SDN Based prioritized data transfer using AI

Aravinth Kumar A M (2019506012)

Manoj S (2019506048)

Vimal V(2019506114)

CFR-RL: Traffic Engineering with Reinforcement Learning in SDN

State : Traffic Matrix at time t , traffic demands

Action Space : All N * (N-1) flows

Reward : Link Utilization

Enabling Scalable Routing in Software-Defined Networks With Deep Reinforcement Learning on Critical Nodes

State : Throughput Matrix

Action Space : weights of links

Reward : Flow completion time

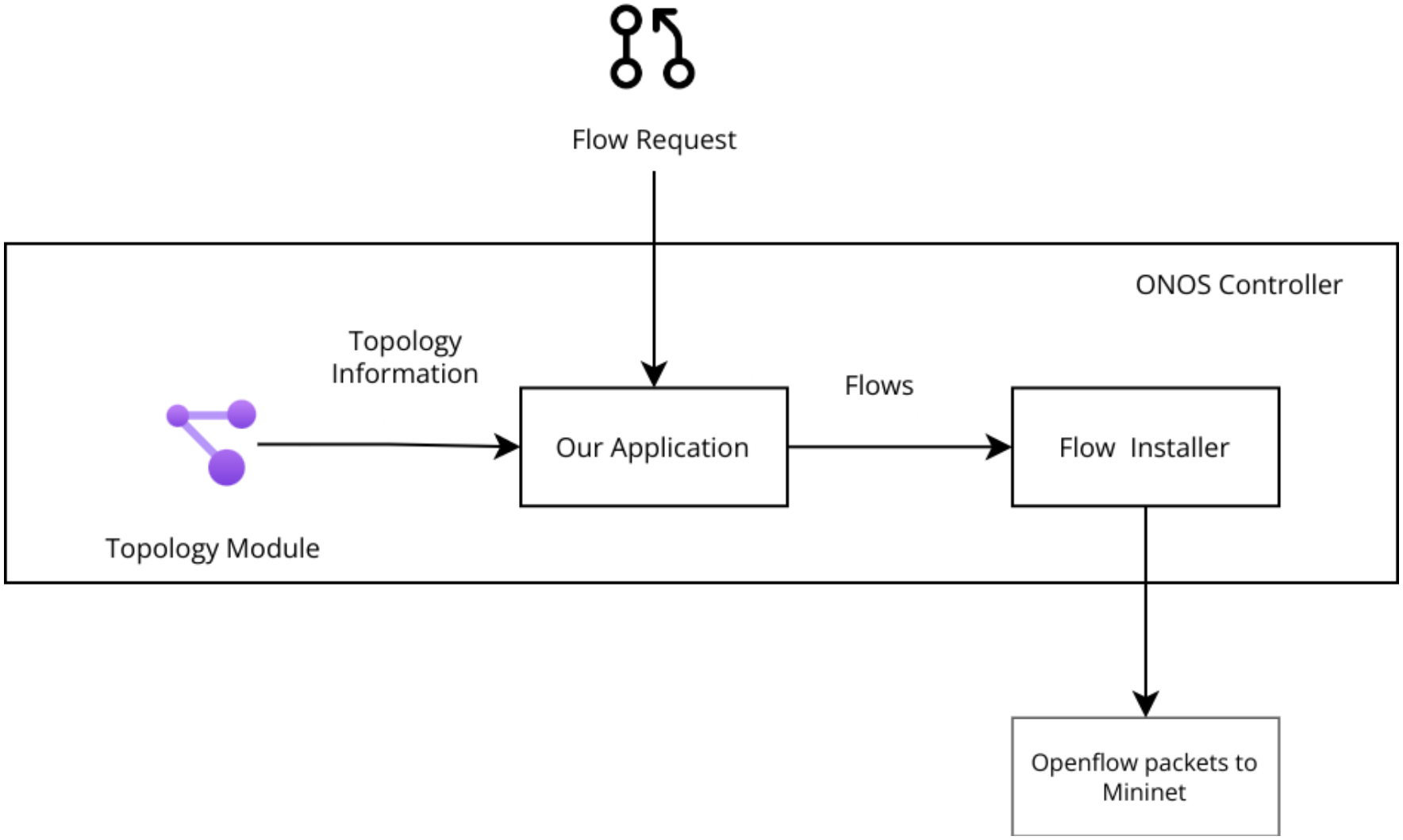
RL-Routing: An SDN Routing Algorithm Based on Deep Reinforcement Learning – Implemented at each switch

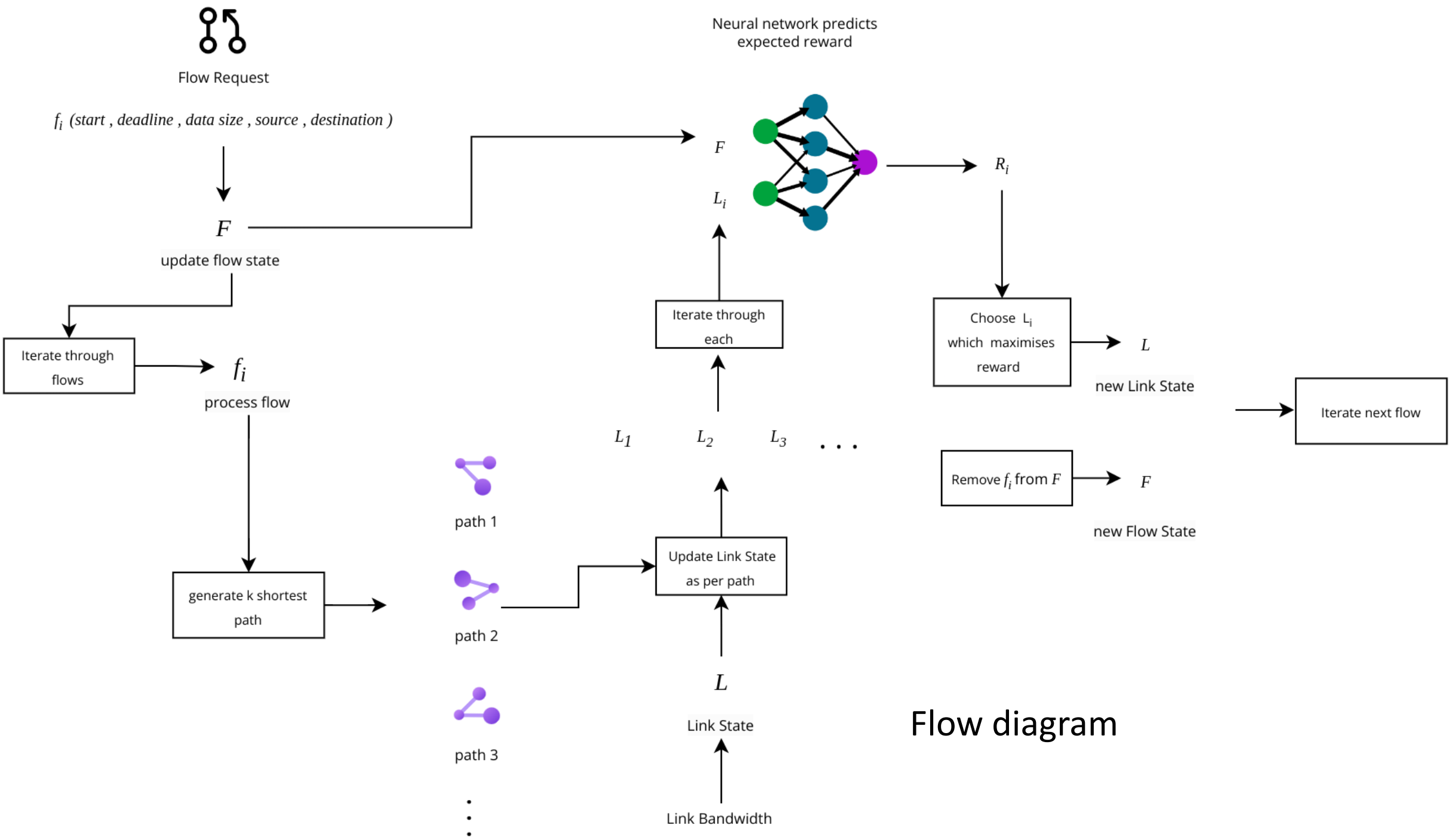
State : link capacity, throughput rate, delay , status , trust level , upward and downward throughput rate , link to switch rate , day of week , time of day

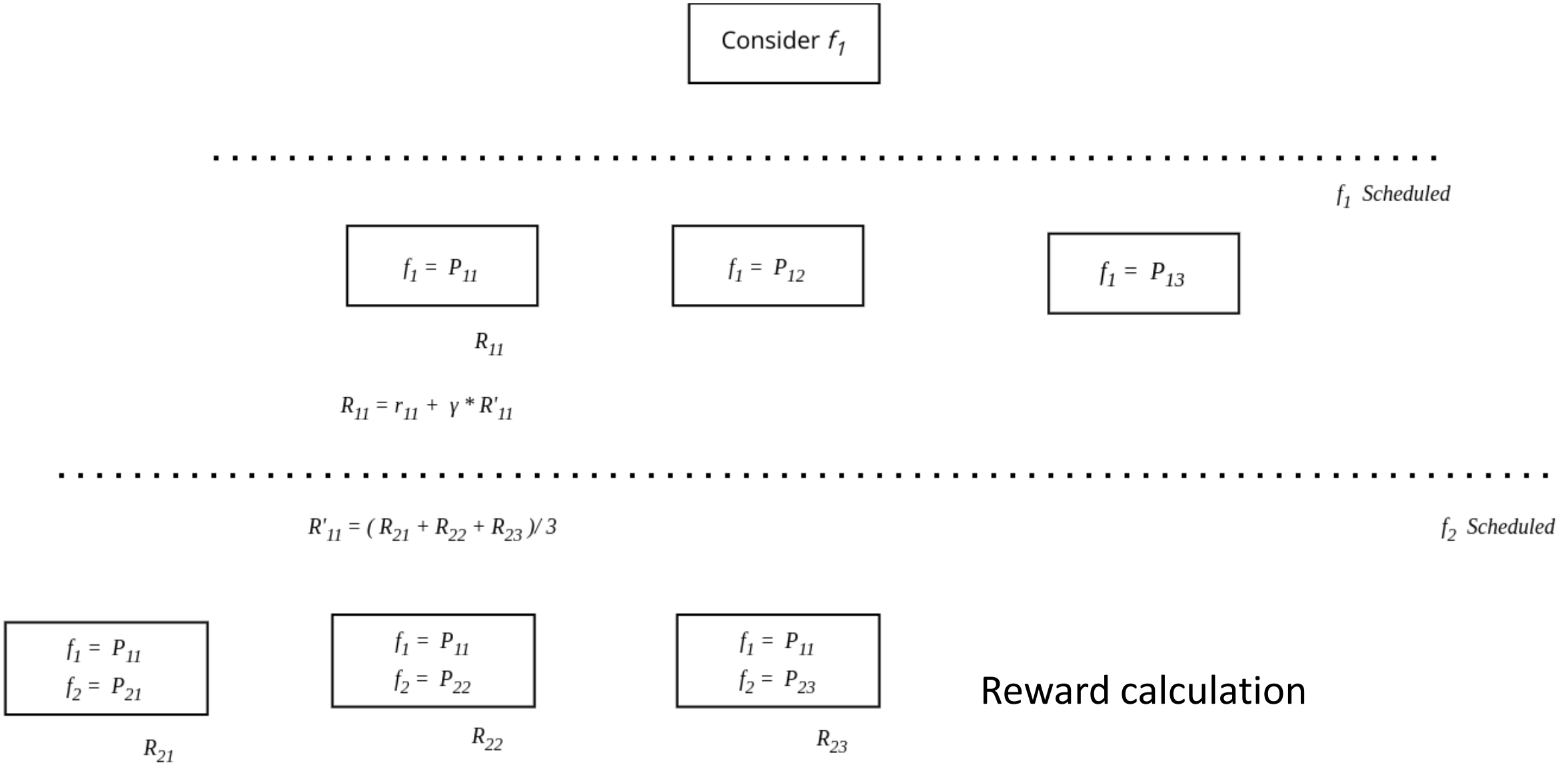
Action Space : PDA algorithm for paths

Reward : Throughput rate and delay

Simple Architecture




Flow Request
f_i (start , deadline , data size , source , destination)
F
update flow state
Iterate through flows
f_i
process flow
generate k shortest path
path 1
path 2
path 3
Link Bandwidth
L
Link State
Update Link State as per path
L_1 L_2 L_3 . . .
Iterate through each
Neural network predicts expected reward
F
L_i
R_i
Choose L_i which maximises reward
L
new Link State
Remove f_i from F
F
new Flow State
Iterate next flow
Flow diagram


Consider f_1
f_1 Scheduled
$f_1 = P_{11}$
$f_1 = P_{12}$
$f_1 = P_{13}$
R_{11}
$R_{11} = r_{11} + \gamma * R'_{11}$
$R'_{11} = (R_{21} + R_{22} + R_{23})/ 3$
f_2 Scheduled
$f_1 = P_{11}$
$f_2 = P_{21}$
$f_1 = P_{11}$
$f_2 = P_{22}$
$f_1 = P_{11}$
$f_2 = P_{23}$
R_{21}
R_{22}
R_{23}
Reward calculation




Thank you