

Open-access networks

Enabling improved service-take-rate

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1 Open-access networks – an introduction

A boost to service development and service-take-rate, efficient sharing of risks and revenues, efficient sharing of network resources, and the possibility for end-users to choose among multiple service providers. The business case for open-access networks looks promising. Broadband network owners and service providers around the world are discovering the financial benefits and the increased market efficiency associated with establishing open-access networks.

A fundamental distinction from traditional access networks is that in an open-access environment ownership of the actual network infrastructure is separated from the services – services from multiple service providers. This shared approach opens the possibility for and encourages service development – separated from all issues regarding the underlying technical platform, on which the services are delivered. In other words, the network becomes a habitat in which a diverse flora of services can thrive. Such an emphasis on service development is exclusively to the benefit for the continuous development of the broadband access society, and it benefits all parties involved: network owners, service providers, and end users.

In order to increase the service-take-rate, attractive and valuable end-user services are important. A challenge for many service providers is to raise each customer's "consumption" of broadband services (known as the "Average Revenue Per User", or "ARPU"). An open-access network is a catalyst to service development, and combined with end users' ease of use, this caters for an increased service-take-rate, and thus improved ARPU.

An open-access network lays the foundation for:

- Service development, which has a positive impact on service-take-rate and thus on ARPU for both network owners and service providers.
- A shared approach to the risks and revenues associated with ownership of network infrastructure, including sharing the revenues from the increased service-take-rate.
- A possibility for end users to choose services from whichever service provider of their choice – anytime.

This document describes the reasons for deploying an open-access network. What are the implications and how does it affect service innovation? It also presents some of the basic technical requirements for the underlying network platform.

2 Why open access?

There are many aspects to consider when discussing an open-access network and an open-access business model. Some aspects are related to business while others are technical. It is important to incorporate business aspects right from the beginning when planning a broadband network that is to be capable of providing open access. Business should determine technology, not the other way around, where the business needs to adapt to limitations in the technical platform. Some of the most commonly highlighted advantages of an open-access network are listed below.

2.1 Sharing the risks and revenues

The investment associated with delivering a specific service to the end users has traditionally resided with the service provider. No-one else is prepared to deploy a broadband network that will be exploited by someone else for service delivery – unless it is an open-access network. The split ownership ensures that investment in the open-access infrastructure is moved from the service provider to the network owner. This is exactly the reason for building an open-access network – the network owner bears the investment for the infrastructure, and charges the service providers for its use. The network owner is analogous to an owner of a highway, and the more service providers that use it, the higher will be the revenue of the network owner.

2.2 Service provider boost

In an open-access environment there will always be room for both established service providers and for newcomers to establish new and enhanced services.

For the network owner it is significant to attract service providers who provide attractive services, since an open-access network without valuable services is not worth anything in the eyes of the end user. Marketing campaigns to attract the most prestigious, high-profile service providers are important in this phase. A cost-efficient network platform for service administration is vital and may be an absolute requirement from a service provider in order to consider the network for their service distribution.

Service providers with a widely recognised brand-name will attract other providers, and the open-access network will become admirably positioned as a “hyped” network, with service providers lining up to join it.

2.3 Service development and service differentiation

In an open-access network where the platform architecture allows control and management on a service level, service development is encouraged, resulting in extended service variation. These new and enhanced services may come from service providers who are already part of the network or by completely new providers.

Service differentiation and service packaging are efficient ways of extending the service offering, which can be used to customize services and address certain end-user groups.

Service development is an important prerequisite for a well-functioning open-access network, as this grows the number of services available for the end users to subscribe to, in other words it is vital to grow the service-take-rate.

2.4 Increased service-take-rate

One of the goals of broadband access players is to increase the amount of services that each end user consumes – known as the “service-take-rate”.

Consider an example in which a person spends \$60 on broadband services. The ambition is to make this person increase his/her broadband consumption and spend at least \$100 on broadband services. How can this be achieved? One method to reach this is by increasing the number of services available for the end user to subscribe to. This can be achieved through service development, service differentiation and/or service packaging, as is mentioned above.

An open-access environment encourages a higher manifold of services, and this stimulates end users to spend more on broadband services. The increased spending on broadband services could come from services that they previously obtained somewhere else, or it could come from broadband services that they did not even consider earlier such as e-learning, e-health, home surveillance, etc. It is the goal of the service provider, and network owners, to displace an end user upwards in the staircase shown in Figure 1.

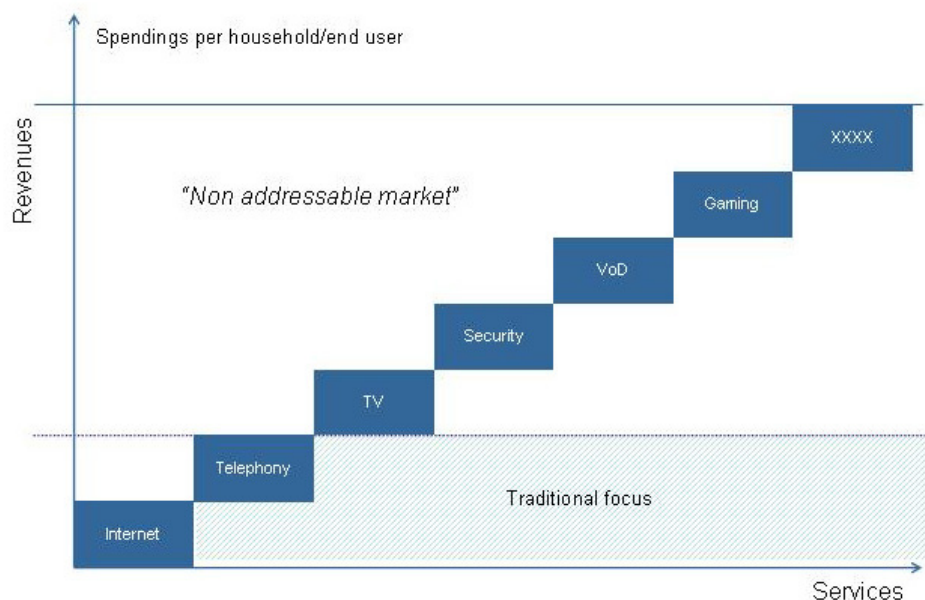


Figure .1 Spending on broadband services per household/end user. The aim is to displace the end user up the staircase, making them increase their spending on services from their broadband connection.

2.5 End-user flexibility

The introduction of end-user flexibility is a commonly highlighted advantage of open-access networks. “Lock-in” is avoided. (“Lock-in” describes the situation in which an end user can subscribe only to services provided by the network operator, who in most cases is the only service provider in the network. This is often the case in traditional access networks.) End users are given the possibility to choose from a variety of services from a multitude of providers, and this opportunity in itself will attract both new services and new service providers.

2.6 Influencing local and regional development

The socio-economic influence of an open-access network should not be under-estimated. In an environment in which third party service providers are given access to a common infrastructure, organisations with local interests might see an opportunity to offer services with specific connection for a community or a region, such as the edited highlights of a local football game. This contrasts with the situation in metropolitan areas, where the large concentration of potential end users will most often attract service providers with a more national or global focus.

The “digital divide” becomes clearly visible in such circumstances, and the open-access network concept may tilt the balance from rural stagnation to rapid local development. Local communication within the boundaries of the open-access network is inexpensive, and local government will thus be able to offer invaluable support to local business by establishing such an open and neutral platform for communication.

3 Key features of an open-access network

The characteristics of an open-access environment are that it must be open to many service providers and it must be neutral in terms of competition. To fulfil these characteristics, requirements are put on the network platform that carries the services. Two of the most important factors are how to achieve sufficiently efficient administration of services throughout the network, and how to allow for efficient routing of traffic.

3.1 Efficient service administration

The first of these factors concerns the administrative system. This system in an open-access network handles the mapping of services to end users. The service mix is highly individual, and the system must be able to reconfigure subscription in a manner that is both secure and efficient. Cost efficiency is one important aspect here. The comprehensive number of configurations involved when end users activate, deactivate and/or change their service subscriptions need to be performed with a high level of automation. A manual handling of the processes involved with configuration would be far too time consuming and thus expensive. The administrative system controls traffic and reports usage to the service providers, who subsequently charge the end-user. Security and other technical features are also important. The system should be able to control all traffic streams through the open-access network and prevent any unauthorised use of services.

It is important that the system can support control at service level, control at access level is not optimal for an open-access network. An administrative system that allows fine-grained control of services in the network will make it much easier to manage service differentiation and packaging, as this requires manageability per service, e.g. change of bandwidth for one service should not affect the available bandwidth for another of the services the end user subscribes to. If control can be supported only at access level, this may result in changed service parameters for one service when the service configuration profile for another service offered over the same access line has been adjusted.

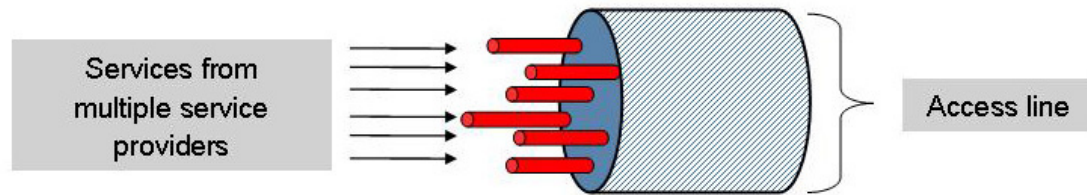


Figure 2. The ability to control each individual service from each service provider – instead of the whole access line – is important for the possibility to develop and differentiate the services.

The system also needs to keep an eye on aggregated traffic as well as individual bandwidth allocation and usage, it must report any deviations and raise an alarm at the network control centre when this is needed.

Few, if any, products and system tools in the networking industry have been designed with these specific requirements in mind. It is therefore vital to evaluate whether a technology really has the potential to satisfy these expectations, and it is vital to study any implementations that are available, before deciding which vendor to choose.

The telecommunications system can be looked upon as a large number of interconnected networks, as can the Internet. An open-access network can be regarded as one of these, an independent network connected to several other networks. The most significant difference between an open-access network and a traditional access network is that the open-access network is designed to act as a transit area for traffic from many service providers, traffic directed at individual end users.

An open-access network merely acts as an extension for other services, and it should therefore be as transparent as possible. Furthermore, it should be possible to handle a very large number of reconfigurations in the open-access network, since each end user in the network will have the opportunity to create relationships with several different service providers. This rapidly becomes a very demanding task. Conventional tools for network management and traffic shaping have been designed for traditional public networks or enterprise use, and are usually not well-adapted for the demands of open-access networks. Public network tools may contain advanced billing features, but are usually customized to fit the internal structure of one large operator network. Enterprise tools may have advanced features for traffic shaping and ensuring the quality-of-service (QoS), but these tools seldom have billing functions.

The appearance of open-access networks has given birth to a new type of administration tool, developed especially to offer easy set-up and mass-scale configuration of many services from different sources, while being at the same time able to handle real-time billing based on several different metrics. These tools have been customized to fit the role played by a network owner responsible for the day-to-day operations and maintenance of the network.

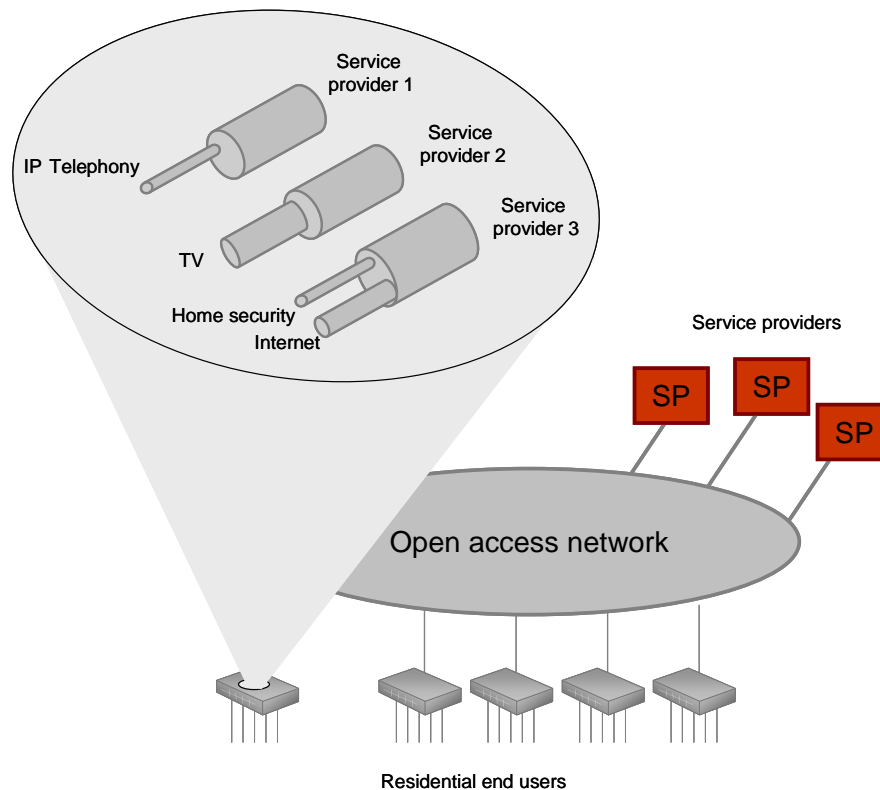


Figure 3. Administration of an open-access network is a highly demanding task. The administrative system in an open-access network must be able to handle a very large number of end users and for everyone of them it must configure an individual mix of services from different service providers. This must be done in a highly secure and efficient way, while at the same time keeping control of technical parameters, such as the available bandwidth.

3.2 Local routing

The second important factor in an open-access network concerns routing, and its optimization. Local traffic in the network should normally be routed locally in order to achieve the highest possible efficiency. This contrasts sharply with most routing currently performed at the operator level, which is based on the idea of independent operator networks interconnected with others via centralized peering or presence at certain Internet exchange points.

This will not be an issue for two end users in the open-access network communicating with each other who are customers of the same service provider. Problems may arise, however, when they are customers of different service providers. The traffic in this case will normally be handled as transit traffic, which is “up-linked” via a gateway to the sender’s service provider network. An exchange between the providers will take place “somewhere else”, and the traffic will then be sent back into the open-access network and to the receiving end user via the other provider.

4 IP in an open-access network

Internet technology and the Internet protocol play a key role in nearly all modern network infrastructures. Open-access networks are no exception. The beauty of IP is that it separates underlying network infrastructure from higher level services – and creates an unequalled level of flexibility for the network owner. This means that we can in practice attach any physical cable or radio interface to the network that uses signalling that follows the rules of IP. The same applies for IP services, which will run on any network based on an infrastructure that uses IP.

This flexibility is critical for open-access networks, and the use of IP technology creates an enormous advantage for such networks. The advent of IP telephony and advanced methods for IP streaming of video content has made it possible to use IP as a general technology for distributing triple-play services (Internet, telephony and TV).

4.1 The importance of local routing

The possibility to perform local routing between end users, independent of their Internet service provider, is an important part of the open-access network concept. Routing local traffic along the shortest path, which may cross traditional administrative boundaries, is evidently more efficient than the procedure in which each service provider routes all traffic into its own backbone network, for exchange with other providers at some central peering point.

In the extreme case, end users who are physically close neighbours in the open-access network may send bandwidth-hungry video streams between each other only to find that their traffic has been sent to a remote, regional (or even national) peering point, and then back again. This introduces a delay, it may exceed bandwidth limitations for the end-users, and it is not an efficient use of network resources.

There are several technical solutions for local routing between end users in an open-access network. The important point to make here is that local routing is possible, even mandatory, for local traffic even if the traffic passes between different service providers. This feature will stimulate local use of the network, and it will in the long run optimize traffic load across both the open-access network and the service-provider networks.

5 Summary

An open-access infrastructure provides a networking environment in which service development, service differentiation, and service packaging are encouraged. These opportunities will become reality provided that a network platform designed with this in mind is available, and – even better – the services will be delivered in a cost-efficient manner.

The larger variety of broadband services offered will stimulate end users to consume more services, thus improving the service-take-rate, and the ARPU. The simplicity with which end users can activate services will further stimulate their broadband service consumption.

All services, independently of the service provider that offers them, are delivered over a shared infrastructure, owned and operated by an independent network owner. The shared risk/revenue approach allows a separation of the network infrastructure from the services, which is a prerequisite for the open-access business model.

The most critical question is, without doubt, administration. No open-access network will function properly without the support of a well-designed control and administrative system. This must be designed for the purpose. It must be able to handle a large number of services from several service providers, address them individually to a mass population of end users, and it must operate in a reliable and secure manner. It must be capable of handling usage statistics on an individual, per-service scale, in order to deliver correct basic data for billing. Few, if any, general management platforms are currently capable of this, which paves the way for another type of platform designed with this in mind.