

changed to more industrialised forms. It is often assumed that the shift towards utility provision means centralisation but this is not the case.

Whilst the interaction of all consumers (demand competition) and all suppliers (supply competition) drives the process of evolution, the question of whether a specific activity or data set centralises or decentralises depends upon the actions of individual actors (suppliers and consumers) in this market. For example, it would have been relatively trivial for the hardware manufacturers to create Amazon clones and a price war in the IaaS space around 2008–2010 in order to fragment the market by increasing demand beyond the capability of Amazon to supply due to the constraint of building data centres. I had these exact conversations with Dell, IBM and HP throughout 2008 and 2009. I even told them their own inertia would fight against this necessary change and they would deny the existence of the punctuated equilibrium until it was too late. The fact they didn't act and lost their own industry is entirely the fault of their own executives and also one of the major factors why we have seen centralisation in the IaaS space.

Centralisation depends upon the actions of specific actors (in this case the inaction of hardware suppliers and hosting companies). In the future, this may in fact yo-yo from centralised to decentralised or find a balance between the two (as with electricity provision and self generation). Such a change in the means of production is however unlikely to change the interfaces themselves i.e. a shift from central to self-generation does not mean a change in voltage or frequency for domestic power provision. The future interfaces of computing have already been defined.