Ensuring "ready for NGA access" buildings in the EU Initiative to Reduce the Cost of Rolling Out High Speed Communication Infrastructure in Europe

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From
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Subject
Response to Public Consultation on an EU Initiative to Reduce the Cost of Rolling Out High Speed Communication Infrastructure in Europe

Introduction

On 27 April 2012, the European Commission (EC) Information Society and Media Directorate-General launched a public consultation on an European Union (EU) Initiative to reduce the cost of rolling out high-speed communication infrastructure in Europe. This Initiative is triggered by the Digital Agenda for Europe[1], in which Member States have endorsed broadband targets aiming for 100% broadband coverage by 2013 for all Europeans, and increased speeds of 30MBps for all, with at least 50% of the European households subscribing to Internet connections above 100MBps by 2020. For these targets to be achieved, investments will need to be stepped up.

This document is a response to the Public Consultation document[2]. The editor is a Senior Scientist working for TNO, the Netherlands Organisation for Applied Scientific Research. He is working with the industry as well as research institutes, leading an internationally known research group specialized in in-house networking, equipment, and services. The scope of the Public Consultation document is broader than that, grouping 23 questions into 5 chapters on making a better use of existing infrastructure, enhancing transparency and coordination of civil engineering works, handling requests to roll-out networks in a more efficient and transparent way, ensuring "ready for NGA access" buildings, and additional cost-saving measures. But given our expertise, we only focus on the questions in Chapter V “Ensuring ready-for-NGA-access buildings”, i.e. questions 20-22. In the next section of this document we formulate our answers. The final section of the document provides the required background information about TNO.

[1] http://ec.europa.eu/information_society/digital-agenda/index_en.htm
[2] http://ec.europa.eu/information_society/policy/ecomm/doc/library/public_consult/cost_reduction_hsi/cost_reduction.pdf

Response to questions 20-22

20. What existing requirements under construction laws are you aware of regarding in-building equipment for electronic communication infrastructure? Please specify the Member, State, region or municipality.

In the Netherlands, the national construction law "Bouwbesluit" cites the Dutch norm NEN 1010 "Veiligheidsbepalingen voor laagspannings-installaties" (Safety requirements for low-voltage electrical installations) [3]. Applying NEN 1010 is not mandatory, if other safety measures can be proven to be just as effective. In practice however, NEN 1010 is always used.

There are no other requirements regarding in-building equipment for electronic communication infrastructure in Dutch construction laws. The Dutch regulatory authority for electronic communications has not yet developed specific guidance so that new buildings are provided with adequate equipment or next-generation access, while also securing open access and technological neutrality. The authority also does not mandate, on a systematic basis and regardless of the party owning the network, access to the terminating segments of next generation networks, including in-house equipment.

21. What is, in your view, the most suitable and cost effective way to ensure the existence of adequate and state-of-the-art in-building equipment, while also securing open access for electronic communications providers?

In short, we recommend:

- to stimulate the installation of sufficient empty cable ducts in new buildings,
- to leave it up to the tenant to choose the actual home networking technologies (wired, wireless, no-new-wires) for his services,
- to invest in the research and development of effective technologies in the fields of remote management and Quality-of-Service of in-home active equipment,
- to stimulate the use of HGI standards that provide technological guidelines to make the home gateway accessible to third parties, including the inclusion of open software execution environments,
- to regulate third-party network providers such as building owners, which are not tenants, nor public access network providers, but may limit open access to their network for other communication providers.

An explanation follows below.

Our answer focusses on our field of expertise, i.e. in-home infrastructure. To our opinion, infrastructure is always "open" in its passive form, i.e. without it being used for actual electronic or optical communication. Passive in-home infrastructure includes ducts, wiring, and space dedicated to technical installations (e.g. the metering cupboard). A distinction then has to be made between existing housing

[3] http://www.nen.nl/web/NEN-1010-2.htm ; no English translation exists.

and newly-built houses. In the Netherlands, the latter contains about 0.7% of the total amount of houses on a yearly basis.

In newly built houses, we discourage the pre-wiring of houses with whatever cable at construction, because that would violate technology neutrality. There are still many new developments happening in cabling, but also in wireless technologies and the so-called no-new-wires solutions (in-home power-line communication, in-home multimedia-over-coax, etc.). Home networking technologies vary in their suitability for different services. For instance, wireless technologies are more useful for mobile devices, whereas wired technologies are better suited for stable Ultra HD TV services. Without pre-knowledge of the future tenant's service preferences, the pre-wiring installer then must choose for the newest state-of-the-art technology (e.g. 1 Gbit/s Polymer Optical Fiber, POF) to match the possible needs of the user. However, the newest state-of-the-art technologies are generally relatively expensive and little standardized, and consequently have a low depreciation time. We therefore propose to leave the technology choice up to the tenant.

In existing houses, however, tenants show a clear preference for wireless and no-new-wires technologies, because they are perceived as relatively easy to install. This is unfortunate, because modern cabling technologies offer many advantages, such as low use of energy per bit, low bit-error rate (i.e. high robustness of the communication), and low costs per bit/s. POF has the additional advantages of high sustainability (no copper), and relative ease of installation (it is thin and flexible). The use of wired technologies in the house would thus stimulate the use of advanced, innovative, robust, and high-bandwidth services, at a low cost and use of energy. We therefore recommend that new buildings are constructed with sufficient empty ducts in the walls. One duct per major room is enough: the last meter can be sufficiently covered with short-range low-energy wireless technologies such as Bluetooth or radio-over-fiber.

However, openness of the in-home infrastructure is an issue when looking at the active components. For instance, many TVs are connected to the home gateway and the IPTV service of the access network provider with a dedicated cable. That cable cannot be concurrently used by other services or service providers. Basically, the IPTV provider then controls the IPTV network really end-to-end, past the demarcation point all the way up to the TV. Also many energy management service providers are opting for such in-home network architectures for their services.

Unfortunately, the current state of the art in home networking technologies does not provide enough functionality to avoid those closed architectures given the dependability and robustness requirements set by the mentioned service providers. Regulation is not yet going to help here. First, Europe needs to invest in the research and development of effective technologies in the fields of in-home Quality-of-Service and remote management. The current technologies in these fields are not suitable to deal with the inherent heterogeneity of home networks and to be used by unknowing network administrators such as the average tenant.

However, some progress is being made regarding the openness of the equipment at the demarcation point, the so-called home gateway, most notably in the Home Gateway Initiative (HGI)[4] and European Framework Projects such as FIGARO[5]. So far the prevailing business model has been that the home gateway is provided by the access network operator. Choosing a different network operator means taking a different home gateway. This cannot be avoided for the full 100%, from a technical point of view. At least the access Network Termination (NT) unit, which is usually integrated in the home gateway, needs to be exchanged. If the home gateway consists of two separate units, i.e. the NT unit and a service gateway with a generic Ethernet interface towards the NT[6], then only the NT needs to be changed instead of the whole home gateway. Efforts are underway in the HGI to standardize the mentioned Ethernet interface[7]. This has the additional advantage that the effort of reconnecting and reconfiguring the in-home network to the new access network is now minimized, as only the service gateway needs to be connected to the new NT.

Another, promising approach by the HGI to making the home gateway more open to third-party service providers stems from the observation that modern consumer services are more and more defined by intelligent software than hardware. For instance, most popular Internet services assume the availability of certain generic hardware (computer devices, connected screens, …) and generic networks (broadband IP), and distinguish themselves in terms of innovative software-defined functionality. The home gateway can facilitate this trend best by providing an open software execution environment to third-party software developers and service providers. HGI has recently published a standard[8] which home gateway providers and access network providers can use as a blueprint for such future gateways. In Europe, Deutsche Telekom seems to be leading this way with their soon to be launched Qivicon service[9].

In the Netherlands, most people live in single houses, and the text above applies. Things may get more complicated e.g. in case people live in apartment blocks owned by a third party. Then the situation may arise (depending also on local customs and regulations) that the service consumer pays for network connectivity to the said third party and/or is dependent to a certain degree on network functionality the third party offers. The third party may have interests in not offering open access to the end users on his in-building network, though the next generation access provider may have provided open access to the third party. In

[4] www.homegateway.org .
[5] www.ict-figaro.eu .
[6] F.T.H. den Hartog et al, “Convergence of Residential Gateway Technology”, IEEE Commun. Mag. 42, 5 (May 2004).
[7] Home Gateway Initiative, HGI-RWD024-R3 “Active NT Requirements to Support the 2-Box Model in the Context of NGA Active Line Access”, to be published.
[8] Home Gateway Initiative, HGI-RD008-R3 “HG Requirements for Software Execution environment”, http://www.homegateway.org/publis/RD-008-R3.pdf .
[9] www.qivicon.de .

this case the third party must be regulated in a way comparable to the access provider.

22. What would be the advantages and disadvantages of an obligation to equip buildings with open next generation access? How do you assess the additional costs incurred?

Advantages

- It would stimulate technical innovation needed to make open access technically possible in homes.
- It would make in-home equipment and networks more sustainable: it can be re-used with other service providers.
- It would stimulate tenants to buy new in-home equipment and wiring, as they know it can probably be re-used when moving to more advanced services and different service providers.
- It would stimulate tenants to try new services and new service providers, as they know that switching does not have many consequences for their in-home equipment, networks, and management effort.
- It would stimulate standardization of new in-home communication equipment and their interoperability.

Disadvantages

- Separating the home gateway into two or more subunits leads to more clutter (cables, devices) at the customers demarcation point, which may or may not be in the meter cupboard, which may or may not have the space for it.
- Current integrated home gateways have a depreciation time of typical 5-7 years. Looking at the developments of technical specifications in e.g. the HGI over the past 7 years, there is no reason to assume that either the NT or the service gateway subunits will depreciate much slower. So also with open access, the boxes need to be renewed rather frequently to keep up with the newest developments in access technologies and service platforms. We doubt if the little increase in depreciation times of the several subunits and the configuration advantages to the user will outweigh the costs and discomfort of having plural boxes in the meter cupboard.
- We discourage the pre-wiring of houses with whatever cable at construction time for the reason of realizing open access, because that would probably violate technology neutrality, it is relatively expensive, and has the additional risk of making the wrong technology choice.

The costs incurred by an obligation to equip buildings with open next generation access are relatively low if our recommendations are followed. Extra ducts and enabling open software execution platforms on home gateways will be the most costly of our recommendations. However, they are rather long-term investments than costs, as we expect them to lead to higher revenues from the service innovations they enable.

Background information

TNO

• Role: university / research institution
• Country: The Netherlands
• Interest Representative Register ID 40524063921-20
• 10 members of TNO have directly approved this contribution

Frank den Hartog is a Senior Scientist at TNO, studying Future Internet architectures and heterogeneous consumer networking. He is also Chair of the Technical Working Group of the worldwide Home Gateway Initiative (HGI). Before joining TNO in 2003, he worked for KPN Research, where he pioneered the home networking research area. He obtained a PhD in physics from Leiden University, and graduated at Eindhoven University of Technology. He (co-)authored over 100 peer-reviewed conference articles, journal papers, patents and contributions to standardization. He is a guest lecturer at various universities, acquires and manages large collaborative research projects, co-founded the Dutch Trans-sector Research Academy for complex Networks and Services (TRANS), and successfully supervised two PhD students. He won the Connected Home Global Summit 2011 Industry Award for "Best Innovation in Software Modularity and Applications for Home Gateways", and was Chair of DECT&CAT-iq World 2012.