

AJIT: Accountable Just-in-Time Network Resource Allocation with Smart Contracts

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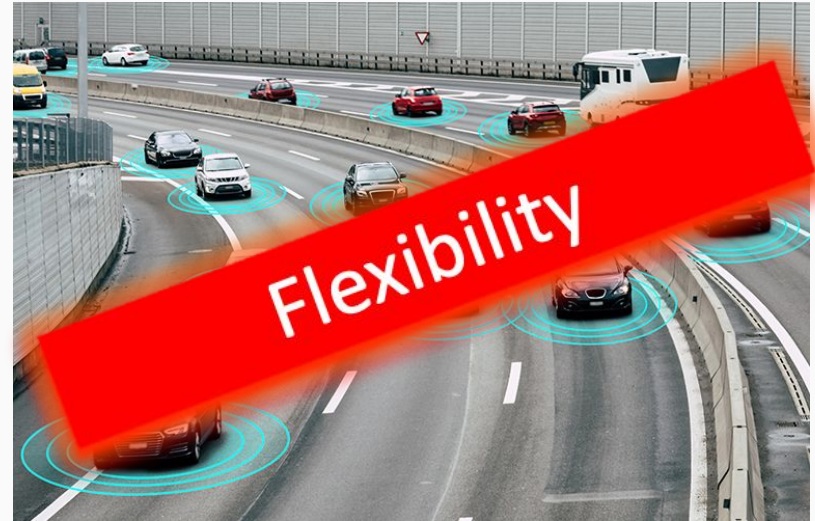


UNIVERSITY OF
SURREY

For some applications, failure is not an option



Remote Surgery



Connected Cars

Best Effort is Dead,
Long Live

Guaranteed Effort!

Best Effort is Dead, Long Live Guaranteed Effort!



Guarantees are difficult when network conditions can change...

...over space



VS



...over time



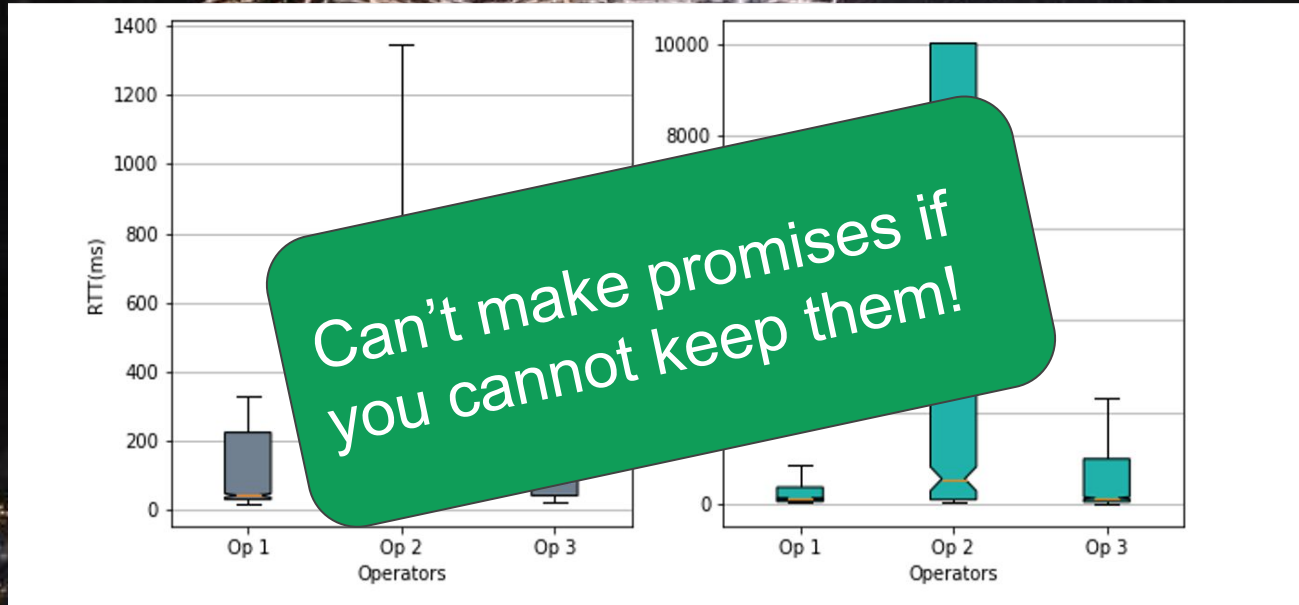
VS



It is not easy to always be the best

New Year's eve

15th Jan



Promise **Specific**
things to **Specific**
Entities at **Specific**
Times & **Specific**
Places **Just-in-Time**

50Mbps from
Car1 to Car2
from 11:15-11:30
in Abingdon

... Using Just-in-Time Smart Contracts



Ongoing work and research questions-I

Supporting required levels of transaction throughput

1. Use permissioned ledgers
 - standardising through ETSI
2. Localised smart contracts
 - one base station or edge location for car platoon
3. Instantiate pre-planned templates
 - e.g., between two hospitals for remote surgery

Ongoing work & Research Questions - II

Monitoring and Enforcing Service Level Agreements

- Doing this at line rate is crazy!
- Enable review and audit at a later time
- Consumer and operator are incentivised to tamper with audit trails...

Ongoing work & Research Questions - III

~~Billing~~ and Pricing

- Airline-style dynamic pricing for your next 15 minutes of phone contract?
- Application-specific SLAs and App-initiated connectivity
 - BBC iPlayer app buys a 5 Mbps connection for next 30 minutes for a TV show
 - Email app can live on 250 Kbps when price is low enough

Capacity Planning and **Online** Resource Allocation

- Dynamic network slice creation
- Using AI Planning to decide between different possible allocations

Smart Contracts are saved in a
permissoned Blockchain

