High-quality video applications over IP

The growth of the Internet and the increasing use of video clips and web-casting has paved the way for an IP-centric view on service delivery, even for video. However, the transmitted quality when downloading and streaming video over the Internet has so far not matched the normal broadcast standards - mainly due to the bandwidth bottleneck. But now the combined deployment of broadband access networks, a proper service platform, and a Set-top Box (STB) makes it possible to deliver high-quality video to residential customers.

Based on standard protocols

A Video over IP solution is based on standard protocols, independent of access type as long as IP and sufficient capacity can be provided to the home. However, the network must support IP multicasting in order to distribute broadcast programming such as classical live TV, premium channels, Pay Per View (PPV), and Near Video on Demand (NVOD). The STB in the home acts as an interactive gateway to the services that are received and displayed on the TV set.

Scalable solution

The solution is scalable, meaning that the operator can start with a small number of subscribers and a limited investment in equipment. It is also possible to start with a limited number of services in a cost-efficient way, like broadcast of TV channels only. At a later stage, more services can be added.

Ethernet DSL Access for Video over IP

Ericsson has gained substantial experience in providing high-resolution TV services over IP networks, concentrating on ADSL and Ethernet-based broadband access networks.

Ethernet DSL Access (EDA) is a broadband access solution that utilizes switched Public Ethernet in the access network, deploying an “IP all the way” system that supports a scalable and integrated service approach for high-speed data, video and voice.

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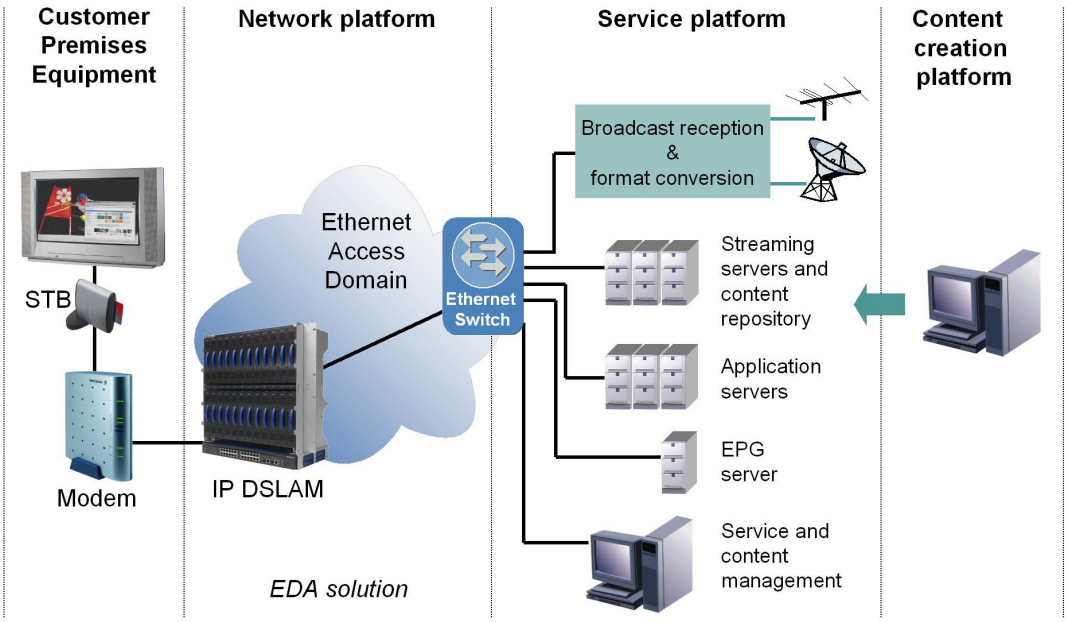


Service potential

From a service point of view, the potential of Video over IP is significant. The creation of new services can benefit from a combination of digital TV, Internet and web technology.

A wide range of revenue producing services can be offered:

- **Classical TV**; allows end-users to view classical live and free-to-air TV channels or subscribe to premium packages or pay TV channels
- **Media on Demand**; services allowing the end-user to purchase and access content either by joining a Pay Per View (PPV) or Near Video on Demand (NVOD) multicast service, or an individual interactive unicast service like Video on Demand (VOD)
- **Enhanced TV**; interactive services combining TV programs with synchronized data content, such as information or advertising services that provide additional information and possible impulse retail, voting, gaming, and so on. One part of this is the Electronic Program Guide (EPG), which allows users to view present and future programming information
- **Internet services**; providing web-based services like Internet surfing, using the TV set as monitor

Furthermore, it is also possible to provide a “walled garden” service portal, offering a variety of content and services provided by the service operator. Examples of services are t-commerce (TV e-commerce), Internet banking, information services, e-mail, and so on.

Solution framework

The above illustration shows the principal reference architecture of a Video over IP solution within the Ericsson Ethernet DSL Access (EDA) solution.

A solution for Video over IP consists of the following main parts:

- **Customer Premises Equipment;** a Set-top Box (STB)
- **Network platform;** a broadband IP access and backbone network supporting IP multicast and Quality of Service (QoS)
- **Service platform;** contains the servers and systems that implement and deliver the broadcast and interactive TV services to the end-users. Includes service management of users and content, service offerings, charging data, and so on
- **Content creation platform;** providing the tools and processes needed to create and maintain the service offerings of the service platform

Customer Premises Equipment

The Set-top Box (STB) is the interface to the TV set and the subscriber's gateway to the TV services. Usually the STB has an Ethernet network interface, which implies that an ADSL modem is needed in front of the STB.

Network platform

The transport of video is based on MPEG-2 SPTS over IP. The illustration below shows a network example based on the Ethernet DSL Access (EDA) solution.

The EDA solution enables a multi-service access scenario in which all end-users are able to access different services simultaneously, for example, Video over IP and best-effort web access. The Quality of Service (QoS) for each service is ensured by Ethernet prioritization and ATM QoS mechanisms. The EDA solution offers services like Bandwidth on Demand (BoD) and supports multicast (IGMP snooping) for video broadcast.

The EDA IP DSLAM is placed in an access network that in this case offers two services: Internet access via an Internet Service Provider (ISP), and video services via a Video Service Provider (Video Head-end). The services are separated by Virtual LAN (VLAN) in the Ethernet Access Domain and by ATM Permanent Virtual Circuits (PVCs) on the ADSL line.

Service platform

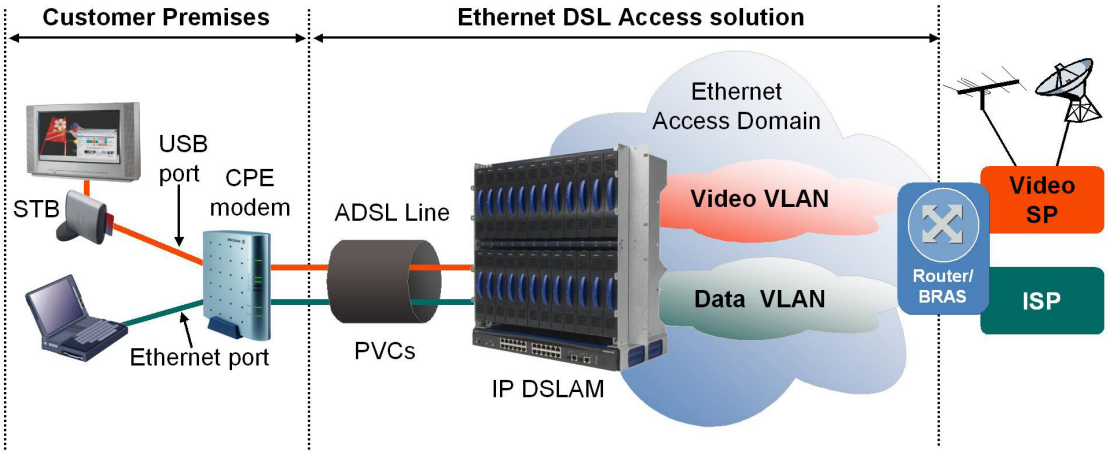
The service platform consists of a broadcast and media conversion part and of servers for applications and media delivery. Content delivered to customers can be divided into two main groups: live feeds and stored content.

Real-time live feeds are broadcast programming received and converted to a format suitable for instant delivery over IP multicast, that is an MPEG-2 Single Program Transport Stream (SPTS) mapped into Ethernet frames in an IP stream.

Stored content is used for multicast services such as PPV, NVOD and for interactive unicast services such as VOD. The content is stored in a media repository and transferred to a local storage on the appropriate video server on a scheduled basis. The content is pumped from the video server in IP multicast or IP unicast formats, depending on the type of service.

A navigator or portal is used to access the different services. The Electronic Program Guide (EPG) server holds the present and future programming information and informative data related to specific programs.

Application severs host the applications necessary to run the different services. These could be applications for different types of interactive services and enhanced TV.



The service manager must handle subscriber data and billing information. The content manager keeps track of the stored video content and the transfer from the video repository to the video server.

Ethernet switch (Layer 3) connects the different components in the service platform and provides the interface to the network.

Content creation platform

Today, a rich variety of mainstream authoring tools are available. The content creation platform includes media preparation tools that support many different tasks, such as converting images from one format to another, creating web pages using HTML and JavaScript, offline video editing, and offline MPEG-2 encoding of content.

Management systems

Management functions, such as subscriber provisioning, fault and performance management, billing, and customer care, are often shared with other services in an IP network and can be handled outside the Video over IP solution itself.

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- EDA 2.0 and EDA 2.1

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