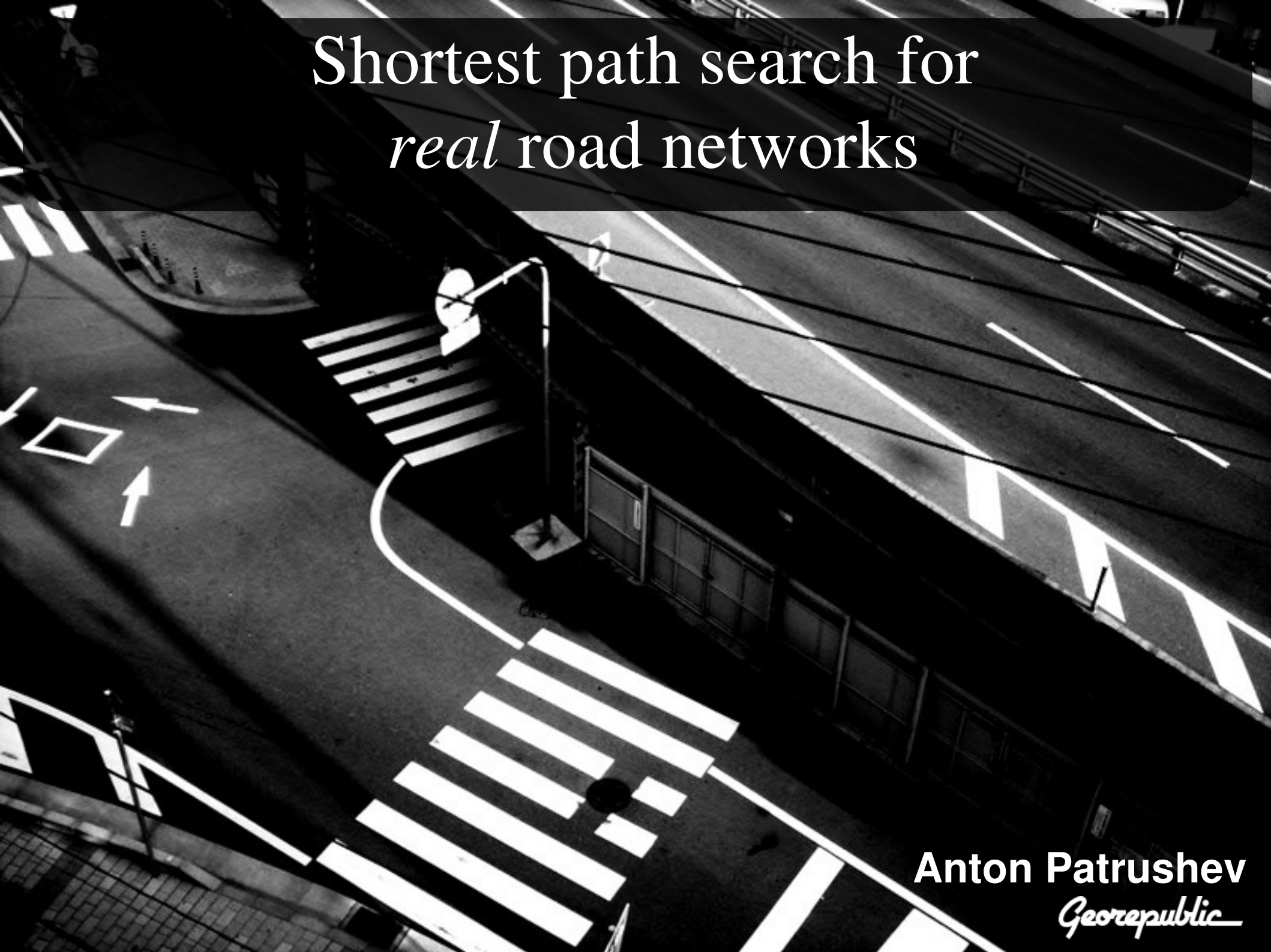
Shortest path search for *real* road networks



Anton Patrushev

Georepublic

What is *pgRouting*?


Shortest path


TSP and DD


VRP (DARP)

Real road networks

How do they look like?

Like *this*...


...or like *this*...


...or sometimes like *this*.

What makes them *real*?

traffic lights

signs

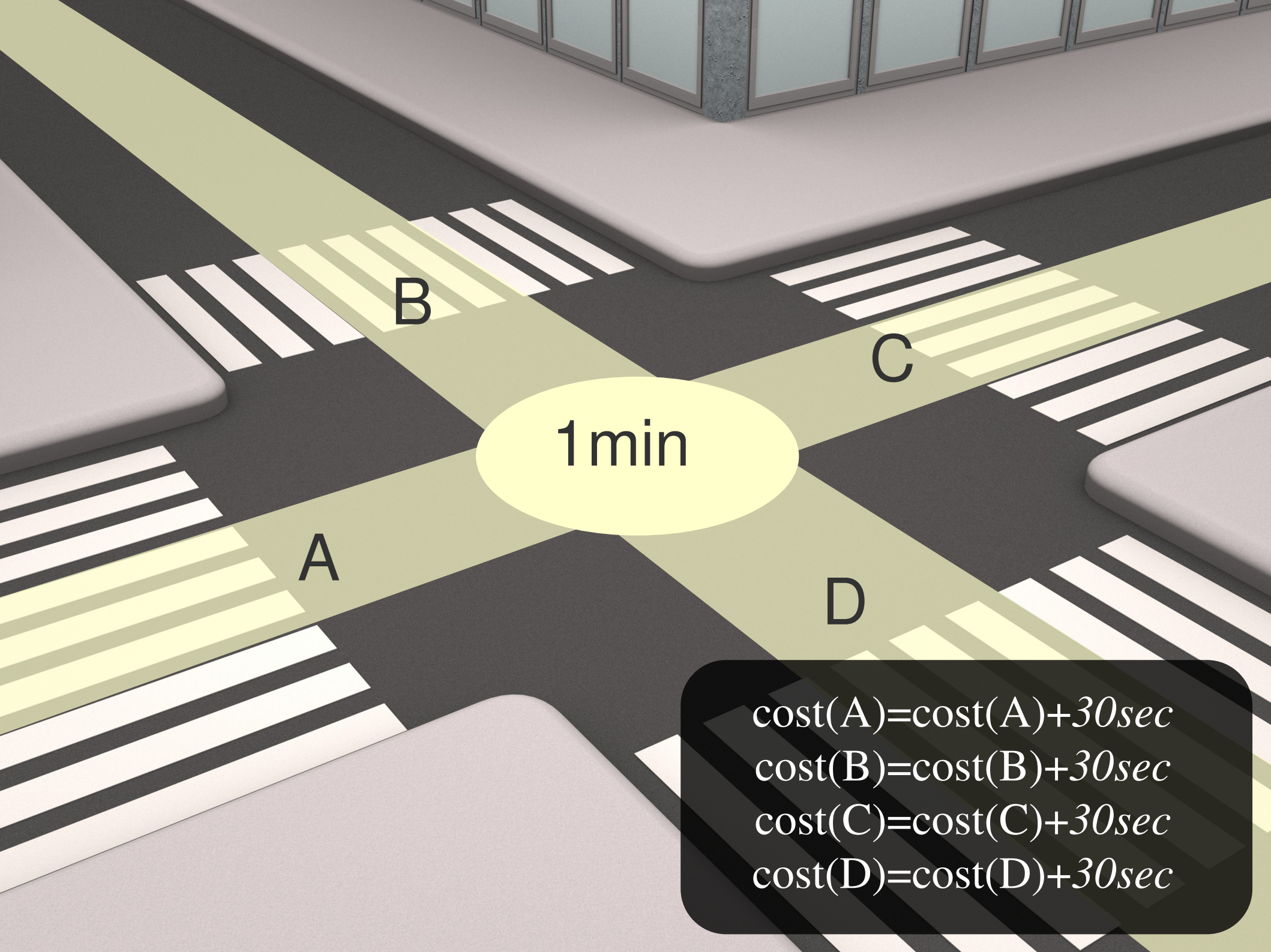
road marking

How *pgRouting* can help here?


source
target
gid,
source,
target,
cost,
reverse_cost,
x1, y1,
x2, y2,
rule,
to_cost

Traffic lights make you slower.

It means we should *increase costs*.

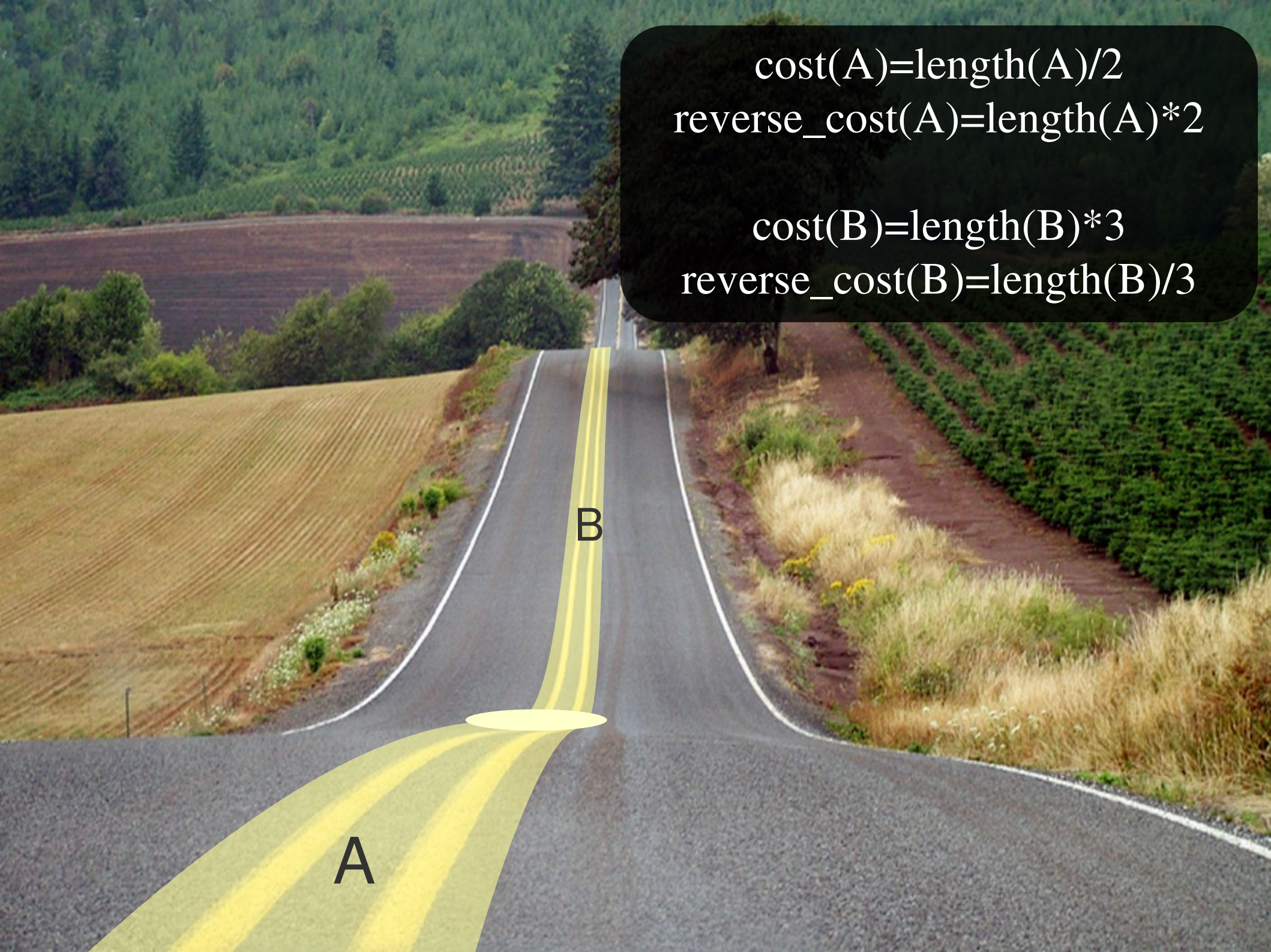

B
C
1min
A
D
cost(A)=cost(A)+30sec
cost(B)=cost(B)+30sec
cost(C)=cost(C)+30sec
cost(D)=cost(D)+30sec


Signs tell you about
restrictions and *road types*.

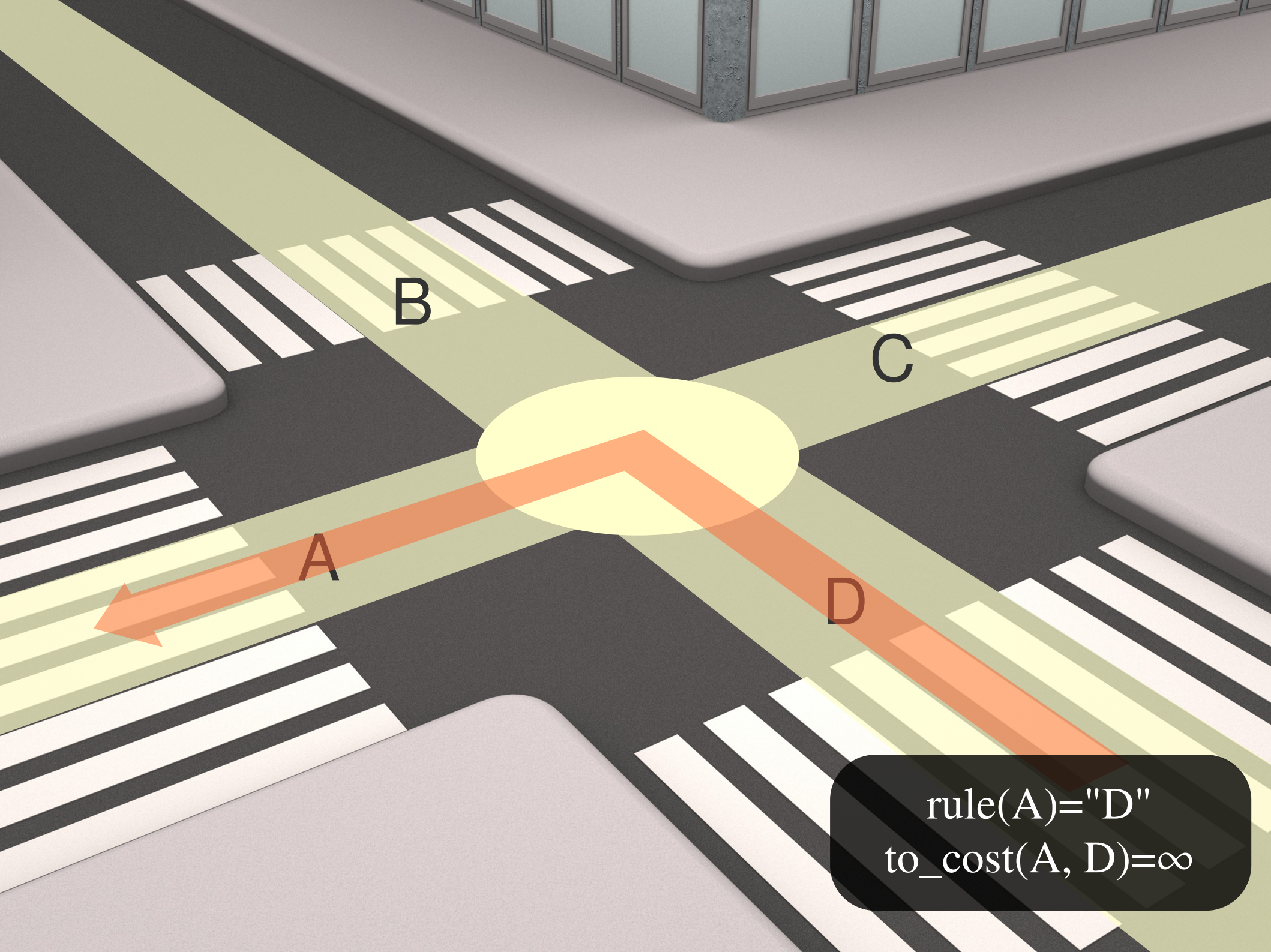

ONE WAY


cost(A)=length(A)
reverse_cost(A)=∞
A

Sometimes the costs have *different* meaning.


cost(A)=length(A)/2
reverse_cost(A)=length(A)*2
cost(B)=length(B)*3
reverse_cost(B)=length(B)/3
B
A

Turn restrictions obviously restrict turns.


B
C
A
D
rule(A)="D"
to_cost(A, D)=∞

Road type signs can be used for cost calculation.

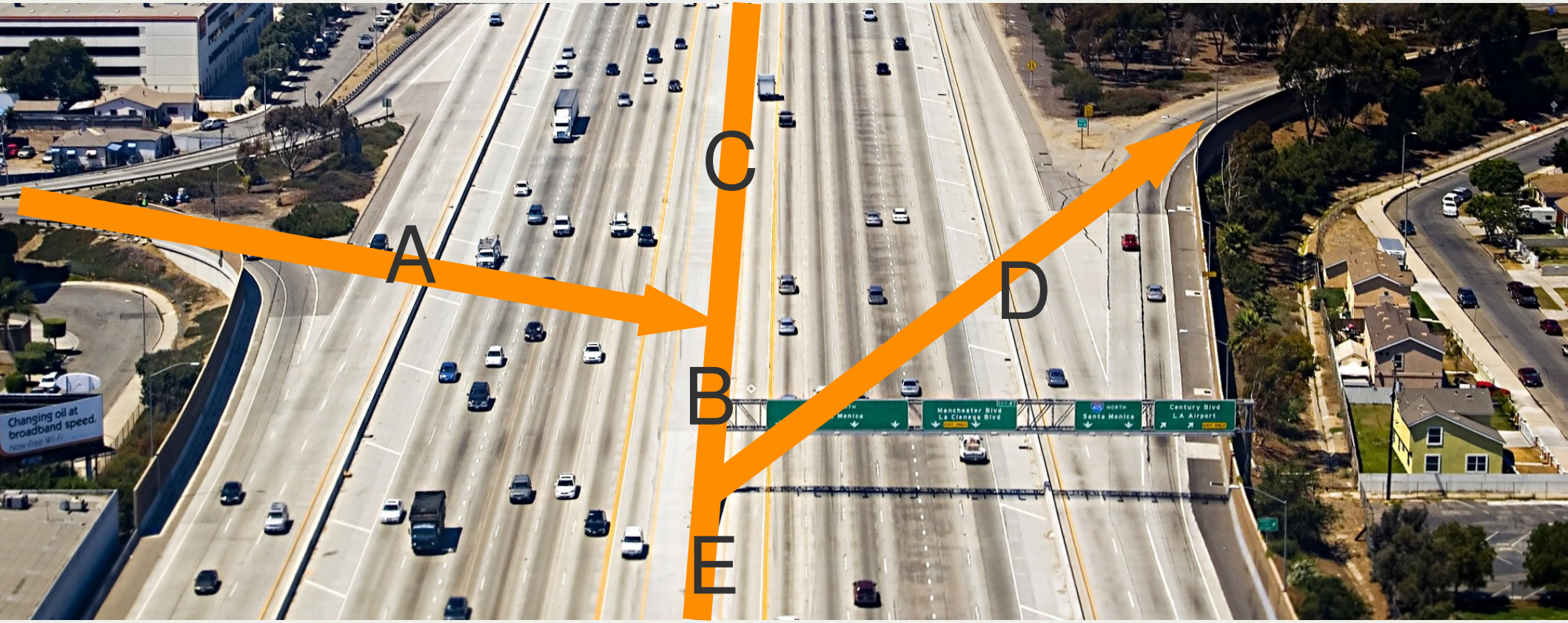

Not only *types*, but also *conditions*.


What about *road marking*?

It separates
lanes, ...


...specifies *road types*, ...

... and *restrictions*.



rule(D)="A, B"

to_cost(D)=∞

And you know what's *cool* about pgRouting?

All costs are *dynamic*.

Which is opposite to *pre-calculated*.


If the road is *closed*, ...
ROAD
AHEAD
CLOSED


... there is an *accident*, ...
POLIZEI
33 Bad Schwartau
Über Pommernzentrum
OH PE 38

... a sign with restrictions *limited in time*, ...


... bad *weather conditions*, ...


... or an *obstacle*, ...

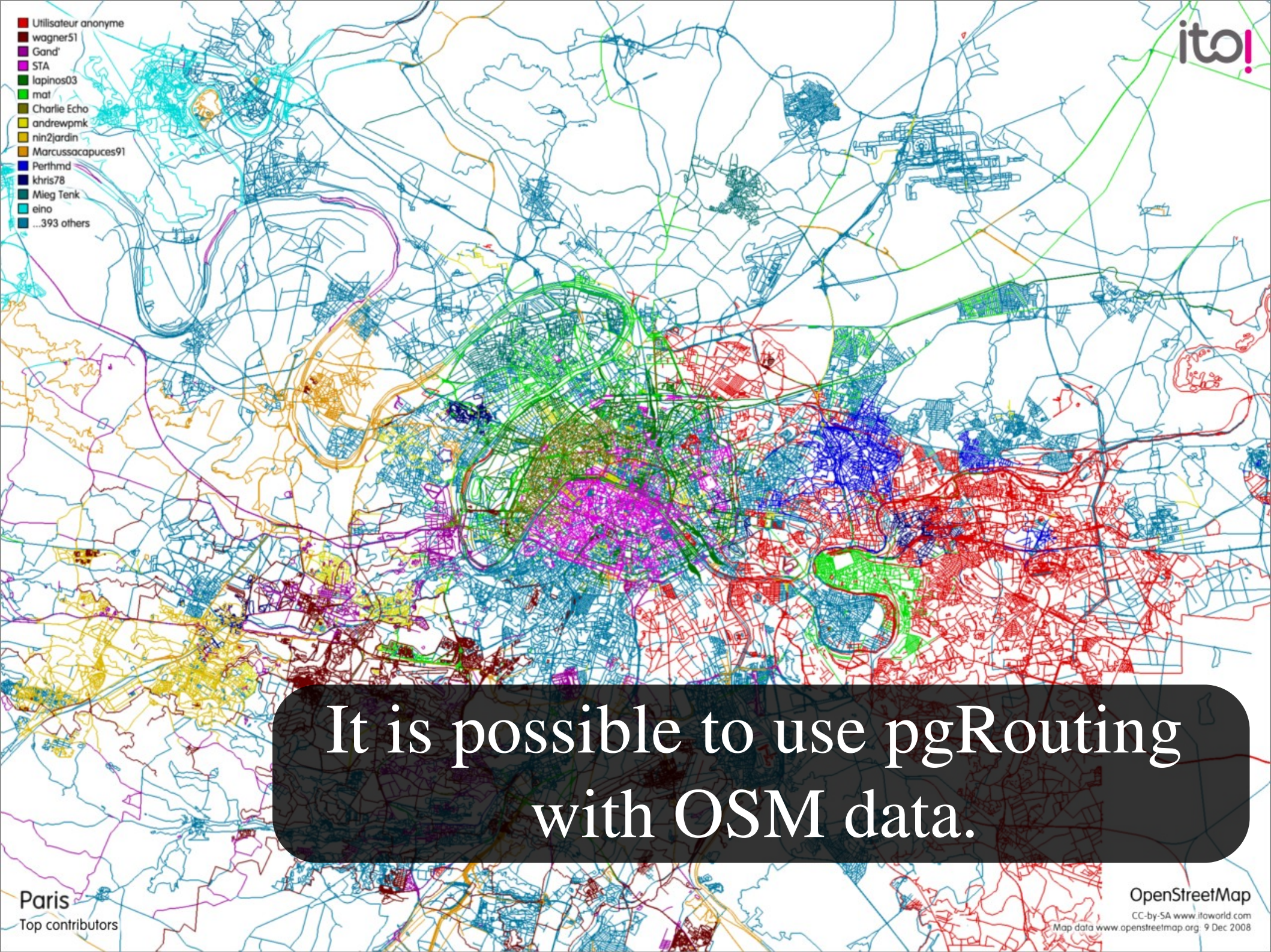

You don't need to
rebuild and *reload*
your network...


... and wait forever.

You only need to *adjust the cost* for this particular road.

And next search will go another way.

Cost can be virtually *anything*.

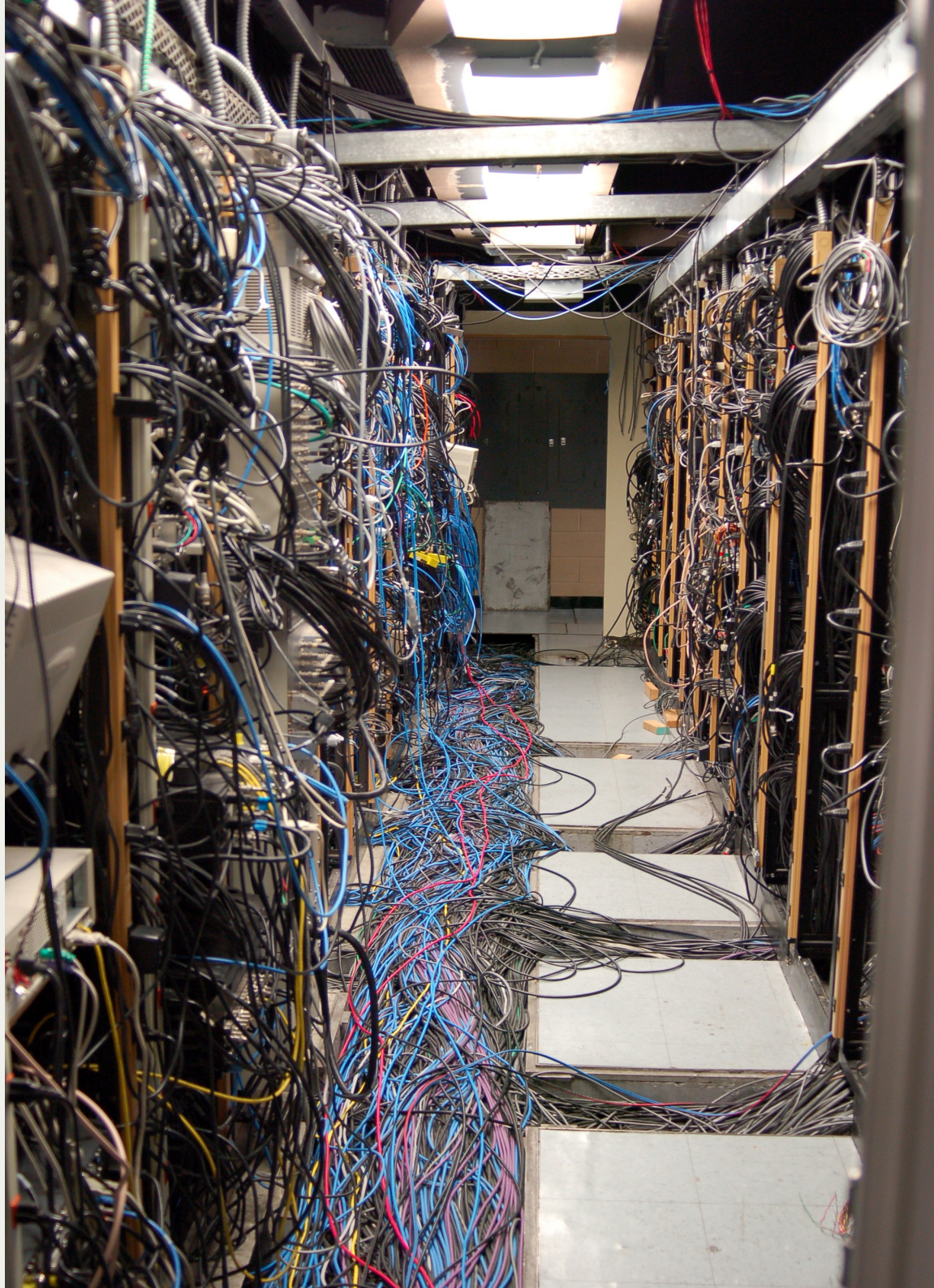

Utilisateur anonyme
wagner51
Gand'
STA
lapinos03
mat
Charlie Echo
andrewpmk
nin2jardin
Marcussacapuces91
Perthmd
khris78
Mieg Tenk
eino
...393 others
itoi
It is possible to use pgRouting with OSM data.
Paris
Top contributors
OpenStreetMap
CC-by-SA www.itoworld.com
Map data www.openstreetmap.org: 9 Dec 2008

pgRouting can be used for *different* kinds of networks.

Canals and rivers, ...


... hiking trails, ...

... or *any other* kind of network.



Now it's *showtime*!

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Just want you to remember

pgrouting.org
georepublic.de
openvrp.com


THANK YOU