Designing for Tussle: Case studies in control over control

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Abstract

In 2002 'Design for Tussle' [1] was articulated as a new design principle for the Internet. It was the result of a DARPA funded project to re-think the Internet architecture, which was only being applied selectively by the industry, leading to islands of incompatibility and worse, complete stasis. The problem lay in the end to end design principle [2], which was formulated to foster innovation by ruthlessly removing all but rudimentary functions from infrastructure. Complete infrastructure transparency allowed innovations in its use, unimpeded by feature interactions. However, this gave network operators no incentive to invest in infrastructure. They had no hooks to extract any more than commodity revenues from their customers. In turn, innovative applications had no infrastructure growth to exploit. Design for Tussle was articulated as a route out of this impasse. The architecture was being ignored because it mandated up front that one industry should win and another should lose. A more level playing field was required — even better, a playing field with adjustable tilt.

But knowing what *not* to do was one thing. Positive guidance on best practice has been less evident. This talk aims to redress that balance. We draw from a selection of research, to give case studies of where Design for Tussle has best been applied. Most of the examples are from our own research projects, where Design for Tussle has been our deliberate aim, despite our strongest examples in the QoS area having been developed before the term 'Design for Tussle' was articulated. Other areas are covered in less depth, such as denial of service protection and access network routing. Essentially, rather than determining which party has control, the ability to control who is in control is added. To the question "So who controls the control over control?" the answer is whoever or whatever is in control in society. In other words, the market, the government, the industry regulator etc. Who predominates in the tussle for control will depend on the conditions in different cultures around the world, whether they are command economies, regulated market economies or completely *laissez faire*.

So, as designers of the future Internet, we must be sensitive to its role in shaping our future society, by allowing that society to shape the structure of the communications industry, but without allowing technical concerns such as scalability and evolvability to be compromised in the process.

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Author's biography

Bob Briscoe joined BT in 1980 and now directs the research programme of BT's Networks Research Centre. In the late-1980s he managed the transition to IP of many of BT's R&D networks and systems. In the mid-1990s he represented BT on the HTTP working group of the IETF and in the ANSA distributed systems research consortium, which led to the creation of the OMG and CORBA. In 2000 he initiated and was technical director of the Market Managed Multiservice Internet (M3I) consortium, a successful European collaborative project investigating the feasibility and user acceptability of controlling Internet quality on fast time-scales through pricing. His published research, standards contributions and patent filings are in the fields of loosely coupled distributed systems, scalable network charging and security solutions (esp. multicast), managing fixed and wireless network loading using pricing and on the structure of communications markets. He is also studying part-time for a PhD at University College London.

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Document history

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