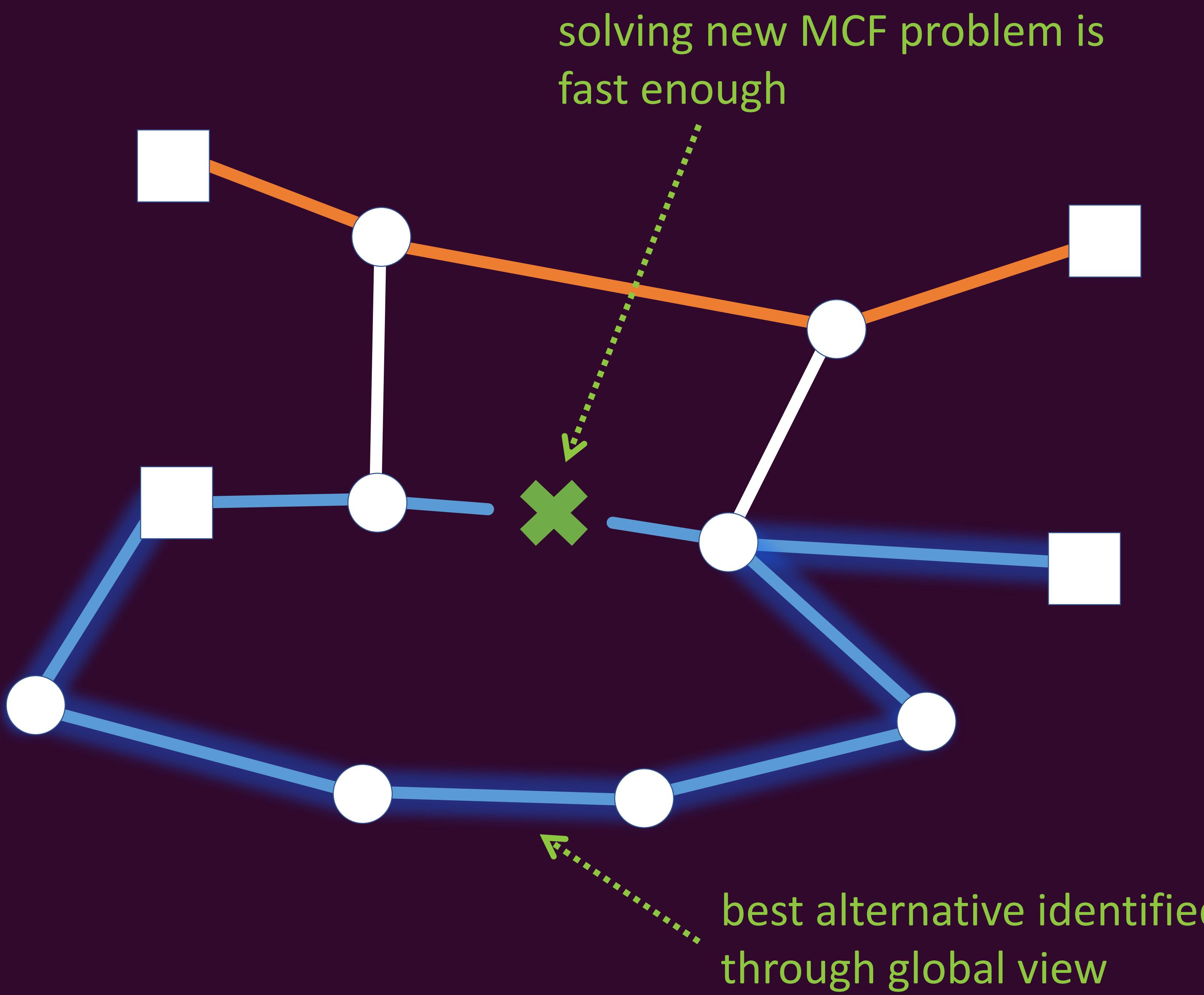


# Theory works: Solving Multi- Commodity Flow Problems in a Network with Failures



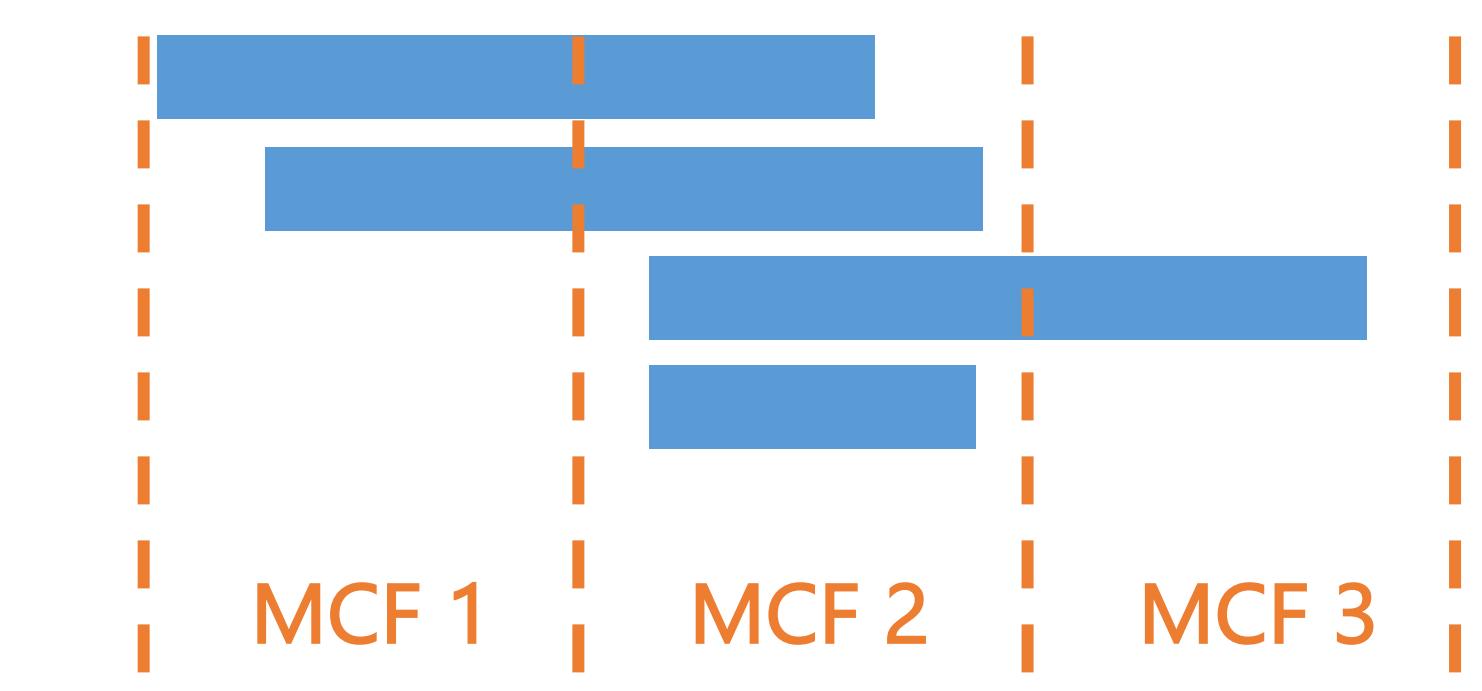
**Generic solution** independent of topology

**Highly configurable** for different tradeoffs

**Global view** to approximate optimal allocation

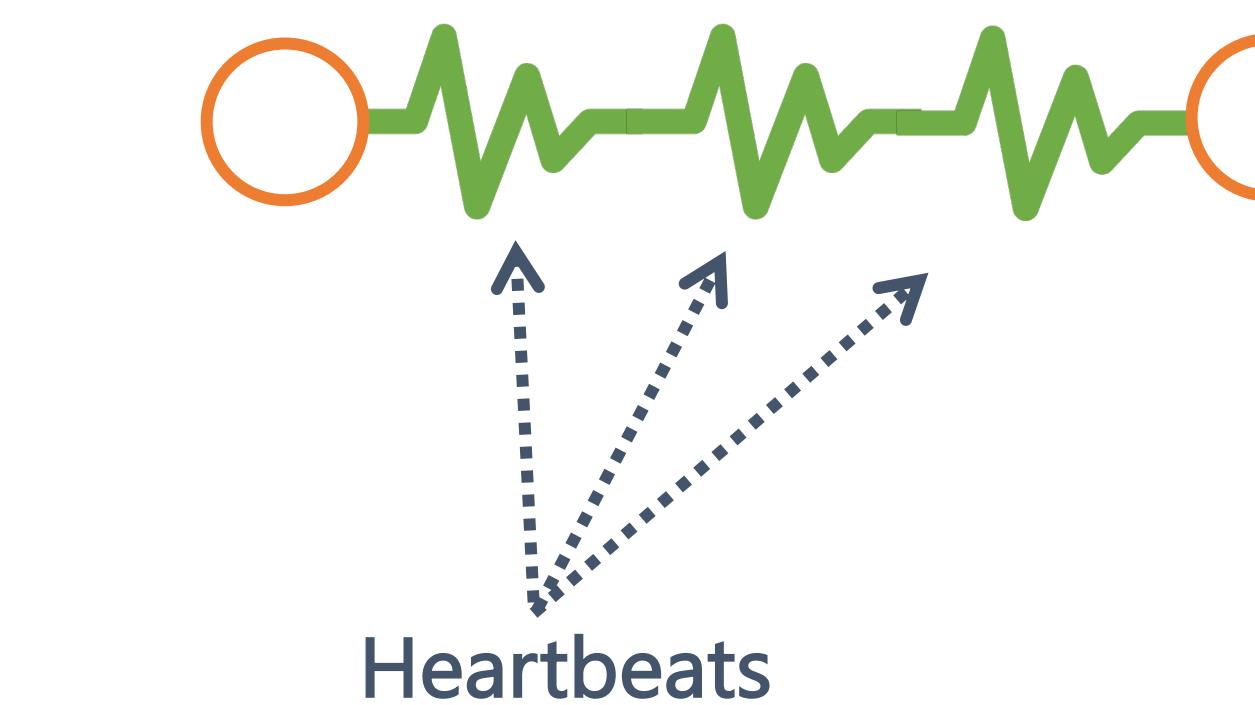
## A **global view**

Central controller solves multiple MCF problems for base traffic



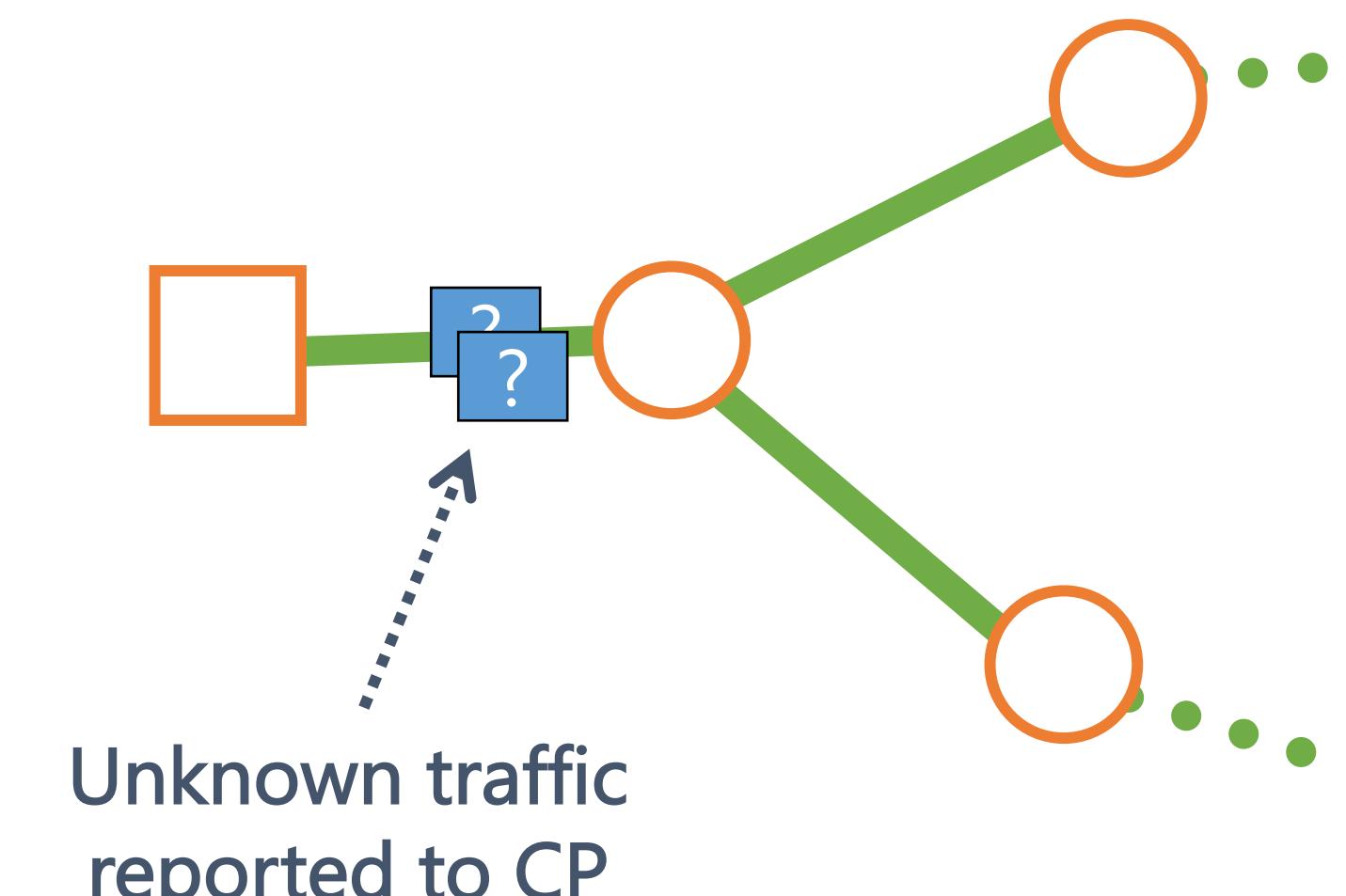
## React to **failures**

Detect failures and recompute MCF problems on link changes



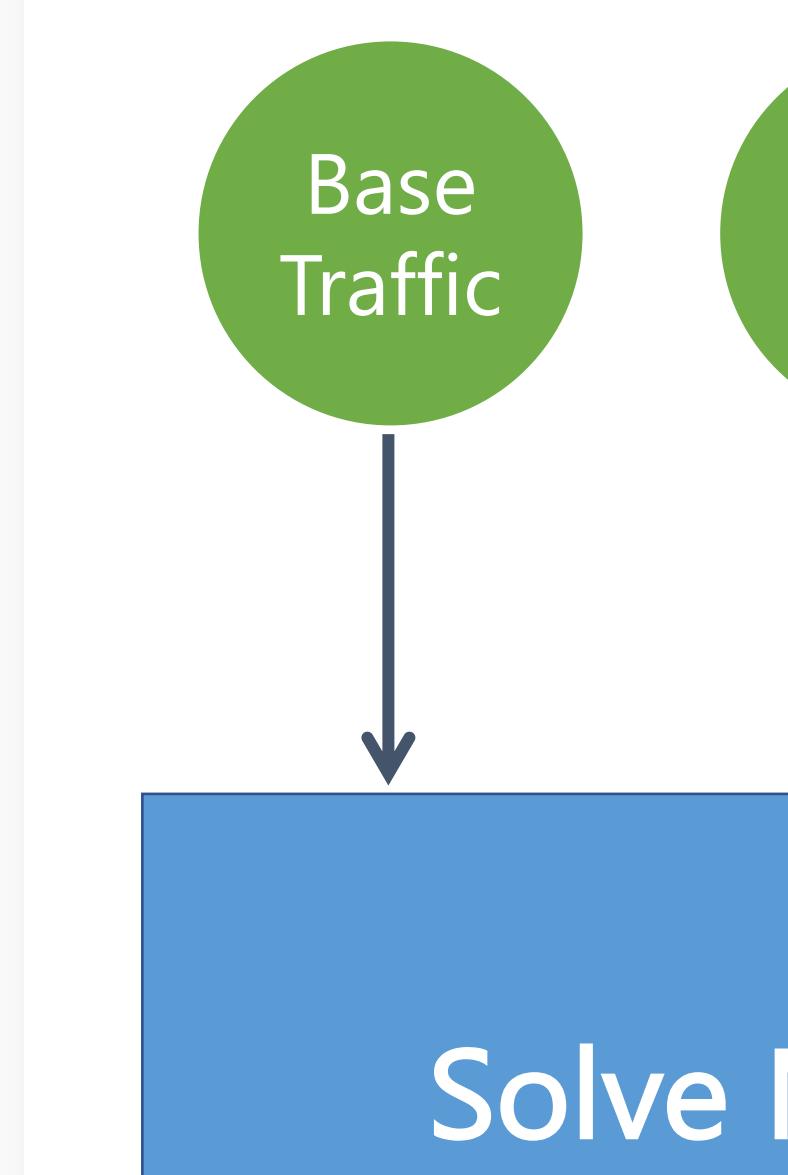
## Allow **additional traffic**

Approx. residual graph to accommodate unknown flows



## Enough pieces: **putting it all together**

### Before Experiment

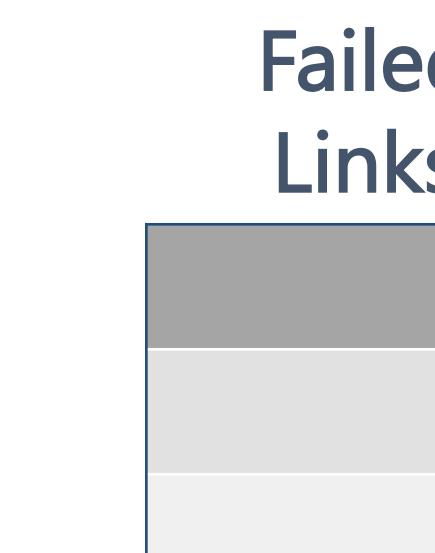


Solve MCFs for time intervals

Controller  
Switches

Install paths at  
ingress switches

### During Experiment

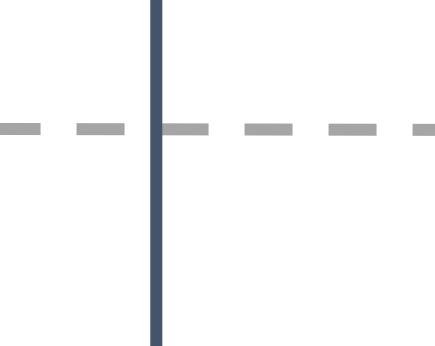


Fits in residual  
graph?

Heartbeats

Detect  
failures

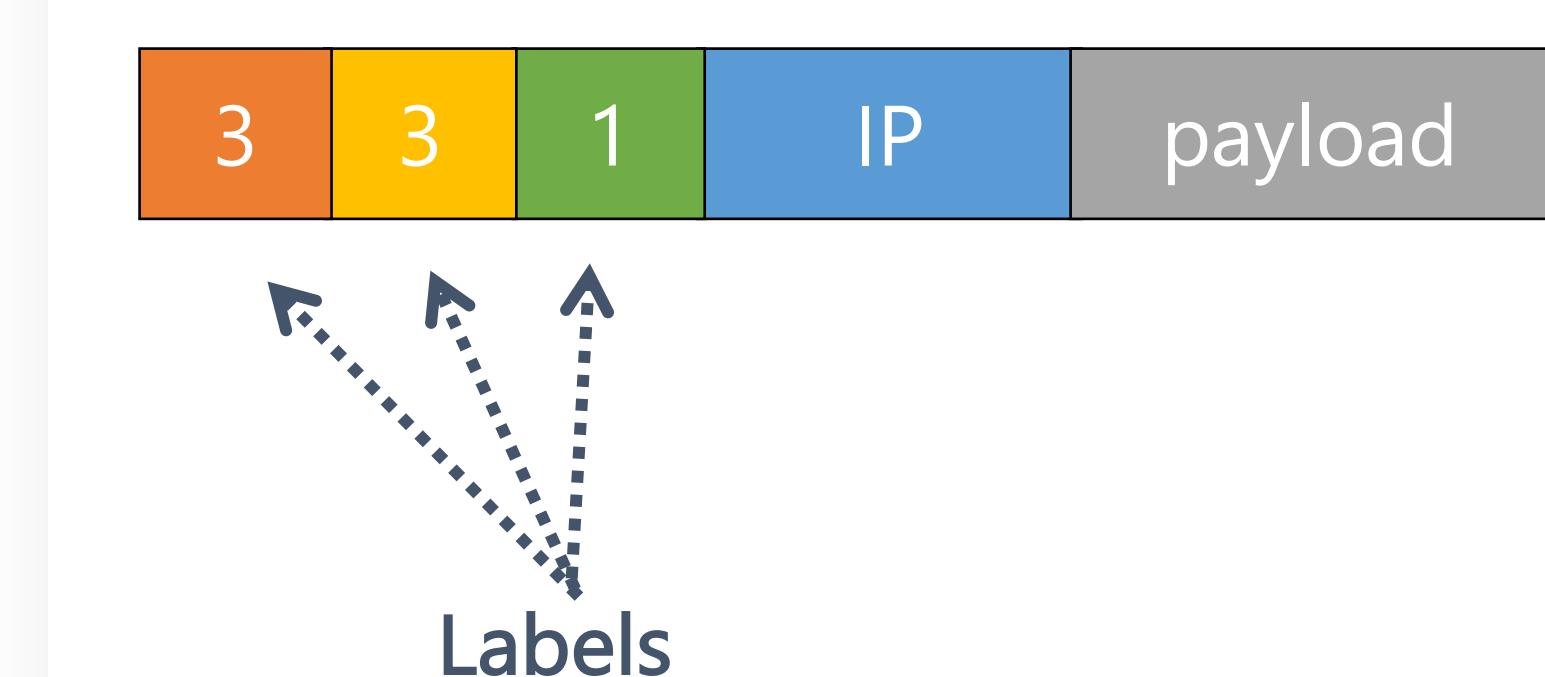
Install path  
updates



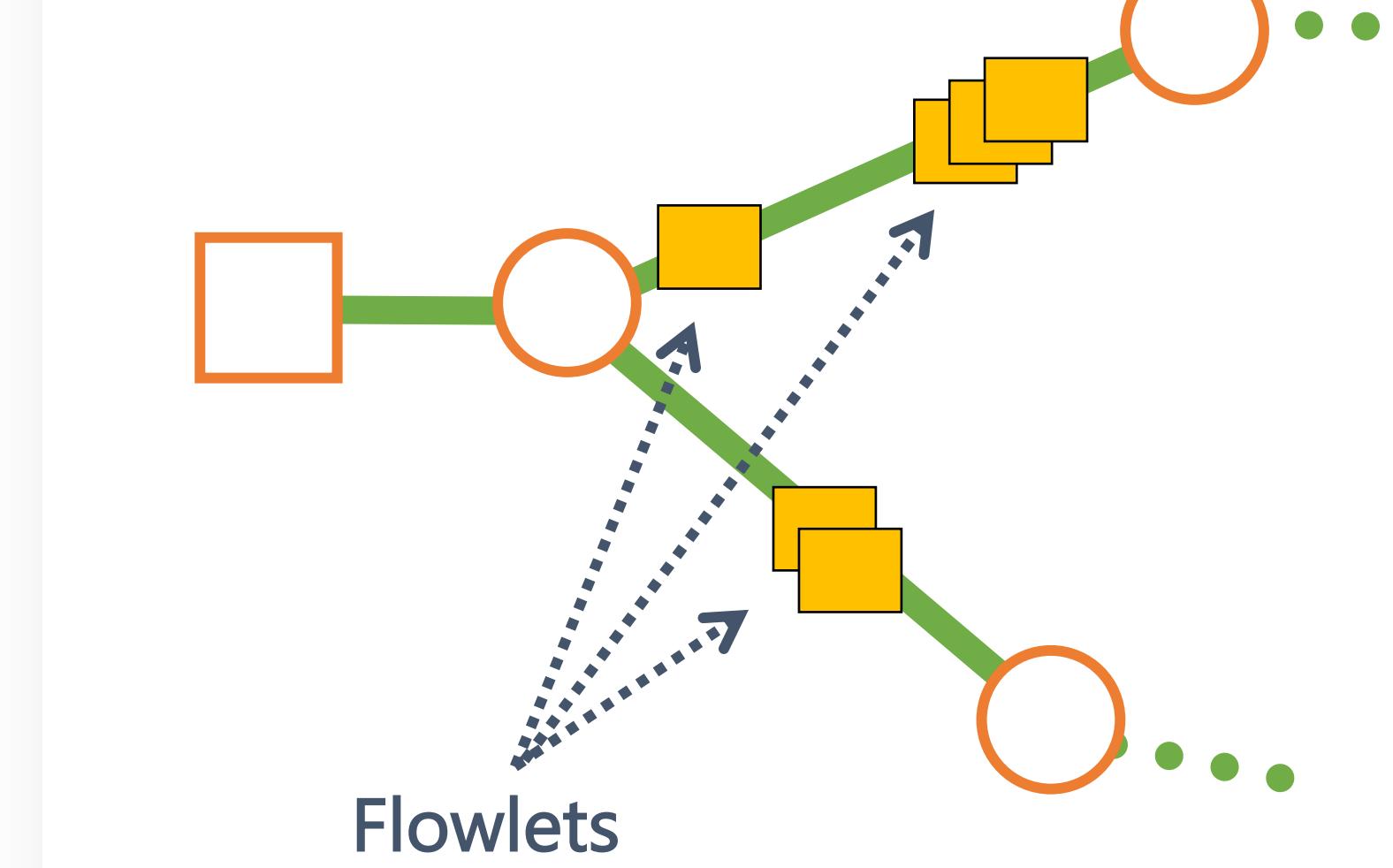
Detect  
additional  
traffic

## More **building blocks**

MPLS forwarding, packets carry entire path



Load balancing: path selection at ingress at flowlet granularity



05\_DIJKSTRA

LUKAS HEIMES, DAN KLUSER AND PATRICK ZIEGLER

ADVANCED TOPICS IN COMMUNICATION NETWORKS 2021