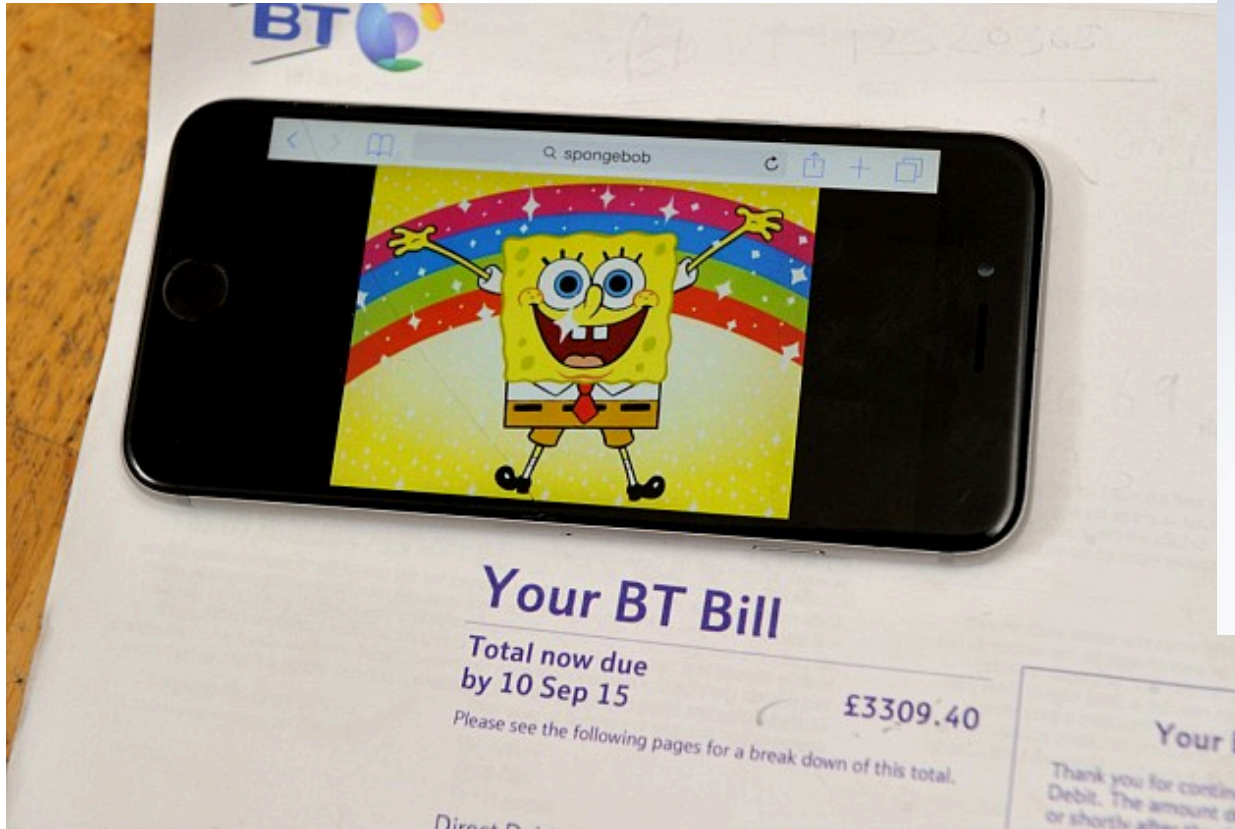# Concept for Cooperative Traffic Management

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Low Trust in (MOBILE) Operators, MOBILE BB is far from Fixed BB

http://www.dailymail.co.uk/news/article-3228132/Father-furious-BT-sent-3-300-bill-10-year-old-son-watched-just-six-cartoons-iPhone-6.html
https://www.youtube.com/watch?v=0ilMx7k7mso

Traffic Management in CELLULAR Networks

› For cellular networks, growth of data outpaces growth of capacity
  – Potential bottlenecks: air interface, Mobile Backhaul
  – If the operator can decrease his cost (and propagates that to users) it is beneficial to everyone

› Today Traffic Management is mainly implicit, non-cooperative
  – Either fixed share (the network must meet the resource demand of most demanding app) or
  – DPI based optimization
  – (Overprovisioning by low monthly caps)

› Issues with DPI
  – Encryption
  – It might put some OTTs at disadvantage (e.g. they are falsely recognized)
  – Advantage is not perceived by the user or it is perceived as hostile due to the different preferences of that user
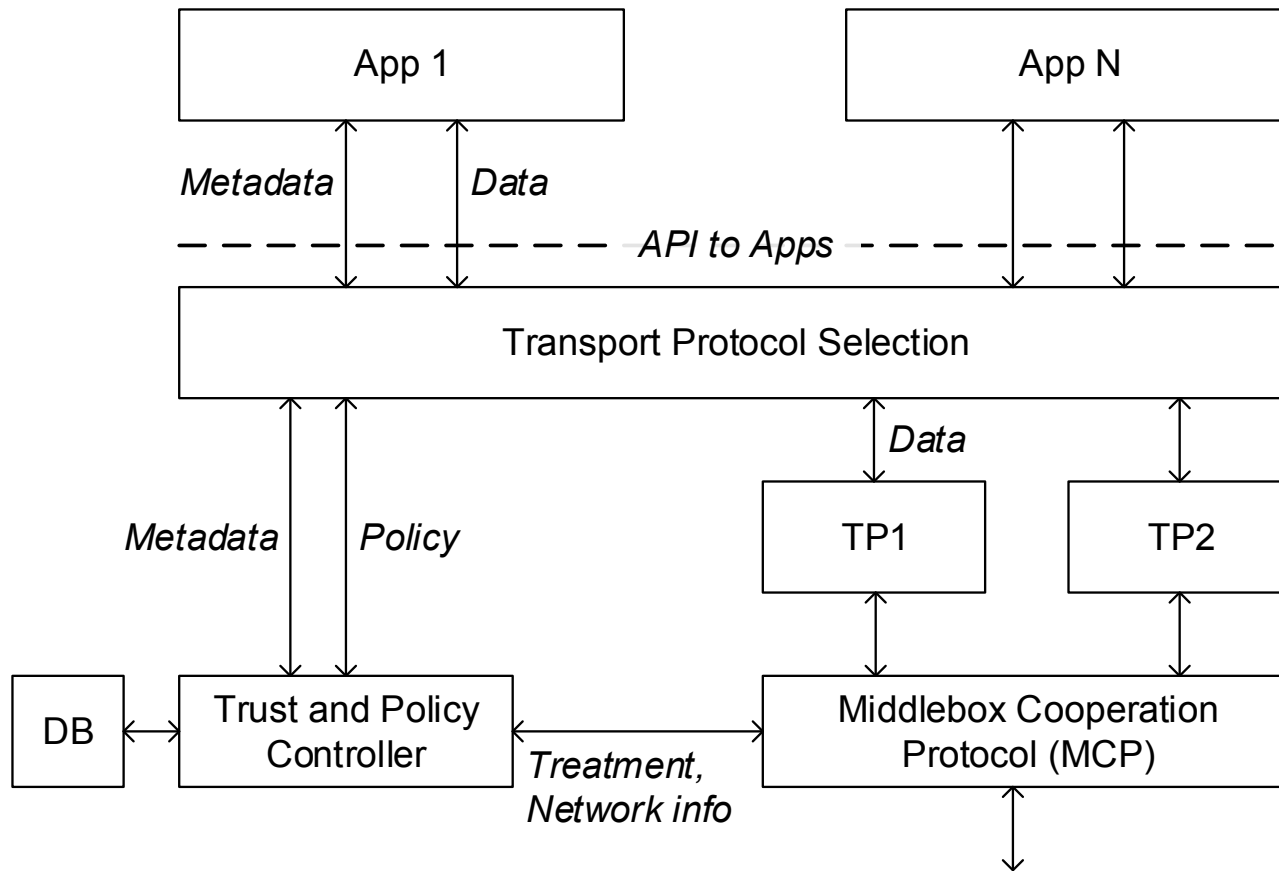
Cooperation and the Tussle

› To achieve cooperation
  – Operators must provide demonstrated value
  – Clear interfaces are needed which are designed for the tussle. (*"Visible exchange of value", "Exposure of cost of choice", "Visibility (or not) of choices made" and "Tools to resolve and isolate faults and failures".*)

› The end-user shall be able to influence resource sharing, but
  – Should not be bothered too much
  – Probably does not understand his needs in most cases

› Other actors already have their agents
  – Network operators (Middleboxes, e.g. Policy Decision Points, DPI, PEPs)
  – OTTs (in the app, in the server)

› We propose an agent for the end-user in the Tussle: Trust and Policy Controller

Trust and policy Controller and MIDDLEBOX cooperation
The agent of the end-user

```
┌─────────────────────┐        ┌─────────────────────┐
│        App 1        │        │        App N        │
└─────────────────────┘        └─────────────────────┘
      ↕         ↕                    ↕         ↕
   Metadata    Data
─ ─ ─ ─ ─ ─ ─ ─ ─ ─ API to Apps ─ ─ ─ ─ ─ ─ ─ ─ ─ ─
┌───────────────────────────────────────────────────┐
│           Transport Protocol Selection            │
└───────────────────────────────────────────────────┘
   ↕         ↕                Data
                            ↕        ┌──────┐   ┌──────┐
Metadata    Policy                  │ TP1  │   │ TP2  │
                                    └──────┘   └──────┘
                                       ↕          ↕
┌────┐  ┌──────────────────┐    ┌──────────────────────┐
│ DB │↔│ Trust and Policy │↔   │ Middlebox Cooperation │
└────┘  │   Controller     │    │   Protocol (MCP)      │
        └──────────────────┘    └──────────────────────┘
            Treatment,                    ↕
            Network info
```

The Trust and Policy Controller

› Similar to a device firewall

› An optional software
  – Not installing it results in default treatment

› May receive rich metadata
  – Session info
  – Application state

› Translates that to simple preferred treatment (non privacy sensitive)
  – Also reacts on network information

› Determines preferred treatment and other metadata to communicate through MCP using
  – Database (e.g. by community, operator, device vendor)
  – User configuration

Example: non-economic incentive based user-network cooperation

› Cooperation framework

  – Keeps current charging (monthly cap)

  – Introduces a "background" and a "priority" service in addition to BE

  – In case of congestion the network offers "background" service to selected users; accepting the offer accumulates tokens

  – The user may ask for "priority" when needed, using this requires tokens

  – Any communication can be ignored by the user→ BE Service all the time

(from draft-mihaly-spud-mb-communication)