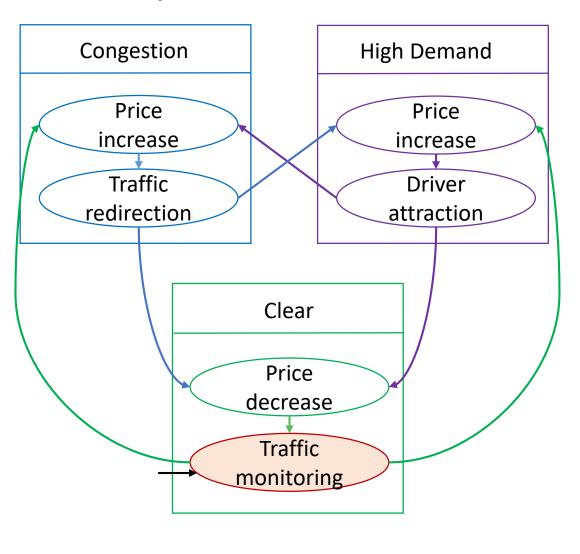


Side panel: Tab "Input stream" Driver (id(1), area(1)) Rider (id(2), area(1))Rider (id(3), area(1)) Rider (id(4), area(1)) Rider (id(5), area(1))Driver (id(6),area(1)) Driver (id(7),area(1)) Driver (id(8), area(1)) Driver (id(9), area(1)) This query Driver (id(10), area(1)) SET drivers=drivers+1 Rider (id(11), area(1)) PATTERN Driver Driver (id(1),area(2)) WHERE area=1 Driver (id(6),area(4)) CONTEXT Clear, High demand, Congestion Driver (id(7),area(3)) Increments the number of drivers Driver (id(8), area(1))

Side panel: Tab "Variables"

Rider (id(12), area(1))

Drivers = 1 Riders = 0 Price = 10

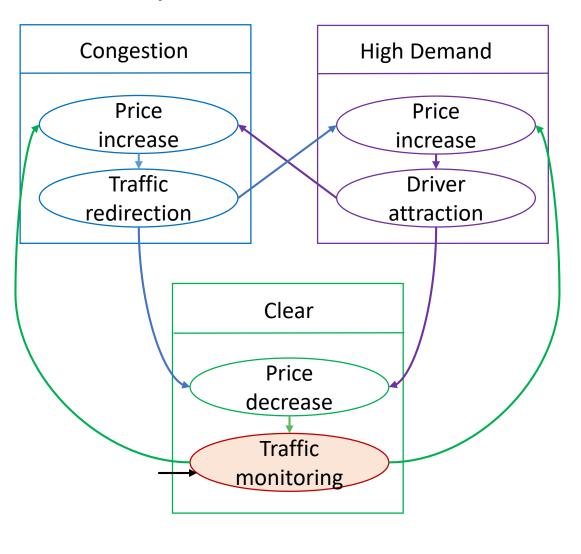


```
Side panel: Tab "Input stream"
Driver (id(1), area(1))
Rider (id(2), area(1))
Rider (id(3), area(1))
Rider (id(4), area(1))
Rider (id(5), area(1))
Driver (id(6),area(1))
Driver (id(7),area(1))
Driver (id(8), area(1))
Driver (id(9), area(1))
                          This query
Driver (id(10), area(1))
                          SET riders=riders+1
Rider (id(11), area(1))
                           PATTERN Rider
Driver (id(1),area(2))
                           WHERE area=1
Driver (id(6),area(4))
                          CONTEXT Clear, High Demand, Congestion
Driver (id(7),area(3))
                           Increments the number of riders
Driver (id(8), area(1))
Rider (id(12), area(1))
```

Side panel: Tab "Variables"

Drivers = 1

Riders = 1

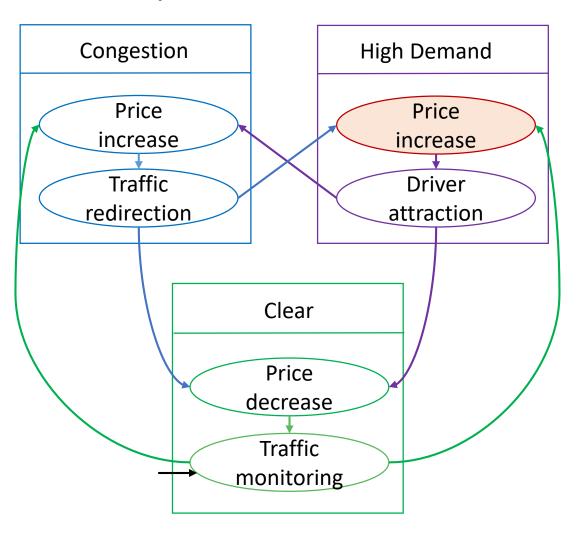


```
Side panel: Tab "Input stream"
Driver (id(1), area(1))
Rider (id(2), area(1))
Rider (id(3), area(1))
Rider (id(4), area(1))
Rider (id(5), area(1))
Driver (id(6),area(1))
Driver (id(7),area(1))
Driver (id(8), area(1))
Driver (id(9), area(1))
                          This query
Driver (id(10), area(1))
                          SET riders=riders+1
Rider (id(11), area(1))
                           PATTERN Rider
Driver (id(1),area(2))
                           WHERE area=1
Driver (id(6),area(4))
                          CONTEXT Clear, High Demand, Congestion
Driver (id(7),area(3))
                           Increments the number of riders
Driver (id(8), area(1))
Rider (id(12), area(1))
```

Side panel: Tab "Variables"

Drivers = 1

Riders = 2



Side panel: Tab "Input stream"

Driver (id(1), area(1)) Rider (id(2), area(1))Rider (id(3), area(1))Rider (id(4), area(1))Rider (id(5), area(1))Driver (id(6),area(1)) Driver (id(7),area(1)) Driver (id(8), area(1)) Driver (id(9), area(1)) Driver (id(10), area(1)) Rider (id(11), area(1))Driver (id(1),area(2)) Driver (id(6), area(4)) Driver (id(7), area(3)) Driver (id(8), area(1)) Rider (id(12), area(1))

Side panel: Tab "Variables"

This query SET riders=riders+1

PATTERN Rider

WHERE area=1

CONTEXT Clear, High Demand, Congestion

Increments the number of riders

This query

SWITCH High demand: Price increase

PATTERN *

WHERE riders>drivers*2

CONTEXT Clear: Traffic monitoring

switches the context

This query

SET price=price*1.1

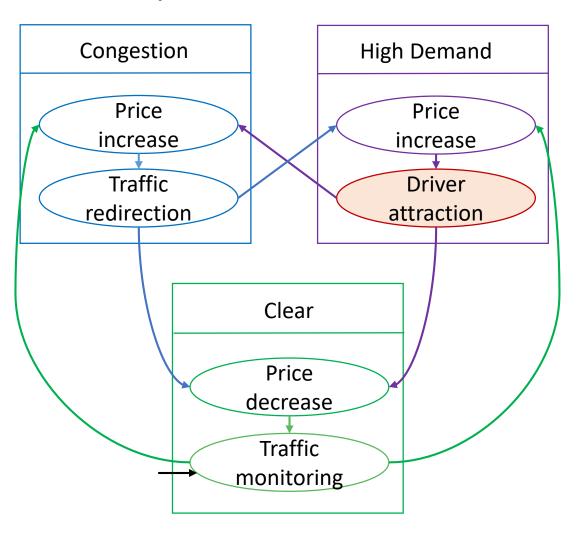
CONTEXT High Demand: Price increase,

Congestion: Price increase

Increases the price

Drivers = 1

Riders = 3



```
Side panel: Tab "Input stream"
```

Driver (id(1),area(1))

Rider (id(2), area(1))

Rider (id(3),area(1))

Rider (id(4), area(1))

Rider (id(5), area(1))

Driver (id(6), area(1))

Driver (id(7),area(1))

Driver (id(8), area(1))

Driver (id(9), area(1))

Driver (id(10), area(1))

Rider (id(11), area(1))

Driver (id(1),area(2))

Driver (id(6),area(4))

Driver (id(7),area(3))

Driver (id(8),area(1))

Rider (id(12), area(1))

This query

SWITCH High demand: Driver attraction

PATTERN *

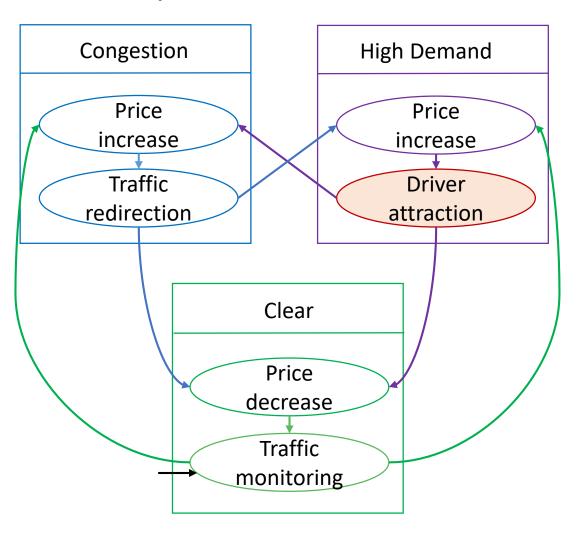
CONTEXT High demand: Price increase

switches the context

Side panel: Tab "Variables"

Drivers = 1

Riders = 3

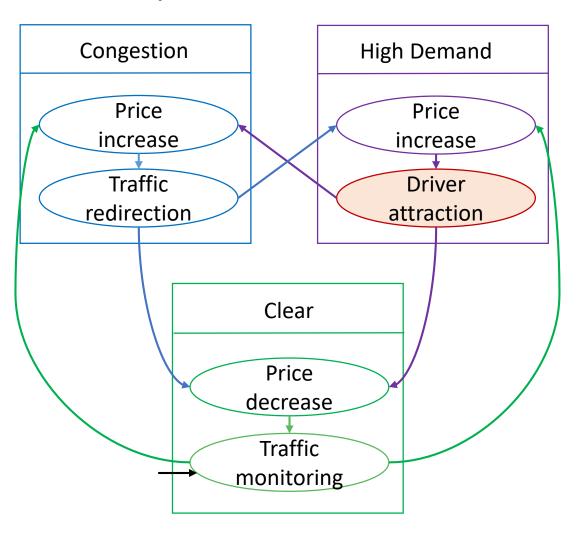


```
Side panel: Tab "Input stream"
Driver (id(1), area(1))
Rider (id(2), area(1))
Rider (id(3), area(1))
Rider (id(4), area(1))
Rider (id(5), area(1))
Driver (id(6),area(1))
Driver (id(7),area(1))
Driver (id(8), area(1))
Driver (id(9), area(1))
                          This query
Driver (id(10), area(1))
                          SET riders=riders+1
Rider (id(11), area(1))
                           PATTERN Rider
Driver (id(1),area(2))
                           WHERE area=1
Driver (id(6),area(4))
                          CONTEXT Clear, High Demand, Congestion
Driver (id(7),area(3))
                           Increments the number of riders
Driver (id(8), area(1))
Rider (id(12), area(1))
```

Side panel: Tab "Variables"

Drivers = 1

Riders = 4

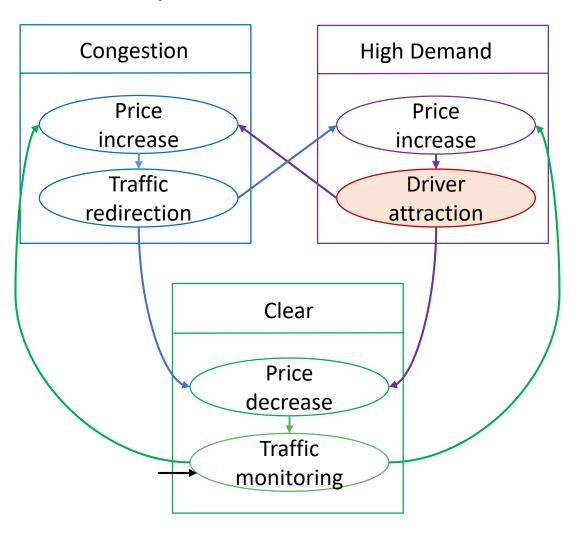


```
Side panel: Tab "Input stream"
Driver (id(1), area(1))
Rider (id(2), area(1))
Rider (id(3), area(1))
Rider (id(4), area(1))
Rider (id(5), area(1))
Driver (id(6), area(1))
Driver (id(7),area(1))
Driver (id(8), area(1))
Driver (id(9), area(1))
                          This query
Driver (id(10), area(1))
                           SET drivers=drivers+1
Rider (id(11), area(1))
                           PATTERN Driver
Driver (id(1),area(2))
                           WHERE area=1
Driver (id(6),area(4))
                           CONTEXT Clear, High demand, Congestion
Driver (id(7),area(3))
                           Increments the number of drivers
Driver (id(8), area(1))
Rider (id(12), area(1))
```

Side panel: Tab "Variables"

Drivers = 2

Riders = 4

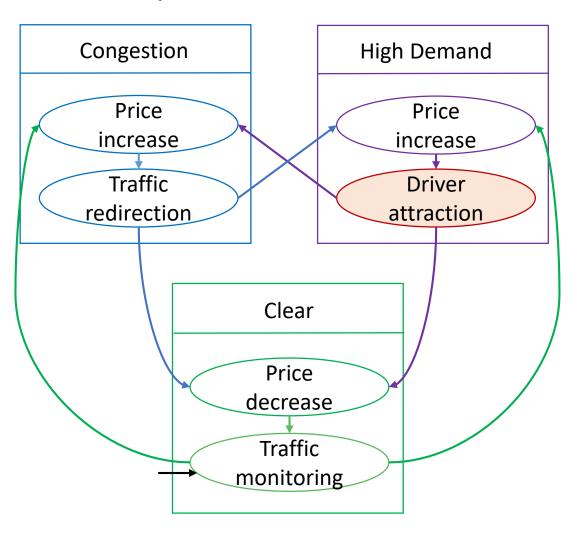


```
Side panel: Tab "Input stream"
Driver (id(1), area(1))
Rider (id(2), area(1))
Rider (id(3), area(1))
Rider (id(4), area(1))
Rider (id(5), area(1))
Driver (id(6),area(1))
Driver (id(7), area(1))
Driver (id(8), area(1))
Driver (id(9), area(1))
                          This query
Driver (id(10), area(1))
                           SET drivers=drivers+1
Rider (id(11), area(1))
                           PATTERN Driver
Driver (id(1),area(2))
                           WHERE area=1
Driver (id(6),area(4))
                           CONTEXT Clear, High demand, Congestion
Driver (id(7),area(3))
                           Increments the number of drivers
Driver (id(8), area(1))
Rider (id(12), area(1))
```

Side panel: Tab "Variables"

Drivers = 3

Riders = 4



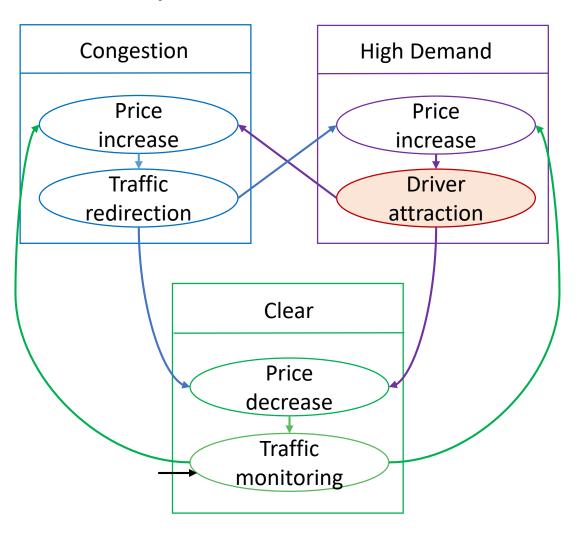
Side panel: Tab "Input stream" Driver (id(1), area(1)) Rider (id(2), area(1))Rider (id(3), area(1))Rider (id(4), area(1)) Rider (id(5), area(1)) Driver (id(6),area(1)) Driver (id(7),area(1)) Driver (id(8), area(1)) This query Driver (id(9), area(1)) SET drivers=drivers+1 Driver (id(10), area(1)) PATTERN Driver Rider (id(11), area(1)) WHERE area=1 CONTEXT Clear, High demand, Congestion Driver (id(1),area(2)) Driver (id(6),area(4)) Increments the number of drivers Driver (id(7), area(3)) Driver (id(8), area(1))

Side panel: Tab "Variables"

Rider (id(12), area(1))

Drivers = 4

Riders = 4



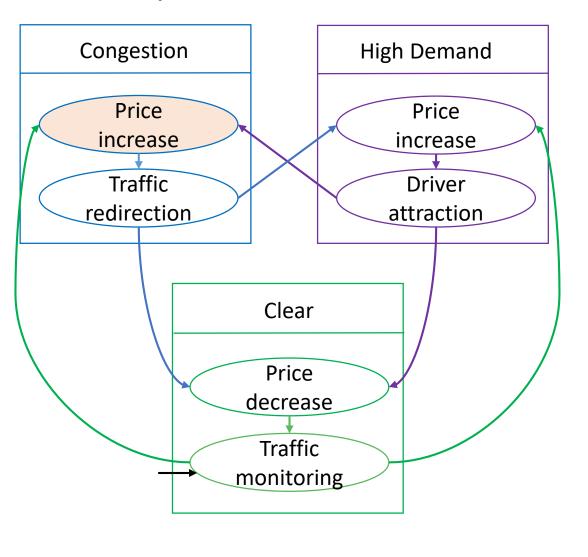
```
Side panel: Tab "Input stream"
Driver (id(1), area(1))
Rider (id(2), area(1))
Rider (id(3), area(1))
Rider (id(4), area(1))
Rider (id(5), area(1))
Driver (id(6),area(1))
Driver (id(7),area(1))
Driver (id(8), area(1))
                          This query
Driver (id(9), area(1))
                          SET drivers=drivers+1
Driver (id(10), area(1))
                          PATTERN Driver
Rider (id(11), area(1))
                          WHERE area=1
                          CONTEXT Clear, High demand, Congestion
Driver (id(1),area(2))
Driver (id(6),area(4))
                          Increments the number of drivers
Driver (id(7), area(3))
Driver (id(8), area(1))
```

Side panel: Tab "Variables"

Rider (id(12), area(1))

Drivers = 5

Riders = 4



Side panel: Tab "Input stream"

Driver (id(1), area(1)) Rider (id(2), area(1))Rider (id(3), area(1))Rider (id(4), area(1)) Rider (id(5), area(1)) Driver (id(6),area(1)) Driver (id(7),area(1)) Driver (id(8), area(1)) Driver (id(9), area(1)) Driver (id(10), area(1)) Rider (id(11), area(1))Driver (id(1),area(2)) Driver (id(6), area(4)) Driver (id(7),area(3)) Driver (id(8), area(1))

Rider (id(12), area(1))

Side panel: Tab "Variables"

This query

SET drivers=drivers+1
PATTERN Driver

WHERE area=1

CONTEXT Clear, High demand, Congestion

Increments the number of drivers

This query

SWITCH Congestion: Price increase

PATTERN *

WHERE drivers>5, riders<=drivers*2

CONTEXT Clear: Traffic monitoring

Switches the context

This query

SET price=price*1.1

CONTEXT High Demand: Price increase,

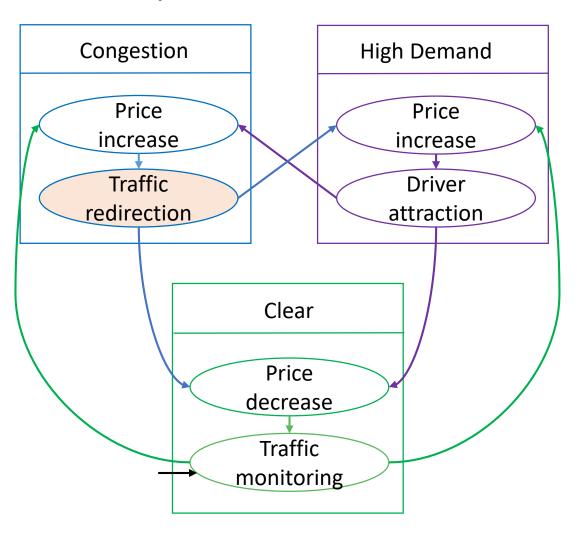
Congestion: Price increase

Increase the price

Drivers = 6

Riders = 4

Price = 12.1



```
Side panel: Tab "Input stream"
```

Driver (id(1), area(1))

Rider (id(2), area(1))

Rider (id(3),area(1))

Rider (id(4), area(1))

Rider (id(5), area(1))

Driver (id(6), area(1))

Driver (id(7), area(1))

Driver (id(8),area(1))

Driver (id(9),area(1))

Driver (id(10), area(1))

Rider (id(11), area(1))

Driver (id(1),area(2))

Driver (id(6), area(4))

Driver (id(7),area(3))

Driver (id(8), area(1))

Rider (id(12), area(1))

This query

SWITCH Congestion: Traffic redirection

PATTERN *

CONTEXT Congestion: Price increase

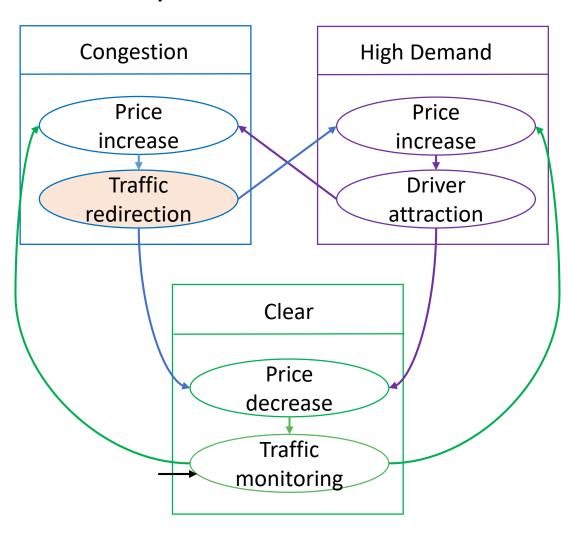
Transitions to other context

Side panel: Tab "Variables"

Drivers = 6

Riders = 4

Price = 12.1



```
Side panel: Tab "Input stream"
Driver (id(1), area(1))
Rider (id(2), area(1))
Rider (id(3), area(1))
Rider (id(4), area(1))
Rider (id(5), area(1))
Driver (id(6), area(1))
Driver (id(7),area(1))
                          This query
Driver (id(8), area(1))
                          SET riders=riders+1
Driver (id(9), area(1))
                           PATTERN Rider
Driver (id(10), area(1))
                           WHERE area=1
Rider (id(11), area(1))
                           CONTEXT Clear, High Demand, Congestion
Driver (id(1),area(2))
                           Increments the riders
Driver (id(6), area(4))
Driver (id(7), area(3))
Driver (id(8), area(1))
```

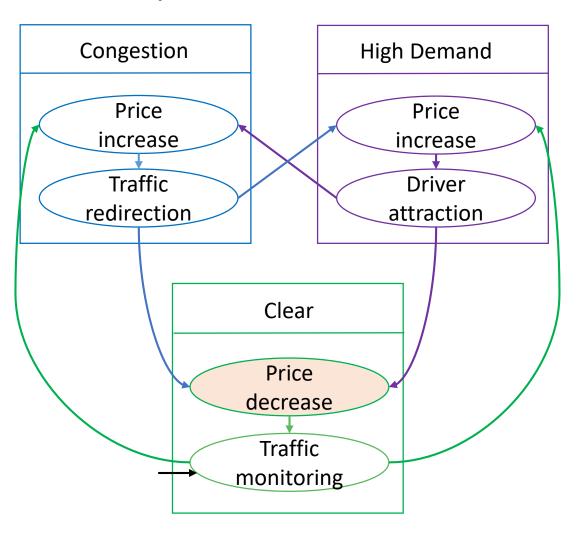
Side panel: Tab "Variables"

Rider (id(12), area(1))

Drivers = 6

Riders = 5

Price = 12.1



Side panel: Tab "Input stream"

Driver (id(1), area(1))

Rider (id(2), area(1))

This query Rider (id(3), area(1))SET drivers=drivers-1 Rider (id(4), area(1))

PATTERN Driver Rider (id(5), area(1))

WHERE area!=1 Driver (id(6), area(1))

CONTEXT Clear, High demand, Congestion Driver (id(7), area(1))

Driver (id(8), area(1))

Driver (id(9), area(1))

This query Driver (id(10), area(1))

SWITCH Clear: Price decrease Rider (id(11), area(1))

PATTERN * Driver (id(1), area(2))

Driver (id(6), area(4))

Driver (id(7), area(3))

Driver (id(8), area(1))

Rider (id(12), area(1))

WHERE riders<=drivers, drivers<=5

CONTEXT High demand: Driver attraction,

Congestion: Traffic redirection

Transitions to other context

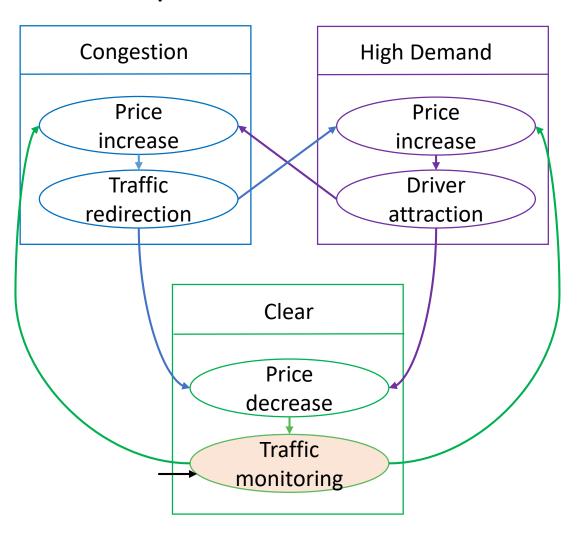
decrements the drivers

Side panel: Tab "Variables" This query

SET price=10 Drivers = 5

CONTEXT Clear: Price decrease Riders = 5

Decreases the price Price = 10



Side panel: Tab "Input stream"

Driver (id(1), area(1))

Rider (id(2), area(1))

Rider (id(3),area(1))

Rider (id(4),area(1))

Rider (id(5), area(1))

Driver (id(6), area(1))

Driver (id(7), area(1))

Driver (id(8), area(1))

Driver (id(9), area(1))

Driver (id(10), area(1))

Rider (id(11), area(1))

Driver (id(1), area(2))

Driver (id(6),area(4))

Driver (id(7),area(3))

Driver (id(8), area(1))

Rider (id(12), area(1))

This query

SWITCH Clear: Traffic monitoring

PATTERN *

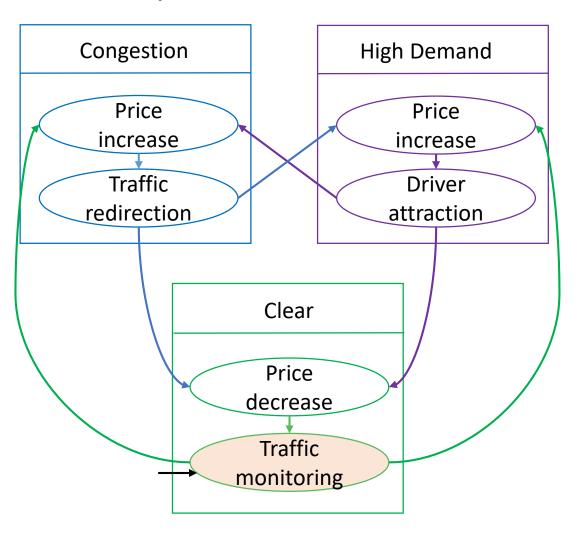
CONTEXT Clear: Price decrease

Transitions to other context

Side panel: Tab "Variables"

Drivers = 5

Riders = 5



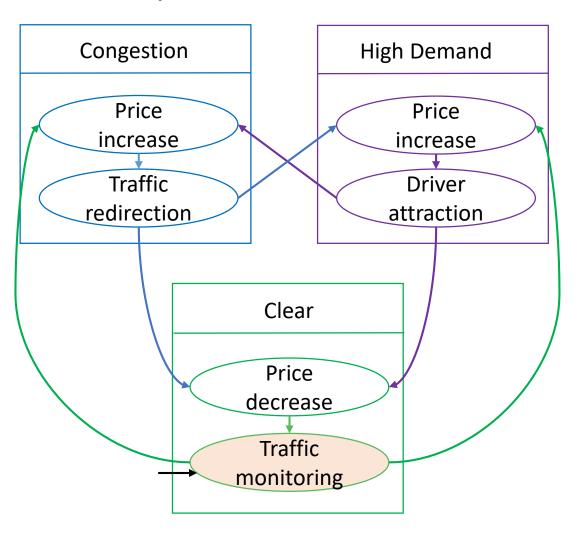
```
Side panel: Tab "Input stream"
Driver (id(1), area(1))
Rider (id(2), area(1))
Rider (id(3), area(1))
Rider (id(4), area(1))
Rider (id(5), area(1))
Driver (id(6),area(1))
Driver (id(7),area(1))
Driver (id(8),area(1))
Driver (id(9), area(1))
                           This query
Driver (id(10), area(1))
                           SET drivers=drivers-1
Rider (id(11), area(1))
                           PATTERN Driver
Driver (id(1),area(2))
                           WHERE area!=1
Driver (id(6), area(4))
                           CONTEXT Clear, High demand, Congestion
Driver (id(7), area(3))
                           Decrements the drivers
Rider (id(2), area(3))
```

Side panel: Tab "Variables"

Rider (id(3), area(4))

Drivers = 4

Riders = 5



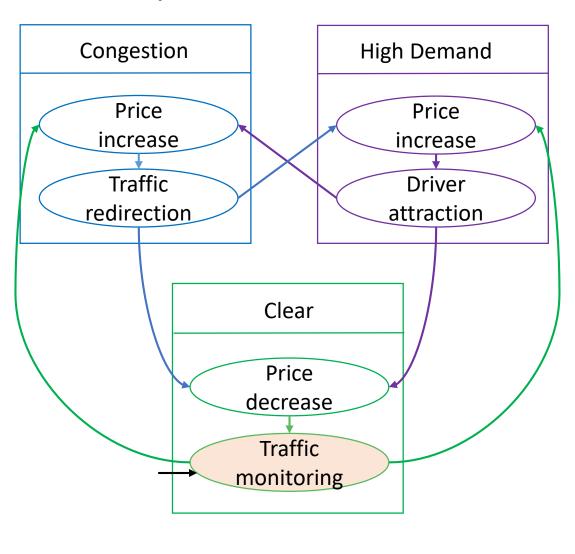
```
Side panel: Tab "Input stream"
Driver (id(1), area(1))
Rider (id(2), area(1))
Rider (id(3), area(1))
Rider (id(4), area(1))
Rider (id(5), area(1))
Driver (id(6),area(1))
Driver (id(7),area(1))
Driver (id(8),area(1))
Driver (id(9), area(1))
                          This query
Driver (id(10), area(1))
                           SET drivers=drivers-1
Rider (id(11), area(1))
                          PATTERN Driver
Driver (id(1),area(2))
                          WHERE area!=1
Driver (id(6),area(4))
                          CONTEXT Clear, High demand, Congestion
Driver (id(7), area(3))
                           Decrements the drivers
Rider (id(2), area(3))
```

Side panel: Tab "Variables"

Rider (id(3), area(4))

Drivers = 3

Riders = 5



```
Side panel: Tab "Input stream"
Driver (id(1), area(1))
Rider (id(2), area(1))
Rider (id(3), area(1))
Rider (id(4), area(1))
Rider (id(5), area(1))
Driver (id(6),area(1))
Driver (id(7),area(1))
Driver (id(8),area(1))
Driver (id(9), area(1))
                           This query
Driver (id(10), area(1))
                           SET riders=riders-1
Rider (id(11), area(1))
                           PATTERN Rider
Driver (id(1),area(2))
                           WHERE area!=1
Driver (id(6), area(4))
                           CONTEXT Clear, High Demand,
Driver (id(7), area(3))
                           Congestion
```

Decrements the riders

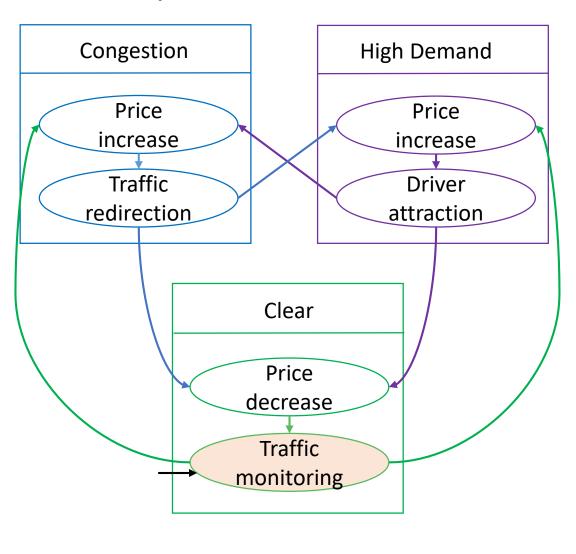
Side panel: Tab "Variables"

Rider (id(2), area(3))

Rider (id(3), area(4))

Drivers = 3

Riders = 4



```
Side panel: Tab "Input stream"
Driver (id(1), area(1))
Rider (id(2), area(1))
Rider (id(3), area(1))
Rider (id(4), area(1))
Rider (id(5), area(1))
Driver (id(6),area(1))
Driver (id(7),area(1))
Driver (id(8),area(1))
Driver (id(9), area(1))
                           This query
Driver (id(10), area(1))
                           SET riders=riders-1
Rider (id(11), area(1))
                           PATTERN Rider
Driver (id(1),area(2))
                           WHERE area!=1
Driver (id(6), area(4))
                           CONTEXT Clear, High Demand,
Driver (id(7), area(3))
                           Congestion
Rider (id(2), area(3))
                           Decrements the riders
Rider (id(3), area(4))
```

Side panel: Tab "Variables"

Drivers = 3

Riders = 3

Bottom panel: Tab "New query"

Context derivation

SWITCH
High Demand: Price increase

PATTERN
*

WHERE
riders>2*drivers

CONTEXT
Clear: Traffic monitoring

Any event triggers this query (denoted PATTERN *).

If riders > 2*drives the model transitions from Clear: Traffic monitoring to High Demand: Price increase.

Context processing

SET riders=riders+1 ▼

PATTERN Rider

WHERE area=1

CONTEXT Clear: Traffic monitoring ▼

An event of type Rider triggers this query (denoted PATTERN Rider).

In the Clear: Traffic monitoring the number of riders is incremented for area 1.

Bottom panel: Tab "Queries per context"

Below, I show all queries for the model

SET drivers=drivers+1
PATTERN Driver
WHERE area=1
CONTEXT Clear, High demand, Congestion

SET riders=riders+1
PATTERN Rider
WHERE area=1
CONTEXT Clear, High Demand, Congestion

SET drivers=drivers-1
PATTERN Driver
WHERE area!=1
CONTEXT Clear, High demand, Congestion

SET riders=riders-1
PATTERN Rider
WHERE area!=1
CONTEXT Clear, High Demand, Congestion

SET price=price*1.1

CONTEXT High Demand: Price increase, Congestion: Price increase

SET price=10

CONTEXT Clear: Price decrease

SWITCH High demand: Price increase

PATTERN *

WHERE riders>drivers*2

CONTEXT Clear: Traffic monitoring

SWITCH Congestion: Price increase

PATTERN *

WHERE drivers>5, riders<=drivers*2

CONTEXT Clear: Traffic monitoring

SWITCH Clear: Price decrease

PATTERN *

WHERE riders<=drivers, drivers<=5

CONTEXT High demand: Driver attraction,

Congestion: Traffic redirection

SWITCH Congestion: Price increase PATTERN *

WHERE drivers>=riders, drivers>5

CONTEXT High demand: Driver attraction

SWITCH High demand: Price increase

PATTERN *

WHERE drivers<=5, riders>drivers*2

CONTEXT Congestion: Traffic redirection

Dummy transitions that are triggered by any event once price is updated

SWITCH High demand: Driver attraction

PATTERN *

CONTEXT High demand: Price increase

SWITCH Congestion: Traffic redirection

PATTERN *

CONTEXT Congestion: Price increase

SWITCH Clear: Traffic monitoring

PATTERN *

CONTEXT Clear: Price decrease