
Technology Whitepaper

Towards a Customer-Friendly Open Broadband Access



Bringing Free Service Selection Closer to the Customer

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1 Summary

The business success of providers in the broadband-service delivery chain depends mostly on the customers' satisfaction with services. The introduction of the open broadband-access model brings new opportunities and challenges to all the involved parties.

Free choice – Open competition – New opportunities

The model provides customers with fair access to services, freedom of choice with regard to services and providers, and a means to select the services themselves. Service providers are able to offer services on equal terms, which results in true competition and consequently improved customer satisfaction. New players in the broadband-access market (utilities, real-estate companies, municipalities) are attracted by the business model of open access.

Different approaches – Different business models – Different benefits

This whitepaper presents approaches to open access that differ in terms of business models and technology. It assesses the benefits or shortcomings that different models bring to different parties. The choice between the three presented open-access models (two-tier, three-tier, integrated) should be made carefully and with respect to business-environment specifics.

Customer experience – The key to success

A focus on customer satisfaction with customer-friendly and simple-to-use services dictates the proper selection of the open-access model's technical implementation. The quality of customers' experience will determine the provider's success or failure. Ignoring customers' expectations leads to failure; awareness of them and respect for their importance enables the success of parties in the service-delivery chain: service providers, integrators and network providers.

2 Open-Access Paradigms

2.1 What Is Open Access?

Open access is an access model that provides broadband-access customers (end users) with fair access to services, provided by different – and usually competing – service providers (SPs). All the service providers share the same network resources and the equipment of a single network provider (NP).

To the customers the open-access model gives a free choice of services and service providers; to individual service providers it guarantees equal terms for offering their services (internet, voice, video, and others) to customers.

The open-access model represents an evolutionary step forward and beyond the traditional wholesale access model, in which a single provider offers its service bundle over the network provider's resources (Figure 1).

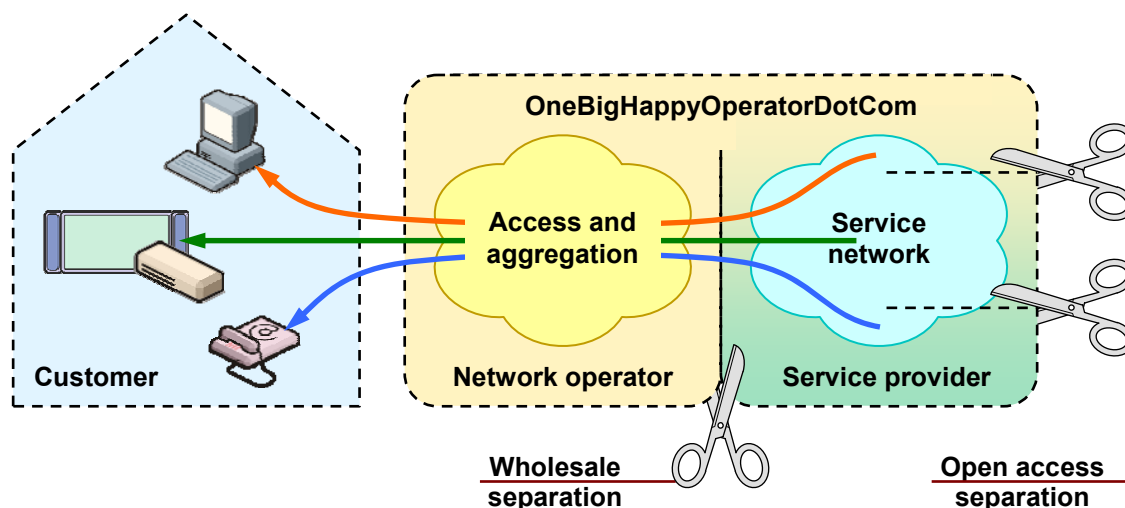
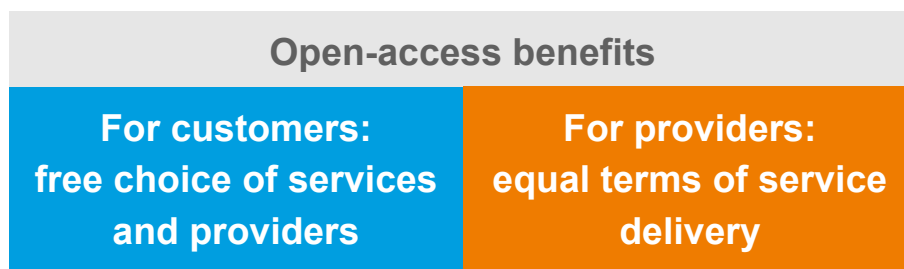


Figure 1: From wholesale to the open-access model

Support for the open-access model is expected in future EU regulations as a requirement imposed on network operators within the EU.



2.2 Why Should Anyone Care?

All the interested parties in the service-delivery chain – end customers, network providers, and service providers (Figure 2) – can benefit from the introduction of the open-access model.

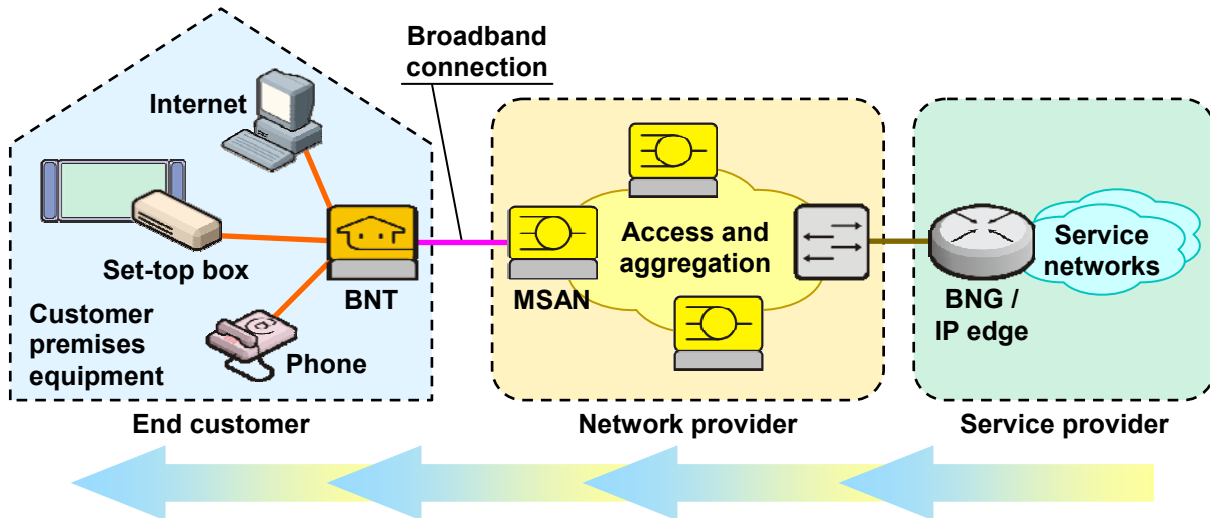


Figure 2: Service-delivery chain

The formal separation of network operators and service providers, introduced in the traditional wholesale model (Figure 1), already makes it possible for NPs and SPs to differentiate their skills and optimize their operating expenses. It is clear that digging and laying fibre ducts, operating a telecommunications network and providing services require different equipment and skills. Although customers have occasionally experienced problems arising from the separation, they generally benefit from it – they have the choice to utilize services from various service providers.

Free choice – Open competition – New opportunities

The open-access model further improves customers' freedom of choice with regard to the services they take. While using voice services from one SP, customers may use internet/data services from another SP, video services from yet another SP, and so on. Furthermore, customers may even collect services of the same kind from different SPs. In this way, customers minimize the costs of the services they use and/or improve the quality of their experience.

By allowing several SPs to openly compete with their services for customer share, true competition is enforced in the market. As a consequence, customers are given a better quality of service, a better choice of services, and lower prices. In addition, new services or service types get introduced sooner.

Customers collect services from various providers, minimize costs and improve the quality of experience

To network providers, the open-access model means that their access networks can be used to deliver a variety of services to customers. Use of the open-access model represents a good way to get a wide offering of services in the network(s) they operate, enabling NPs to stay competitive with the broadband access they sell.

Also, the open-access model represents a new and interesting business model for new players entering the broadband-access market – such as utilities, real-estate companies and municipalities. It allows them to operate as an NP and provide customers with access to services, offered by a set of independent SPs.

2.3 What Challenges Lie Ahead?

The implementation of the open-access model must meet several (technical) requirements that are not present in the traditional wholesale model.

Autonomous service selection

In addition to being given the possibility to choose and/or collect services from several service providers, the customers expect to be given the ability and means to choose and select the services themselves. This means that a self-provisioning (service-selection) platform, accessible by customers, needs to become an integral part of the open-access solution.

A service-selection platform must be an integral part of the open-access solution

Simplicity of service collection

When selecting services of the same kind from different SPs, customers are also more willing to accept services if they have an option to use the same (common or universal) customer premises equipment (CPE) for all the services of the same kind. For example, if a customer receives multicast video services from two video providers, he or she may expect to use a single set-top box, not two disparate devices that would only lead to cabling mess and remote-control confusion.

On the providers' side, the implementation must ensure the separate billing for services, appropriate security mechanisms and the separate authentication of customers. Furthermore, the network providers' equipment must allow low operational and user-support complexity. A common service-delivery infrastructure, based on IP protocols and standard service-subscription protocols, is inevitable and essential for successful operation.

3 Meeting Customers' Expectations

The choice of the technical implementation of the open-access model directly affects quality of customers' experience. Neither the providers' enthusiasm nor the implementation's technical wizardry can, by themselves, bring successful business to a network provider. The success depends almost solely on customers' satisfaction with the services, their perceived quality, and the quality of experience when using the services.

A common service-delivery infrastructure is essential for successful operation

For this reason, the focus on customers' experience is the key to proper selection of the technical implementation of the open-access model and its design.

3.1 A Real-Life Example: The Missing Channel

Imagine a customer that uses TV services from video provider Alpha. By subscribing to its services, she got from Alpha a set-top box together with a remote control. She did not like the appearance of the STB very much: its weird-edged design and murky colours matched neither her furniture nor her TV set. Not to mention the awkward remote control that resembled no known object.

But she knew that IPTV comes with a price, so she got on terms with it. Some time later, she succeeded to connect all the necessary cabling and got it working. Channel switching was somewhat slow, and using two remote controls required some getting accustomed to, but the picture was just fine.

A few months later, she learns from a friend about a great TV show on Channel X. Unfortunately, this channel is not on Alpha's list. After a short enquiry, she gets in touch with video provider Omega, who includes Channel X into its channel set, and learns that she can subscribe to Omega's service package while keeping her existing subscription to Alpha.

Great, she thinks – until she gets Omega's package: another set-top box, yet another remote control, even more cabling. What now? Even if she reconciles herself to the ugly newcomers in her living room and manages to connect everything properly, how will it all work?

She fears that her old TV set lacks one of those SCART things (a word she learned with Alpha's STB), but she worries most about how she will switch channels with her three remote controls: the first one to switch her TV set's video input (What?), the second and the third to switch channels? As if existing remote controls (disk player, video recorder, TV and stereo) were not confusing enough... Is it *really* too much to expect technology to be user friendly? And *all* she wanted was to watch a TV show.

Is it really too much to expect technology to be user friendly?

For a while, we leave our confused (and, at the moment, dissatisfied) customer alone with her disappointment, and take a closer look at the prerequisites that can make customers' lives easier – or worse, if not applied properly.

4 Approaches to Open Broadband Access

Technically speaking, the open-access model can be implemented in several ways, with different roles and obligations for the involved parties. Beyond the traditional wholesale model, taken as the basis, the open-access model appears in several flavours:

- Two-tier open-access model,
- Three-tier open-access model,
- Integrated open-access model.

4.1 The Traditional Wholesale Model

In the well-known, traditional wholesale model, a single service provider offers its service bundle over the network provider's resources (Figure 3).

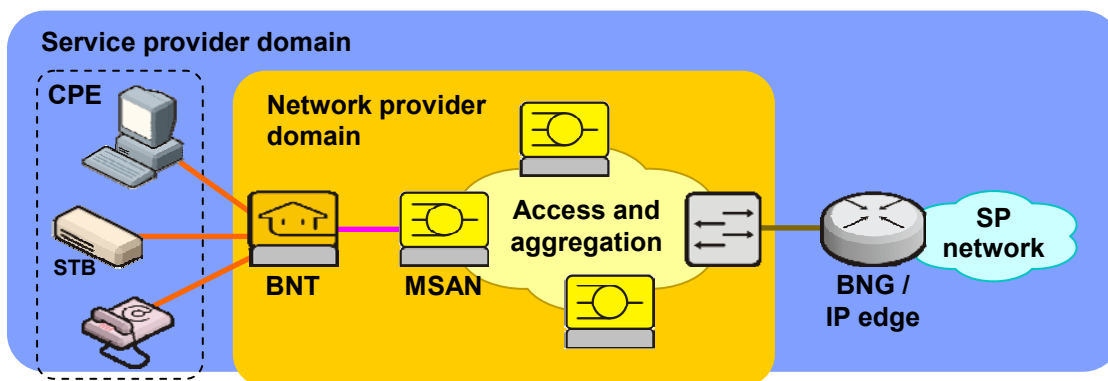


Figure 3: Traditional wholesale model

The service provider (SP) is responsible for providing its customers with all and any services that they require – the one-provider-does-it-all concept. The customers cannot choose services from different SPs, they can only choose between SPs. Switching to another SP means switching complete service offerings.

**Wholesale:
One SP does it all**

While the broadband network termination (BNT) is in the network provider's domain, the CPE (like set-top boxes) is owned by the service provider. Choosing another SP implies replacement of the CPE.

The traditional wholesale model introduces competition between SPs, but not between the individual services of different SPs.

4.2 The Two-Tier Open-Access Model

In the two-tier open-access model, several service providers offer their services over the network provider's resources (Figure 4).

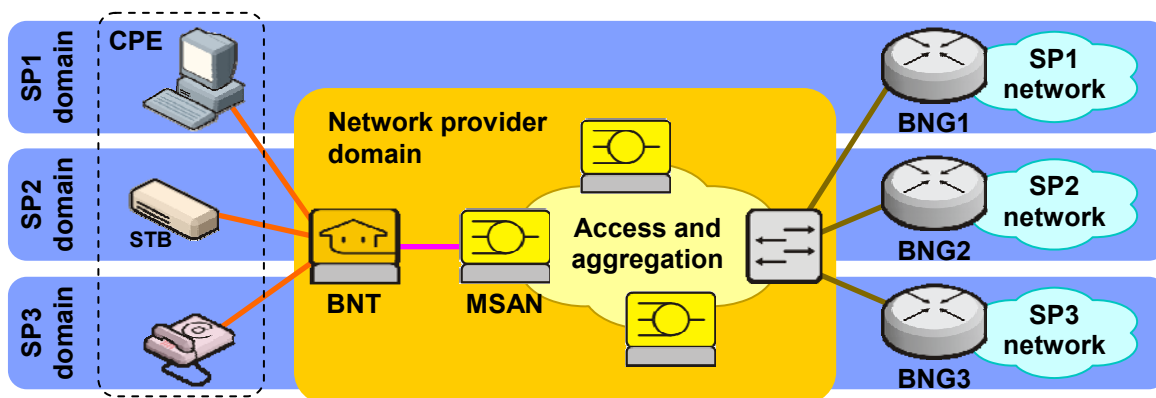


Figure 4: Two-tier open-access model

Individual SPs provide to the customers only the services they are specialized in. They all maintain their service networks individually, and provide their own broadband-network gateways (BNGs) as the connection points for the services they offer over the NP's network.

The customers can choose services from different SPs, and even collect them (like the imaginary customer in the above example). However, since the CPE is owned by different SPs, services cannot be integrated on the CPE, and customers get several devices of the same kind from different SPs (e.g., two set-top boxes). If customers just choose another SP, they have the CPE replaced.

**Two-tier open access:
Choosing another provider
implies replacement of CPE**

The network provider's BNTs and aggregation switches are the points where all the SP's services converge to the NP's transport platform. This means that matching (sometimes conflicting or incompatible) interests and configurations becomes the burden of the network provider.

4.3 The Three-Tier Open-Access Model

The three-tier open-access model is similar to the two-tier model, except for the introduction of the third and intermediate party, the service integrator (Figure 5).

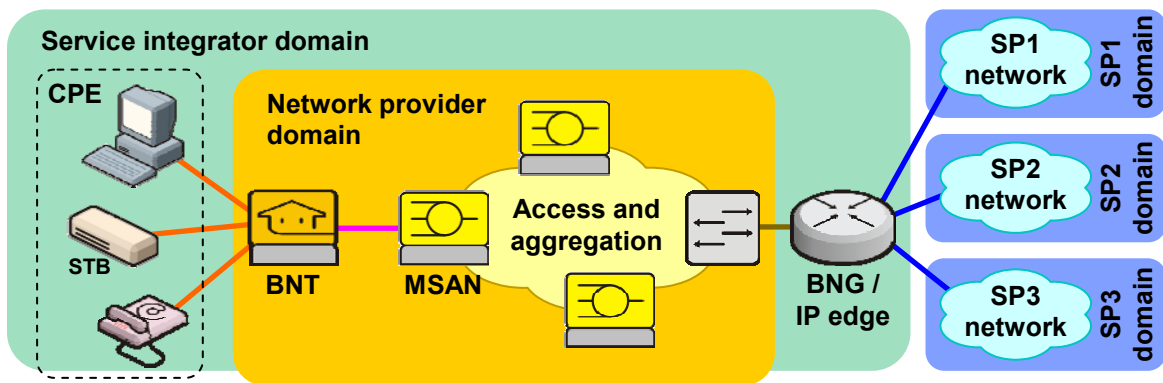


Figure 5: Three-tier open-access model

The service integrator (SI) provides its own BNG as a connection point for the services that individual SPs offer to customers over the NP's network. The responsibility for service integration (matching the interests and configurations of individual SPs) becomes the burden of the service integrator.

Customers can choose services from different SPs, and even collect them. But since the CPE is owned by the SI, it is not replaced when the customers choose another SP. Similarly, if customers collect services of the same kind from different SPs, they keep their existing CPE since the services are integrated by the SI, and customers use only one device of the same kind per service type (e.g., only one set-top box). The specifics of the individual SPs are hidden from the customer by the SI.

**Three-tier open access:
Customers collect services
and keep their CPE**

To the NP, the SI acts as a wholesale SP. In this way, the NP's business model is the same as with the

traditional wholesale model. On the other hand, however, three parties in the three-tier model share the income instead of two parties (present in the traditional wholesale model and the two-tier open-access model). Does this imply lower revenues for the providers – or higher costs of the services?

In addition, the involvement of three parties into the service delivery may bring delays in introducing (new) services and SPs, and make fault localization difficult without sophisticated operations, administration and maintenance (OAM) mechanisms.

4.4 The Integrated Open-Access Model

The integrated open-access model eliminates the need for an intermediate, service-integrating party: the network provider itself takes over the role of the service integrator (Figure 6).

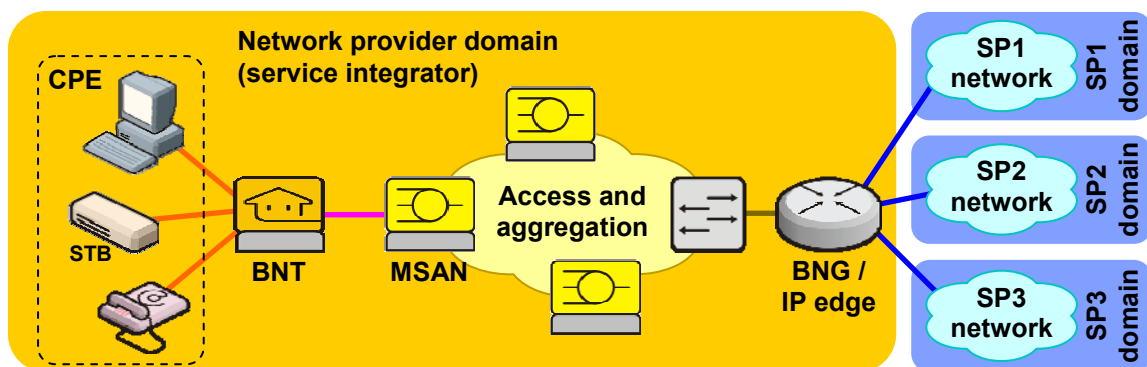


Figure 6: Integrated open-access model

The burden of service integration, taken on by the NP, comes with a benefit. The NP provides its own BNG as a connection point for SPs' specialized services – therefore, it may also set the rules for connecting to its BNG and the traffic properties of services to the SPs. In this way, service integration becomes an easier undertaking for the NP. What is more, by being given the control of the service transport, the NP can efficiently optimize the use of its networking resources.

Customers can choose services from different SPs, and even collect them. But since both the BNT and CPE are owned by the NP, the CPE is neither replaced when customers choose another SP, nor multiplied when customers collect services of the same kind from different SPs. Customers keep their existing CPE, regardless of their choice of individual SPs. The specifics of the individual SPs are hidden from the customer by the NP.

Owning both BNT and CPE and having them under control also implies that the NP is able to avoid the possible interoperability headaches and/or costs. The NP can use BNTs that are optimized in terms of functionality and cost – the latter being a sensitive issue for new players in the broadband-access market.

**Integrated open access:
NPs control transport and
optimize the use of their
networking resources**

Compared to the three-tier model, the integrated open-access model is more attractive to the NP and SPs: only two parties share the income for a service, not three. And it brings services to customers at no

higher cost, giving them a choice of services without CPE multiplication or physical replacement.

4.5 And the Winning Model Is...

A comparison of the three open-access models is rather straightforward: each of them may be assessed from the perspective of each link in the service-delivery chain: service provider, service integrator, network provider, and the customer. To any of them, different models bring different gains and costs, with differing ease of use or operation. Although the integrated open-access model may appear to be the best compromise, the choice of open-access model should be made carefully.

Finally, the winner of the selected open-access model should always be the customers. Not only can they switch service providers – they can also switch to another network provider, if disappointed with the service offerings and their quality.

Returning to our confused and frustrated imaginary customer from the above example – what can she do differently, if given an opportunity by a more customer-friendly business model from her NP?

So she heard about a great TV show on Channel X, which is not on video provider Alpha's list. Now she uses the web or her existing set-top box to access the NP's service-selection portal, and learns that Channel X is available with video provider Omega. Informed of both the service and its price, she marks a few checkboxes and confirms her choice. A few moments later, she is able to watch Channel X using her existing equipment. If she does not like the show, she will cancel the subscription. It is as simple as that.

IP-based broadband services can be and should be simple to use and customer friendly

At the service-selection portal she may also learn about new models of set-top boxes that her NP has made available, and decide to choose one more pleasing to her eye. If she can choose her cell phone, why should she not be able to choose her other consumer-electronics devices?

5 It Cannot Be That Simple, Can It?

Actually, IP-based broadband services can be simple to use. They can be customer friendly, and they should be designed for simplicity of use. Customers want to use their services, not study their technical background or the providers' business models. They require to be given the choice of services, as they want them and when they want them. And they get easily annoyed and discouraged if services that they are used to, suddenly become unreasonably complex and hard to use.

Of course, the technical details of the implementation of open broadband access require a lot of engineering effort by a knowledgeable and qualified workforce. Nevertheless, ignoring customers' expectations will lead to nothing but failure. Only a well-considered business model with properly designed devices may enable the success of parties in the service-delivery chain: service providers, service integrators and network providers.

6 Abbreviations

BNG	Broadband Network Gateway
BNT	Broadband Network Termination
CPE	Customer Premises Equipment
EU	European Union
IP	Internet Protocol
IPTV	Internet Protocol Television
MSAN	Multi-Service Access Node
NP	Network Provider
OAM	Operations, Administration and Maintenance
SI	Service Integrator
SP	Service Provider
STB	Set-Top Box
TV	Television



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