 1.5 78 05:14:00
Position Express1 Bus13 Light 2 4 1.5 23 05:14:00
Position Express2 Bus21 Normal 2 6 3.0 22 05:14:00
Position Express2 Bus23 Light 2 6 2.25 11 05:14:00
Position Express1 Bus12 Normal 2 4 2.0 66 05:14:11
Position Express1 Bus11 Normal 3 4 2.0 44 05:14:11
Position Express1 Bus13 Heavy 3 4 3.0 78 05:14:11
Position Express2 Bus23 Light 3 6 2.25 38 05:14:11
Position Express1 Bus12 Light 4 6 1.5 70 05:14:11
Position Express1 Bus11 Heavy 4 6 3.0 14 05:14:13
Position Express2 Bus21 Heavy 3 6 4.5 12 05:14:13
Position Express1 Bus12 Light 4 4 1.5 65 05:14:14
Position Express1 Bus13 Light 4 4 1.5 1 05:14:14
Position Express2 Bus23 Normal 4 6 3.0 55 05:14:15

```

pyro2 — bash — 80x32

```

_rrrEA:It is possible that your system's shared memory settings are not sufficient to run RTI Connext DDS. For a more in-depth explanation of the problem and solution, please visit http://community.rti.com/kb/ossx10
[D0000]CREATE Participant[00000|ENABLED] DDS_DomainParticipant_reserve_participant_index _rrrEA:Failed to initialize shared memory resource segment for key 0x401dd0
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[D0000]CREATE Participant[00000|ENABLED] DDS_DomainParticipant_reserve_participant_index_entryports:Unusable shared memory transport. For a more in-depth explanation of the possible problem and solution, please visit http://community.rti.com/kb/ossx10
Waiting for the bus...
Express2
3
2
Getting on Bus23 at 05:13:27. Normal, 5 stop left
Arriving at stop #5, at 05:13:43, Normal 4 stops left
Arriving at stop #6, at 05:13:46, Normal 3 stops left
Arriving at stop #1, at 05:13:49, Heavy 2 stops left
Arriving at stop #2, at 05:13:54, Normal 1 stops left
Arriving at stop #4, at 05:14:00, Light 0 stops left
(base) Bumjins-MacBook-Pro:pyro2 bumjinpark$ 

```

pyro2 — python3 launcher.py — 121x32

```

Bus22 published a accident message at stop #1 on route Express1 at 05:13:57
Bus22 published a position message at stop #1 on route Express2 at 05:13:57 Normal
Bus13 published a accident message at stop #1 on route Express1 at 05:13:57
Bus13 published a position message at stop #1 on route Express2 at 05:13:57 Normal
Bus22 published a position message at stop #4 on route Express2 at 05:13:58 Light
Bus12 published a accident message at stop #1 on route Express1 at 05:13:58 Normal
Bus12 published a position message at stop #1 on route Express1 at 05:13:59 Normal
Bus22 published a position message at stop #1 on route Express1 at 05:13:59 Normal
Bus12 published a position message at stop #2 on route Express1 at 05:14:00 Normal
Bus22 published a position message at stop #4 on route Express2 at 05:14:00 Light
Bus23 published a position message at stop #6 on route Express2 at 05:14:02 Normal
Bus22 published a position message at stop #6 on route Express2 at 05:14:03 Normal
Bus23 published a position message at stop #6 on route Express2 at 05:14:05 Light
Bus22 published a position message at stop #6 on route Express2 at 05:14:06 Normal
Bus23 published a position message at stop #6 on route Express2 at 05:14:08 Light
Bus22 published a position message at stop #7 on route Express2 at 05:14:09 Normal
Bus11 published a position message at stop #2 on route Express1 at 05:14:09 Light
Bus13 published a position message at stop #2 on route Express1 at 05:14:10 Light
Bus21 published a position message at stop #2 on route Express1 at 05:14:10 Heavy
Bus12 published a position message at stop #3 on route Express1 at 05:14:11 Normal
Bus13 published a position message at stop #3 on route Express1 at 05:14:11 Heavy
Bus22 published a position message at stop #3 on route Express2 at 05:14:12 Light
Bus11 published a position message at stop #2 on route Express1 at 05:14:12 Heavy
Bus21 published a position message at stop #2 on route Express2 at 05:14:13 Heavy
Bus12 published a position message at stop #4 on route Express1 at 05:14:14 Light
Bus13 published a position message at stop #4 on route Express1 at 05:14:14 Light
Bus23 published a position message at stop #4 on route Express2 at 05:14:15 Normal

```

pyro2 — bash — 80x32

```

_rrrEA:Failed to initialize shared memory resource segment for key 0x401dd0
[D0000]CREATE Participant[00000|ENABLED] DDS_Transport_Shmem_create_recvrresource _rrrEA:It is possible that your system's shared memory settings are not sufficient to run RTI Connext DDS. For a more in-depth explanation of the problem and solution, please visit http://community.rti.com/kb/ossx10
[D0000]CREATE Participant[00000|ENABLED] DDS_Transport_Shmem_create_recvrresource _rrrEA:Failed to initialize shared memory resource segment for key 0x401dd0
[D0000]CREATE Participant[00000|ENABLED] DDS_Transport_Shmem_create_recvrresource _rrrEA:It is possible that your system's shared memory settings are not sufficient to run RTI Connext DDS. For a more in-depth explanation of the problem and solution, please visit http://community.rti.com/kb/ossx10
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[D0000]CREATE Participant[00000|ENABLED] DDS_DomainParticipantPresentation_reserv e_participant_index_entryports:enable reserve participant index
[D0000]CREATE Participant[00000|ENABLED] DDS_DomainParticipant_reserve_participant_index_entryports:Unusable shared memory transport. For a more in-depth explanation of the possible problem and solution, please visit http://community.rti.com/kb/ossx10
Waiting for the bus...
Express2
3
4
Getting on Bus12 at 05:13:31. Normal, 3 stop left
Arriving at stop #2, at 05:13:33, Normal 2 stops left
Arriving at stop #3, at 05:13:35, Light , accident, 1 stops left
Arriving at stop #4, at 05:13:47, Normal 0 stops left
(base) Bumjins-MacBook-Pro:pyro2 bumjinpark$ 

```

Launcher.py

```
import rticonnextdds_connector as rti
import random
import threading
import configparser
import datetime
import time
import numpy as np # random number with probabiliy generator
from functools import partial
from itertools import chain

#connector = rti.Connector("MyParticipantLibrary::Zero", "./accident.xml");

class TreadingBuses(object):

    def __init__(self):
        self.vehiclelist=[]

    def appendVehicle(self, vehicleInput):
        self.vehiclelist.append(vehicleInput)

    def doThreading(self):
        threads = []
        for bus in self.vehiclelist:
            #print("aaa")
            threadTem = threading.Thread(target=bus.operateBus) # testing
            threads.append(threadTem)
            print("Thread {} initialized".format(bus.vehicleName))

        time.sleep(2) #sleep
        print("All thread has started \n")
        for t in threads:
            t.start()

class Bus(object):

    def __init__(self, rn, vn, ns, tbs):
        self.routeName=rn
        self.vehicleName=vn
        self.numStops=ns
        self.timeBetweenStops=tbs
        self.stopNum=1
        self.savedTimeBetweenStops=tbs
```

```

self.accStat=0

self.connector = rti.Connector("MyParticipantLibrary::Zero", "./position.xml")
self.writePOS = self.connector.getOutput("Publisher::P2464_EECS_Bumjin_Park_POS")
self.writeACC = self.connector.getOutput("Publisher::P2464_EECS_Bumjin_Park_ACC")

self.total_stops = self.numStops*3 #18
self.heavyNums= int(self.total_stops/10) #1
self.lightNums= int(self.total_stops/4) #4
self.normalNums= self.total_stops-self.heavyNums-self.lightNums # 13

def setTBS(self,saved,times):
    self.timeBetweenStops=saved*times

def traffic(self):
    #light = 0.25 * timeBetweenStops # for simplicity, use total_stops instead of
    timeBetweenStops.
    #heavy = 1.5 * timeBetweenStops
    #normal = 1 * timeBetweenStops
    # total number of stops = numStops*3
    ##np.random.choice(np.arange(0, 3), p=[0.25, 0.1, 0.65])

    while (1):
        #randomNum=random.randint(1,3) #1~3
        randomNum=np.random.choice(np.arange(0, 3), p=[0.1, 0.25, 0.65])      ##note. this is
        just a random number generator based on probability ###
        if(randomNum==0 and self.heavyNums!=0):                                ## condition on rightside
            is the # of heavys based on total stop_num
            self.heavyNums -= 1
            #item = self.savedTimeBetweenStops*1.5
            #self.timeBetweenStops=self.savedTimeBetweenStops*50.0/100.0 # increases
            speed by 50%
            self.setTBS(self.savedTimeBetweenStops,1.5)
            return "Heavy "
        if(randomNum==1 and self.lightNums!=0):
            self.lightNums -= 1
            #item = self.savedTimeBetweenStops*0.75
            #self.timeBetweenStops = self.savedTimeBetweenStops*75.0 / 100.0 # decreases
            speed by 25%
            self.setTBS(self.savedTimeBetweenStops,0.75)

            return "Light "
        if(randomNum==2 and self.normalNums!=0):
            self.normalNums -=1
            #self.timeBetweenStops=self.savedTimeBetweenStops
            self.setTBS(self.savedTimeBetweenStops,1.0)

            return "Normal"

def writePosition(self, acc): #publish position

```

```

#self.timeBetweenStops+=10
self.writePOS.instance.setString("route",self.routeName)
self.writePOS.instance.setString("vehicle",self.vehicleName)
self.writePOS.instance.setNumber("numStops",self.numStops)

self.writePOS.instance.setNumber("fillInRatio",random.randint(1,100))
self.writePOS.instance.setNumber("stopNumber",self.stopNum)
trafficCon=self.traffic()

if acc==1:
    self.timeBetweenStops+=10.0
#if self.accStat==0:
#    self.timeBetweenStops=self.savedTimeBetweenStops
    self.writePOS.instance.setNumber("timeBetweenStops",self.timeBetweenStops)
    self.writePOS.instance.setString("trafficConditions",trafficCon)

self.timeStamp = str(datetime.datetime.now().time().strftime("%H:%M:%S"))
self.writePOS.instance.setString("timestamp",self.timeStamp)
self.writePOS.write()
#self.timeStamp = datetime.datetime.now()

return "{} published a position message at stop {} on route {} at {}"
.format(self.vehicleName, self.stopNum, self.routeName, self.timeStamp,trafficCon)

def writeAccident(self): # publish accident

    self.writeACC.instance.setString("route",self.routeName)
    self.writeACC.instance.setString("vehicle",self.vehicleName)
    self.writeACC.instance.setNumber("stopNumber",self.stopNum)

    self.timeStamp = str(datetime.datetime.now().time().strftime("%H:%M:%S"))
    self.writeACC.instance.setString("timestamp",self.timeStamp)
    self.writeACC.write()

    return "{} published a accidnet message at stop {} on route {} at {}"
    ".format(self.vehicleName, self.stopNum, self.routeName, self.timeStamp)

def operateBus(self):
    print("operateBus called")
    for i in range(3):# 3rounds
        for j in range(self.numStops):

            randomNum=np.random.choice(np.arange(0, 2), p=[0.1, 0.9]) # accident probabiltiy
            #accis=0
            if randomNum==0: #accident
                #self.accStat=1
                #accis=1
                accidentTem = self.writeAccident()

```

```

positionTem = self.writePosition(1)
#accidentTem = self.writeAccident()
print(accidentTem)
print(positionTem)
time.sleep(0.5)
#time.sleep(10) # delays 10 seconds.
#self.savedTimeBetweenStops+=10
#else:
#    self.accStat=0
else:
    positionTem = self.writePosition(0)
    #accidentTem = self.writeAccident()
    print(positionTem)
    #print(accidentTem)
#if self.accStat==1:
#    self.accStat=0

if self.numStops == self.stopNum:
    self.stopNum=0
self.stopNum+=1

time.sleep(self.timeBetweenStops)

```

```

if __name__=="__main__":
    f = open("pub.properties","r")

    v1=[]
    v2=[]
    info1=[]
    info2=[]
    str1 = ""

    f1 = f.readlines()
    for x in f1:
        if x!="\n":
            str1 +=x

    lines=str1.split("\n")
    lines.pop() #removing last \n
    for i in lines:
        tem = (i.split('='))
        if tem[0] == "numRoutes":
            numRoutes=tem[1]
        if tem[0] == "numVehicles":
            numVehicles = tem [1]
        if tem[0][5]== '1':

```

```
    info1.append(tem[1])
    if tem[0][5]== '2':
        info2.append(tem[1])
TreadingBuses=TreadingBuses()

for i in range(0,6):
    #Bus(info1[0],info1[3+i],info1[1],info1[2])

    if(i <3):
        TreadingBuses.appendVehicle(Bus(info1[0],info1[3+i],int(info1[1]),float(info1[2])))
    else:
        TreadingBuses.appendVehicle(Bus(info2[0],info2[i],int(info2[1]),float(info2[2])))

#print("-----")
TreadingBuses.doThreading()
```

OperatorSubscriber.py

```
import rticonnextdds_connector as rti
import time

connector = rti.Connector("MyParticipantLibrary::Zero", "position.xml")
positionSubscription = connector.getInput("Subscriber::P2464_EECS_Bumjin_Park_POS")
accidentSubscription = connector.getInput("Subscriber::P2464_EECS_Bumjin_Park_ACC")

#print("MessageType {:>12}{:>6}{:>10}{:>3}{:>15}{:>20}{:>10}{:>15}".format("Route",
#"Vehicle", "Traffic", "Stop#", "#Stops", "TimeBetweenStops", "Fill%", "Timestamp"))
print("MessageType Route          Vehicle Traffic Stop# #stop TimeBetweenStops      Fill%
Timestamp")

while(True):
    accidentSubscription.take()
    accNum = accidentSubscription.samples.getLength()
    positionSubscription.take()
    posNum = positionSubscription.samples.getLength()
    ##print()

    if accNum!=0:
        routeA = accidentSubscription.samples.getString(0, "route")
        vehicleA = accidentSubscription.samples.getString(0, "vehicle")
        stopNumA = accidentSubscription.samples.getNumber(0, "stopNumber")
        timestampA = accidentSubscription.samples.getString(0, "timestamp")
        print("Accident {:>12}{:>15}{:>13}{:>55}".format(routeA, vehicleA, int(stopNumA),
timestampA))
        #print("Accident    "+routeA+ "      "+vehicleA+ "           "+str(stopNumA)+""
"+timestampA)

    if posNum!=0:
        for num in range(0,posNum):
            routeP = positionSubscription.samples.getString(num, "route")
            vehicleP = positionSubscription.samples.getString(num, "vehicle")
            trafficP = positionSubscription.samples.getString(num,"trafficConditions")
            stopNumP = positionSubscription.samples.getString(num, "stopNumber")
            numStopsP=positionSubscription.samples.getNumber(num,"numStops")

            timeBetweenStopsP=positionSubscription.samples.getNumber(num,"timeBetweenStops")
            fillInRatioP=positionSubscription.samples.getNumber(num,"fillInRatio")
            timestampP = positionSubscription.samples.getString(num, "timestamp")
            #print("[ "+str(num)+"]\r")
```

```
    print("Position {:>12}{: >15}{: >10}{: >3}{: >8}{: >12}{: >21}{: >14}".format(routeP,
vehicleP, trafficP, int(stopNumP), int(numStopsP), timeBetweenStopsP, int(fillInRatioP),
timestampP))
    #print("Position " +routeP+ " " +vehicleP+ " " +trafficP+ " " +stopNumP+
"+str(numStopsP)+" "+str(timeBetweenStopsP)+" "+str(fillInRatioP)+" "+timestampP)
```

```
time.sleep(1)
```

Pass.py (passenger . It gets 3 inputs (routename, startStop#, endStop#)

```
import rticonnextdds_connector as rti
import time
import sys

connector = rti.Connector("MyParticipantLibrary::Zero", "position.xml")
positionSubscription = connector.getInput("Subscriber::P2464_EECS_Bumjin_Park_POS")
accidentSubscription = connector.getInput("Subscriber::P2464_EECS_Bumjin_Park_ACC")

#print("MessageType {:>12}{:>6}{:>10}{:>3}{:>15}{:>20}{:>10}{:>15}".format("Route",
#"Vehicle", "Traffic", "Stop#", "#Stops", "TimeBetweenStops", "Fill%", "Timestamp"))
print("Waiting for the bus... ")

expressName=sys.argv[1]
startStop=int(sys.argv[2])
endStop=int(sys.argv[3])

print(expressName)
print(startStop)
print(endStop)
foundName="null"
switch = 0
stopper=0
howManyLeft=0
getOnSwitch=0
timeTem="null"
trafficTem="null"
storedname="null"

leftstops=0

if __name__=='__main__':
    while(True):
        accidentSubscription.take()
        accNum = accidentSubscription.samples.getLength()
```

```

positionSubscription.take()
posNum = positionSubscription.samples.getLength()
#print("accNum == : ",accNum)

if accNum>0:

    routeA = accidentSubscription.samples.getString(0, "route")
    vehicleA = accidentSubscription.samples.getString(0, "vehicle")
    stopNumA = accidentSubscription.samples.getNumber(0, "stopNumber")
    timestampA = accidentSubscription.samples.getString(0, "timestamp")

    for i in range(0,posNum):
        vehicleP = positionSubscription.samples.getString(i, "vehicle")
        if vehicleA==vehicleP and expressName==routeA:
            trafficP = positionSubscription.samples.getString(i, "trafficConditions")
            stopNumP = positionSubscription.samples.getString(i, "stopNumber")
            numStopsA=positionSubscription.samples.getNumber(i,"numStops")

            #print("Position {:>12}{:>15}{:>10}{:>3}{:>8}{:>12}{:>21}{:>14}".format(routeP,
            vehicleP, trafficP, int(stopNumP), int(numStopsP), timeBetweenStopsP, int(fillInRatioP),
            timestampP))
            #print("Position "+routeP+" "+vehicleP+" "+trafficP+" "+stopNumP+
            "+str(numStopsP)+" "+str(timeBetweenStopsP)+" "+str(fillInRatioP)+" "+timestampP)
            #print(str(num)+"\r")
            #print("Accident {:>12}{:>15}{:>13}{:>55}".format(routeA, vehicleA, int(stopNumA),
            timestampA))
            #print("[ "+str(0)+" ] Accident "+routeA+" "+vehicleA+" "+str(stopNumA)
            +" "+timestampA)

if int(stopNumA)==startStop and getOnSwitch==0 and routeA==expressName:
    storedname=vehicleA
    getOnSwitch=1
    if endStop>startStop:
        howManyLeft= endStop-startStop
    elif startStop>endStop:
        howManyLeft= numStopsA-startStop
        howManyLeft+=endStop
    print("Getting on "+storedname+" at "+ timestampA+", "+trafficP+, accident, "+
    str(int(howManyLeft))+" stops left ")

elif storedname==vehicleA and getOnSwitch!=0:

    howManyLeft-=1
    print("Arriving at stop #"+str(stopNumA)+", at "+timestampA+", "+trafficP+, accident,
    "+str(int(howManyLeft))+" stops left")

    if howManyLeft==0:
        exit()

"""

```

```

if int(stopNumA)==startStop and getOnSwitch==0:
    storedname=vehicleA
    print("Acc get on bus "+storedname)
    getOnSwitch=1
elif storedname==vehicleA and getOnSwitch!=0:
    print("Acc arrived "+storedname)
"""
#got storedname ( vehicle number)

else:
    for num in range(0,posNum):
        routeP = positionSubscription.samples.getString(num, "route")
        vehicleP = positionSubscription.samples.getString(num, "vehicle")
        trafficP = positionSubscription.samples.getString(num,"trafficConditions")
        stopNumP = positionSubscription.samples.getString(num, "stopNumber")
        numStopsP=positionSubscription.samples.getNumber(num,"numStops")

timeBetweenStopsP=positionSubscription.samples.getNumber(num, "timeBetweenStops")
fillInRatioP=positionSubscription.samples.getNumber(num, "fillInRatio")
timestampP = positionSubscription.samples.getString(num, "timestamp")
#print("Position {:>12}{:>15}{:>10}{:>3}{:>8}{:>12}{:>21}{:>14}".format(routeP,
vehicleP, trafficP, int(stopNumP), int(numStopsP), timeBetweenStopsP, int(fillInRatioP),
timestampP))
#print("Position "+routeP+" "+vehicleP+" "+trafficP+" "+stopNumP+
"+str(numStopsP)+" "+str(timeBetweenStopsP)+" "+str(fillInRatioP)+" "+timestampP)

if int(stopNumP)==startStop and getOnSwitch==0 and routeP==expressName:
    storedname=vehicleP

    getOnSwitch=1
    if endStop>startStop:
        howManyLeft= endStop-startStop
    elif startStop>=endStop:
        howManyLeft= numStopsP-startStop
        howManyLeft+=endStop
        print("Getting on "+storedname+ " at "+timestampP+", "+trafficP+", "+
str(int(howManyLeft)) + " stop left")

    elif storedname==vehicleP and getOnSwitch!=0:

        howManyLeft-=1
        print("Arriving at stop #"+str(stopNumP)+", at "+timestampP+", "+trafficP+
"+str(int(howManyLeft))+ " stops left")

        if howManyLeft==0:
            exit()
    time.sleep(1)

print(foundName)

```

pub.properties

```
numRoutes=2  
numVehicles=3  
route1=Express1  
route2=Express2
```

```
route1numStops=4  
route1TimeBetweenStops=2  
route1Vehicle1=Bus11  
route1Vehicle2=Bus12  
route1Vehicle3=Bus13
```

```
route2numStops=6  
route2TimeBetweenStops=3  
route2Vehicle1=Bus21  
route2Vehicle2=Bus22  
route2Vehicle3=Bus23
```

position.xml

```
<?xml version="1.0"?>
<dds xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://community.rti.com/schema/5.1.0/
rti_dds_profiles.xsd" version="5.1.0">

    <!-- Qos Library -->
    <qos_library name="QosLibrary">
        <qos_profile name="DefaultProfile"
base_name="BuiltinQosLibExp::Generic.StrictReliable"
is_default_qos="true">
            <participant_qos>
                <transport_builtin>
                    <mask>UDPV4 | SHMEM</mask>
                </transport_builtin>
            </participant_qos>
        </qos_profile>
    </qos_library>

    <!-- types -->
    <types>

        <struct name="Position" extensibility="extensible">
            <member name="timestamp" id="0" stringMaxLength="128"
type="string" />
            <member name="route" id="1" stringMaxLength="128"
type="string" />
        </struct>
    </types>

```

```

        <member name="vehicle" id="2" stringMaxLength="128"
type="string" />
        <member name="stopNumber" id="3" type="long" />
        <member name="numStops" id="4" type="long" />
        <member name="timeBetweenStops" id="5" type="float" />
        <member name="trafficConditions" id="6" stringMaxLength="128"
type="string" />
        <member name="fillInRatio" id="7" type="long" />
    </struct>

    <struct name="Accident" extensibility="extensible">
        <member name="timestamp" id="0" stringMaxLength="128"
type="string" />
        <member name="route" id="1" stringMaxLength="128"
type="string" />
        <member name="vehicle" id="2" stringMaxLength="128"
type="string" />
        <member name="stopNumber" id="3" type="long" />
    </struct>

</types>

<!-- Domain Library -->
<domain_library name="MyDomainLibrary">
    <domain name="MyDomain" domain_id="0">

        <register_type name="Position" type_ref="Position" />
        <topic name="vehiclePosition" register_type_ref="Position"/>

        <register_type name="Accident" type_ref="Accident" />
        <topic name="vehicleAccident" register_type_ref="Accident"/>
    </domain>
</domain_library>
```

```
<!-- Participant library -->
<domain_participant_library name="MyParticipantLibrary">
    <domain_participant name="Zero"
domain_ref="MyDomainLibrary::MyDomain">
        <publisher name="Publisher">
            <data_writer name="P2464_EECS_Bumjin_Park_POS"
topic_ref="vehiclePosition" />

            <data_writer name="P2464_EECS_Bumjin_Park_ACC"
topic_ref="vehicleAccident" />

        </publisher>
        <subscriber name="Subscriber">
            <data_reader name="P2464_EECS_Bumjin_Park_POS"
topic_ref="vehiclePosition" />
            <data_reader name="P2464_EECS_Bumjin_Park_ACC"
topic_ref="vehicleAccident" />
        </subscriber>
    </domain_participant>
</domain_participant_library>

</dds>
```

