

# Exhaustive path tracing with Paris traceroute

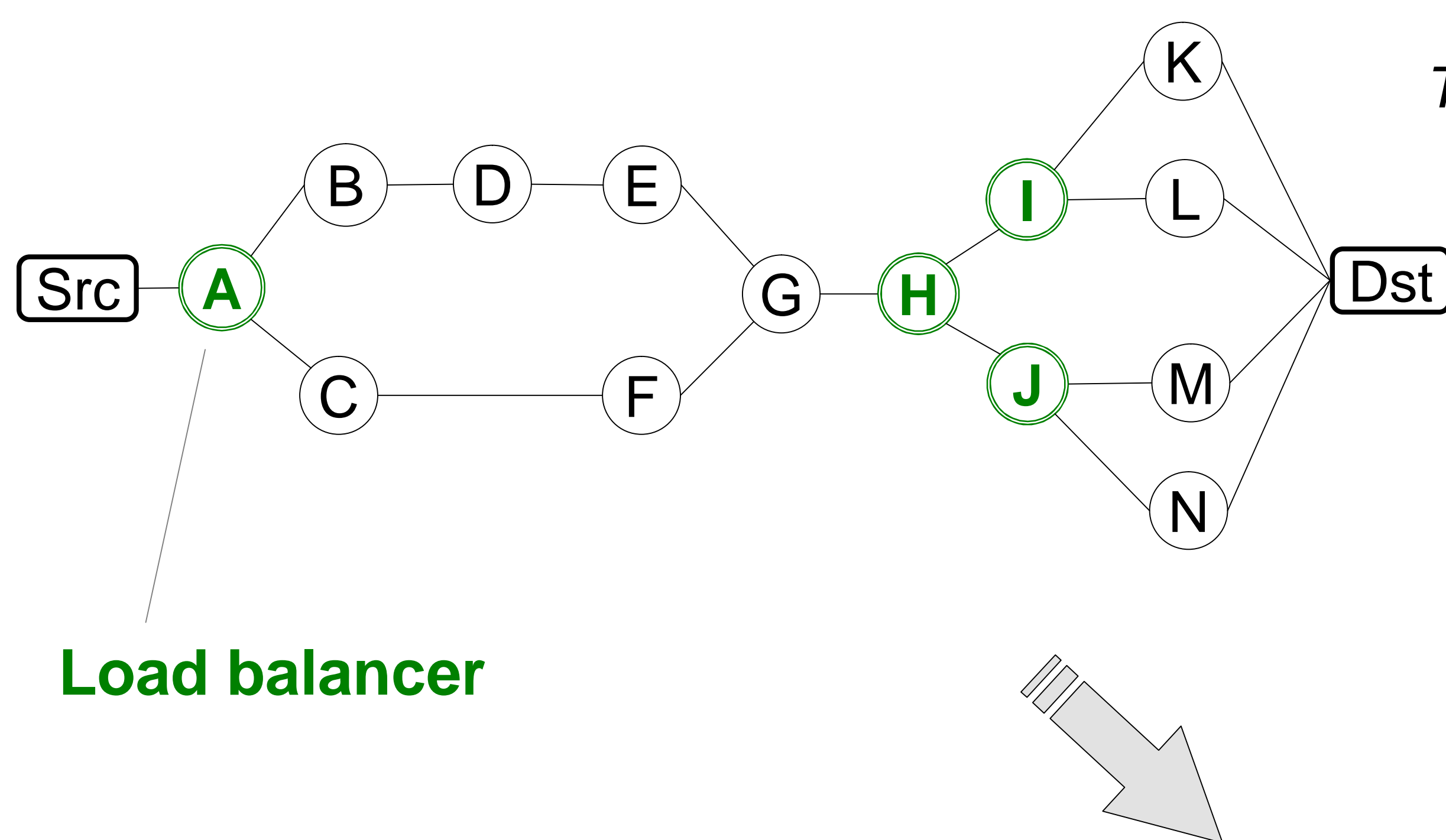
## TRACEROUTE IS WIDELY USED

- Measures the IP path between a source and a destination
- Used for troubleshooting and to build Internet maps

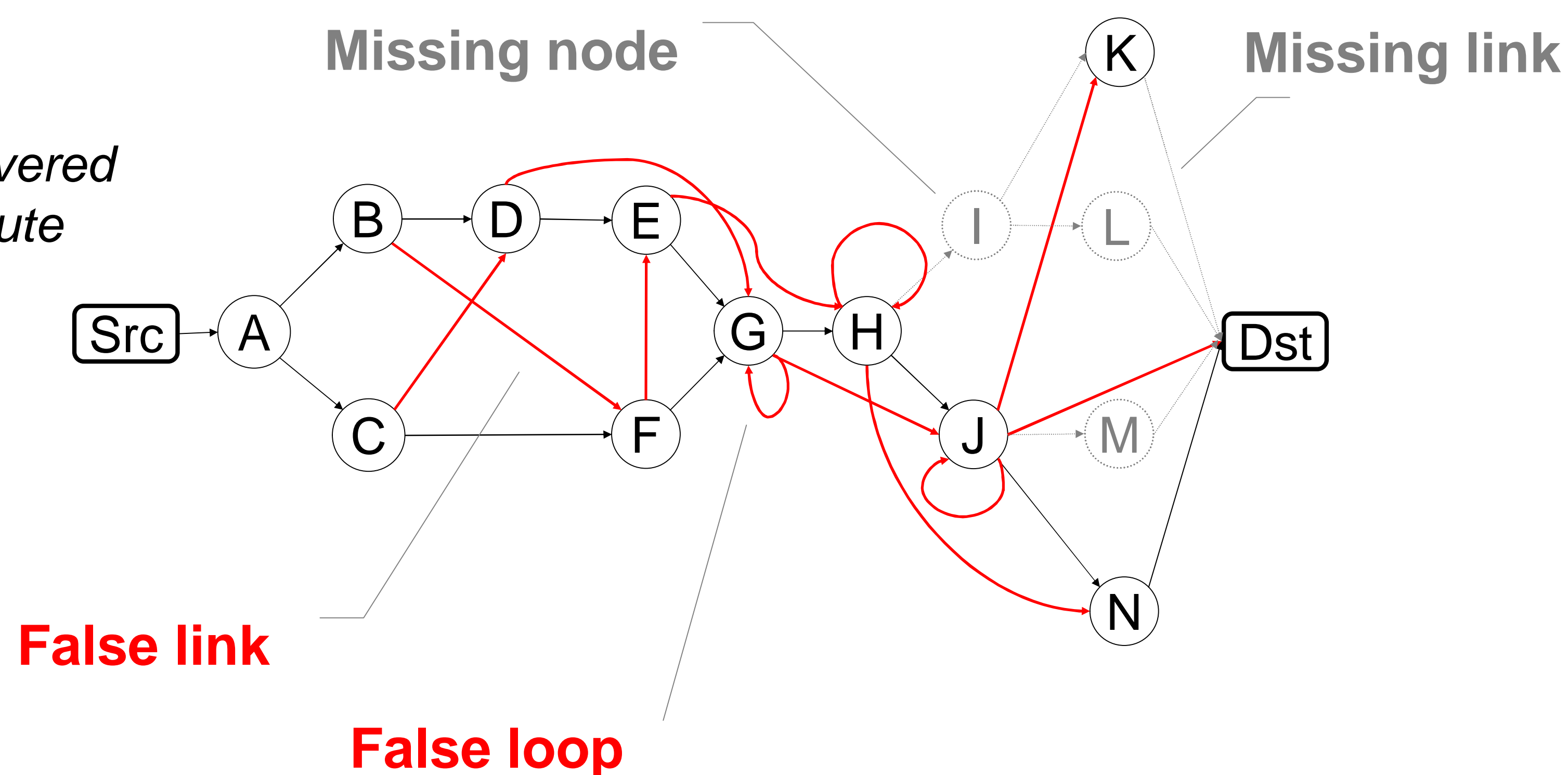
## TRACEROUTE FAILS UNDER LOAD BALANCING

- Traceroute systematically misses interfaces and paths
- May diagnose an incorrect path or build an inaccurate map

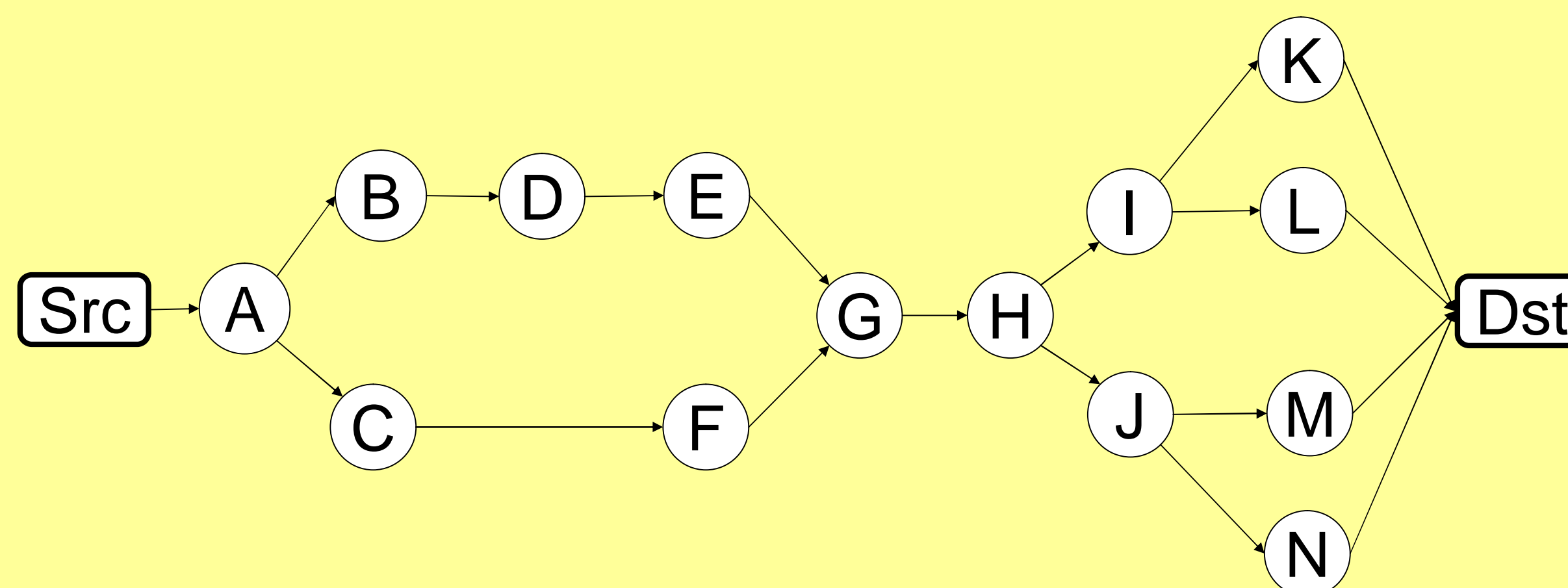
Real topology from Src to Dst



Topology discovered using traceroute



## PARIS TRACEROUTE FINDS ALL TRUE PATHS



- ✓ Sends an adaptive number of probes to discover all interfaces
- ✓ Varies flow identifier in a controlled manner to avoid false links

## LOAD BALANCING IS COMMON IN OUR MEASUREMENTS

### Measurements

- Repeated tracing from LIP6 to 5,000 randomly chosen destinations

### Findings

- Load balancing in 30% of the paths
- Hops with up to 16 interfaces