Using layers for policy analysis: Net neutrality

Introduction

This module builds on Framework: Tech, layers and (un)bundling. You find this module here: https://docs.google.com/document/d/1-9hXabsoL94MeRi3D60r6CpUc62y3oe2dmkH9FSEVbI/edit#

Other parts in this series include 5G Technologies (https://docs.google.com/document/d/1tO2HGoGjxIO6vx5hHhl_o9cIoI3C_sN6yh0zYlTlibs/edit#) and Smartphone apps (https://docs.google.com/document/d/1Uo6iT3NjA4ONczWag-OipL-BjnLsmjMQH9l__vTDlco/edit).

A companion glossary is available here:

https://docs.google.com/document/d/1fxsbRxBYkSzh0stmc9liXTljqYIpQ7fdAH_rC31-zJI/edit?usp=sharing

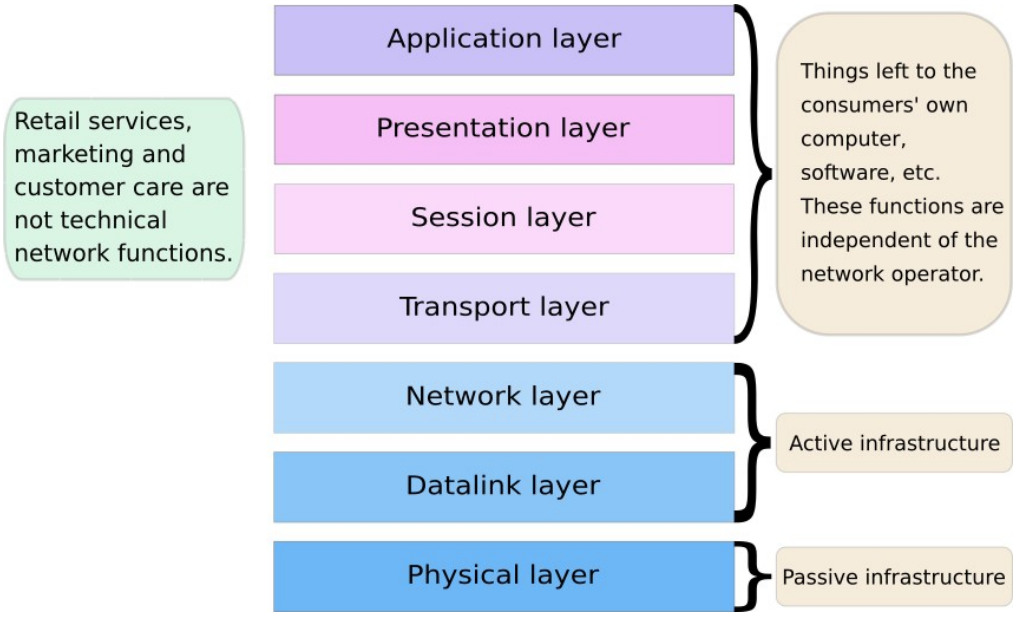
Net neutrality

From a human rights perspective, examples and images of network technologies can seem far away from the rights holders. The latter have no say in the commercial relations between lower layer actors or between higher layer businesses that make software. Nor they are subject or beneficiaries of potential regulatory interventions.Thus, the effects on consumers of unbundling interventions are, after all, indirect.

But it should come as no surprise that net neutrality is a human rights issue[1],[2] and therefore well-suited for an OSI model analysis. Net neutrality relates to the social, economic, political and technical relationships between different entities in a network, and the OSI reference model was created specifically to illustrate the technical relationships from which the social, economical and political relationships flow. In other words, net neutrality can help to contextualise the power relations between the different layers.

For instance, how much power should the operators of passive and active infrastructure in layers 1-3 be able to wield over commercial entities in layers 4-7? Let us return to the Vertical Integration Model from Framework: Section 1, but now in OSI characterization:

1https://www.article19.org/resources/net-neutrality-join-party-defend-internet/
2https://www.article19.org/resources/us-repeal-net-neutrality-harms-internet-freedom-home-abroad/

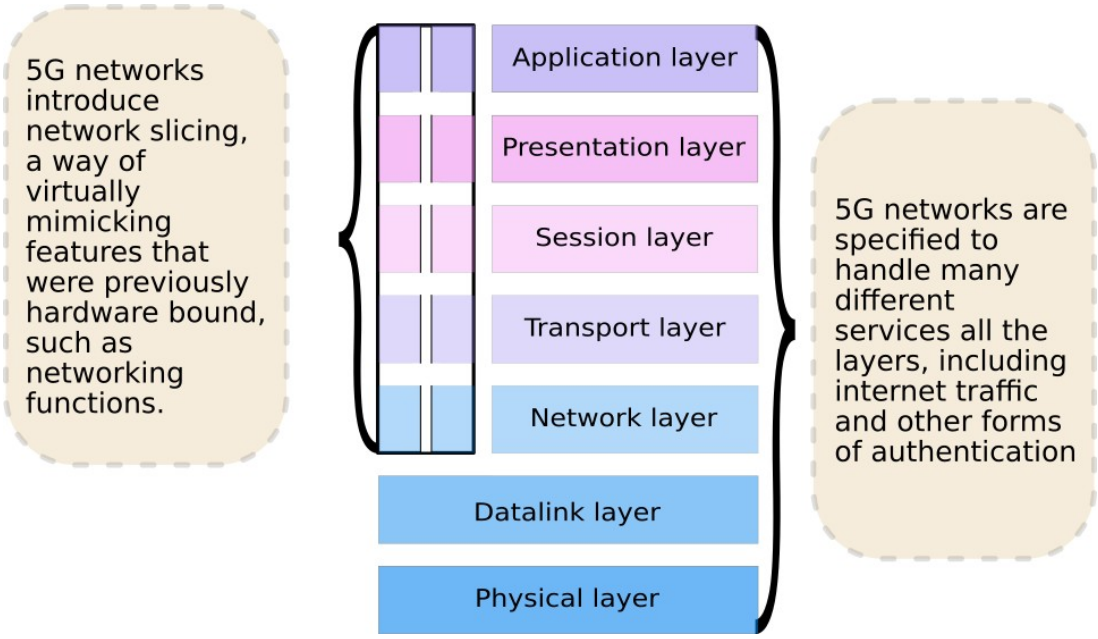


Example N.1: If an entity which operates in layers 1-3 wants to influence what information consumers are accessing through vertical integration or bundling with layer 4-7 services (consider prioritized bandwidth or zero-rating agreements),[3] and also sells some of its layer 2-3 capacity to a access service competitor (who does not own passive layer 1 infrastructure themselves), then the competitor may be forced to do bandwidth prioritization and zero-rating too.

Example N.2: Even if the layer 1 entity does not have any direct technical or commercial integration with layers 4-7, a layer 2-3 entity could technically restrict what retail services, marketing and customer care can be provided by a fully virtualized internet access provider.

Example N.3: A vertically integrated provider with activities on layers 1-3, as well as retail services, marketing and customer care, can restrict services on layers 4-7 to consumers without harming the abilities of other layer 1, or layer 2-3, providers to provide unrestricted services.

3See Annex: Glossary.



Example N.4: Since mobile networking services are more vertically integrated from a technical perspective, mobile networks present larger net neutrality challenges than fixed networks. It is more difficult in mobile networks to have a broad range of different layer 1-3 providers, since networks cannot be easily networked. One network slice needs to be allocated to one entity, which gives that entity control over what happens in the slice. All network features may require authentication by the layer 1 and 2 entity, so this entity has a technical source of commercial power over anything on the higher layers. Mobile network operators (MNOs) and mobile virtual network operators (MVNOs) have traditionally provided layer 4-7 services that go beyond authentication (calling, text messages, etc.), so there is a market tradition of bundling.

Net neutrality laws deal with vertically integrated providers as in Example N.3. These laws place greater emphasis on permitted technical configurations of the equipment used to provide layer 1-3 features, and less emphasis on those vertical *commercial* integrations between layer 1-3 and layer 4-7 providers. However, the latter type of power relations may also influence the freedom of choice of consumers.

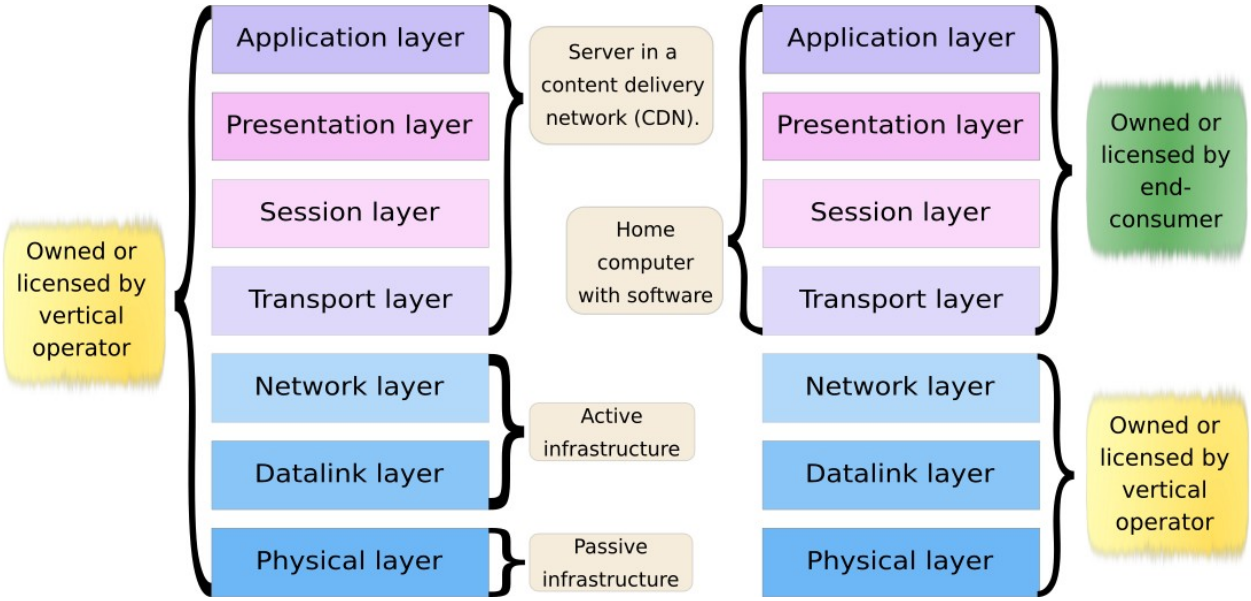
One reason for this choice could be that it is politically more convenient to acknowledge that a technical system impacts an individual end-user, than it would be to restrict contractual freedom in what is, practically, business-to-business relations.

It also ties in with an old internet legislation (cyber law) paradigm, namely that *code is law*. It is not clear that network operators can be trusted to abide by their contracts, while the configuration of a technical system will always determine how a technical system works. A law which codifies permitted configurations of technical equipment could be considered as a stronger guarantee than a law which codifies a particular economic behaviour.

The technical structure described in Example N.1 and N.2 gives rise to the following idea: if layer 1 providers do not enter into direct agreements with layer 4-7 or layer 7 providers, could

layer 2-3 providers compete by making different higher layer bundles? From a technical perspective, strong layer 2-3 competition might sustain net neutrality through competition.

In this picture, a vertically integrated operator connects residential customers to the internet, and enhances its network with intermediary servers that store content:



Example N.5: If a vertically integrated layer 1-3 or 2-3 provider invests in a *content delivery network* (CDN), the providers enable faster content transfer because data has to travel shorter distances (since the internet is global, this could save thousands of kilometers). Charging third-party layer 6-7 services for access to the CDN affects downstream competition.

Self-evaluation questions

1. Make your own OSI representation of the internet connectivity situation in your jurisdiction. Assign different companies to different OSI-layers depending on what infrastructures and services they provide.
2. Can you think of a regulatory consequence of Example N.4 in terms of net neutrality legislation?

Proposed answers

1. This will depend on the market in your country.
2. For instance, the information asymmetry between the regulator that upholds a net neutrality law, and the operator intended to implement that net neutrality law, is exacerbated as the operator is assumed to exercise more direct control over its technical infrastructure - including the tweaking of configurations over time.

   It's also more difficult to rely on strong competition between subnetworks to preserve net neutrality organically, since by definition there is only one network operator which typically is not even expected to interconnect with competing networks, other than exceptionally.

   Downstream providers, such as MVNOs,[4] are completely dependent on the technical configurations applied by upstream providers, such as MNOs.[5]

4See Annex: Glossary.
5See Annex: Glossary.