

# WHITE PAPER: An Introduction to Building IPTV

June 2009

Building IPTV helps organisations maximise the value of TV and video content by delivering it over a building or campus IP network (LAN) to TVs, PCs, and AV display equipment. It offers superior quality, scalability, manageability, and cost effectiveness compared to traditional analogue audio-visual (AV) solutions that require a separate network. Organisations can leverage Building IPTV to affordably improve employee productivity, enhance customer experience, and create new revenue streams

## QUESTIONS ANSWERED IN THIS WHITE PAPER...

- What is Building IPTV?
- Why is it replacing traditional AV solutions?
- What are its benefits for organisations?
- Who is using Building IPTV?
- How does it work?





### WHAT IS BUILDING IPTV?

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Internet Protocol Television, or IPTV, refers to television that is distributed over an IP network—the same kind of network people use to surf the internet and exchange emails.

In reality, IPTV technology enables an organisation's IP network to carry much more than just television. With IPTV, you can easily distribute terrestrial and satellite television and radio, videos/DVDs, digital videos on-demand (VoDs), digital signage, information boards, and web content throughout your facility. All of this multimedia content can be viewed on standard and high definition TVs and various kinds of AV display equipment, as well as PCs on every desktop.

### The Four Faces of IPTV

Anyone who has watched videos on YouTube.com or a TV programme over the internet is already familiar with some form of IPTV. However, this has very little to do with how organisations use IPTV, although the base technology is much the same.

In reality, there are four basic kinds of IPTV, three of which are oriented to consumer needs and not suitable for organisational use.

- Internet IPTV (consumer)
- Telco IPTV (consumer)
- Broadcast IPTV (consumer)
- Local or Building IPTV (organisational)

The major difference is that consumer-oriented IPTV is delivered via the internet, which organisations wish to avoid for reasons of quality, access control, and bandwidth cost.

**Internet IPTV** is delivered over the internet to and from anywhere in the world. An example of this would be home videos on YouTube.com or TV programmes on Zattoo. As this type of IPTV travels over the public internet, there is no effort to optimise bandwidth or content delivery. Videos are easily displayed in a web browser but usually at low quality and with delays in transmission.

**Telco IPTV** is delivered by your Telecommunications provider (phone/internet/cable). Often the television programs you watch at home have travelled across an IP network in the same way your internet (and now some phone) services are delivered. Even though the content comes in over the same wire as your internet service, Telcos implement quality of service (QoS) mechanisms on their network that ensure reliable delivery of live and on-demand content. Examples of Telco IPTV in the United Kingdom are BT Vision and Tiscali TV.

**Broadcast IPTV** is when television broadcasters transmit their programming onto the internet for public viewing on personal computers. Many channels are broadcast for free; others will charge a fee for subscribing to their service. One example of Broadcast IPTV is BBC iPlayer. Unfortunately, broadcasters have no control over bandwidth or quality of service.

**Local IPTV**, also known as **Building IPTV**, is designed to distribute television and video across building and campus networks over a local area network (LAN). The content is injected directly into the building LAN rather than through the organisation's internet firewall. For organisations, this has three fundamental advantages over consumer-oriented forms of IPTV:

- It leverages the comparatively limitless bandwidth of organisational LANs to deliver much higher quality to many more users.
- It allows much more stringent access control—not just by channel, but by business unit, department, group, or even individual user.
- It does not consume any internet bandwidth, which is far more costly than LAN bandwidth.



## WHY IS BUILDING IPTV REPLACING TRADITIONAL AV SOLUTIONS?

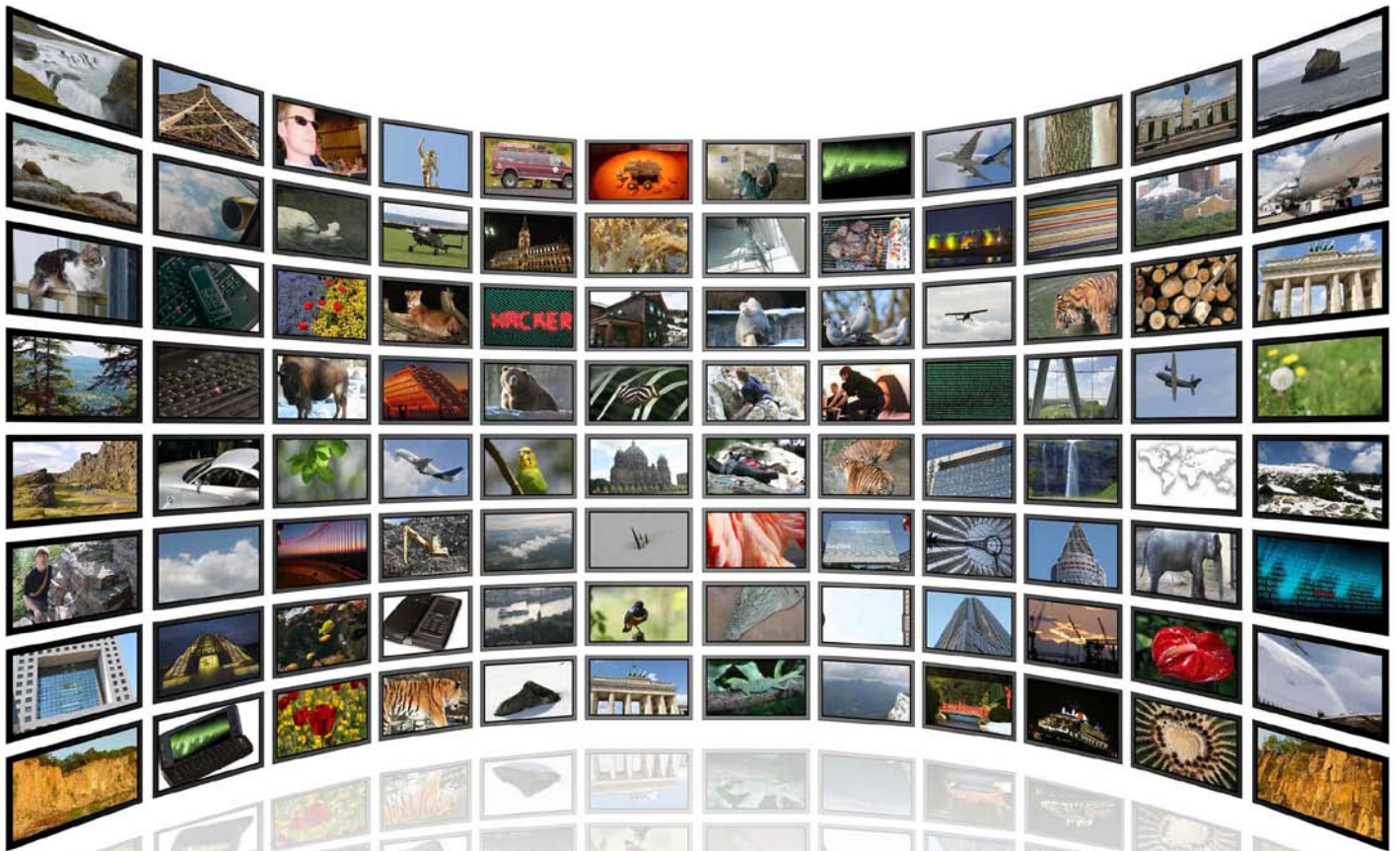
Traditionally, audio-visual content has been delivered using a separate analogue coaxial or CAT-5 network. The rapid development of IPTV technologies, which enable IP networks to deliver the same content along with standard services such as email, internet browsing, and access to business applications, has rendered such networks redundant. Organisations in every industry are taking advantage of analogue equipment end of life, refurbishment or new-build projects to scrap their analogue systems in favour of Building IPTV.

The major motivation for moving to Building IPTV is higher quality at lower cost. Recent evidence suggests that an IPTV implementation is up to 78% more cost-effective than traditional coaxial TV distribution.<sup>1</sup> The reasons for this are manifold, including the ability to deliver content to many more users without picture degradation, the elimination of redundant hardware and cabling, easier management, and less costly expansion. The table below compares traditional AV to Building IPTV for three major AV functions to illustrate the advantages of IPTV.



<i>Traditional AV</i>	<i>Building IPTV</i>	<i>IPTV Advantages</i>
Distributing video via individual videotapes or DVDs	Storing video digitally for on-demand viewing; simultaneously available for multiple users	<ul style="list-style-type: none"> <li>• Flexible storage &amp; archiving</li> <li>• No need to store, manage and transport videotapes or DVDs</li> <li>• On-demand access helps increase use of resources</li> <li>• High quality delivery</li> <li>• Content not at risk to loss from degradation of the videotape or DVD medium</li> </ul>
Distribute live TV and recorded video via separate analogue coaxial or CAT-5 cable network, subject to electrical noise, signal weakening, and limited channel capacity	Stream broadcast or DVD-quality video and audio over your existing local area network (LAN) infrastructure without signal weakening and interference.	<ul style="list-style-type: none"> <li>• Uses existing network infrastructure</li> <li>• No need for separate video network</li> <li>• Consistently high audio and video quality independent of number of users</li> <li>• Supports virtually unlimited number of users</li> <li>• Deliver unlimited number of channels simultaneously</li> </ul>
Send in-house news by memo or email. Require personnel meetings to watch broadcast news on shared televisions	Stream live and stored video from inside and outside your organisation to every desktop as well as TVs or AV displays in common areas	<ul style="list-style-type: none"> <li>• Real-time information</li> <li>• Personalised information</li> <li>• 'Always on' information</li> <li>• 'Any time, any place, anywhere' information</li> </ul>

<sup>1</sup> Data based on recent cost comparison of coaxial TV network versus IPTV implementation by Eurosatellites



## WHAT ARE THE BENEFITS OF BUILDING IPTV?

Leading organisations regard live and recorded video as essential. In every industry it improves their ability to make better-informed decisions and to communicate more effectively with their internal and external stakeholders. Many industries also use it to improve the customer experience to help retain existing customers and acquire new ones, and to create new revenue streams by offering customised services. Building IPTV is simply a more cost-effective way of attaining these goals.

### Benefits of IPTV

- Most organisations already have a building or campus IP network capable of supporting video, making IPTV an incremental cost with a tremendous potential ROI.
- Using existing TVs, PCs, and AV display units without requiring a separate satellite/aerial signal distribution system within the building or campus significantly reduces cost
- Building IPTV allows the addition of new sources and users anywhere there is a network connection without picture degradation, for greater flexibility and scalability
- IPTV's scalability and ease of management promotes the rapid rollout of new TV, video and broadband services across the whole organisation in response to opportunities
- Bringing external TV and radio in through LAN rather than via internet saves costly internet bandwidth and preserves it for critical business use

- With Building IPTV all internet access to streaming content can be blocked at firewall for greater security and regulatory compliance
- Granular control of content access by group or user enhances security and regulatory compliance
- Building IPTV multicasting technology makes better use of LAN bandwidth for a faster ROI on network bandwidth investments
- Any PC can be converted easily into a TV with IPTV software that recognises the content on the network, immediately expanding the reach of organisational TV and video assets
- Building IPTV frees AV experts from mundane wiring concerns to concentrate on core competency: the user experience from source to display (e.g., content generation, digital signage, designing boardroom display systems or corporate studios, etc.)
- Building IPTV brings AV distribution under IT control for lower management costs and more efficient network planning

## WHO IS USING BUILDING IPTV?

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Many different kinds of organisations are already realising the benefits of using a building or campus IPTV solution to deliver quality TV, video, and audio content to users and customers.



### Construction

Skip the installation of a coaxial network altogether by integrating AV and broadcast media into the IP network with an IPTV solution. Increase flexibility and scalability for the client while decreasing the cost of the build.



### Corporate

IPTV in businesses large and small enables delivery of real-time news to inform decision makers, broadcasts to staff desktops, distribution of company information in public areas, simple and unified delivery of training, and staff entertainment. Many corporations use it to reduce absenteeism during popular public events by supplying live feeds to desktops and common areas (e.g., the Olympics).



### Education

Educational IPTV provides instant classroom access to a virtually unlimited global archive of instructive material in a wide variety of languages. Teachers no longer have to wait for tapes and discs to be returned to resource centres.



### Finance

Watch current events unfold from around the globe by distributing international and country-specific news channels for content that may affect share dealings and financial markets.



### Healthcare

Give patients access to television, radio and video at their bedsides. Display information in reception and waiting areas. Record procedures and operations for training and to protect against litigation.



### Hospitality & Leisure

Provide guests with world class in-room entertainment with the latest TV, news, music, films and sport from not only the country where the hotel is based, but from a guest's home country. Stream content to conference facilities, hotel bars and restaurants. Generate revenue by advertising room service, bars and spa/leisure facilities.



### Manufacturing

Use live video feeds from the factory floor for staff supervision and remote quality control inspection. Monitor live workflow to immediately highlight breakdowns and bottlenecks in the manufacturing process.



**Transport**

Provide airline, train and bus passengers with departure and arrival times, announcements and information, security procedures, and live news and entertainment throughout the transport facility.



**Venues/Stadiums**

Stream live coverage directly from the event stage or game pitch to TV screens around the facility so attendees never miss a second of the event. Display third party advertisements, match dates and merchandise information to generate future ticket sales and additional revenue. Provide live TV into hospitality suites.



## HOW DOES BUILDING IPTV WORK?

Figure 1 below illustrates the basic structure of a Building IPTV system. Words coloured in blue in the text are significant parts of such a solution, many of which are represented in the figure.

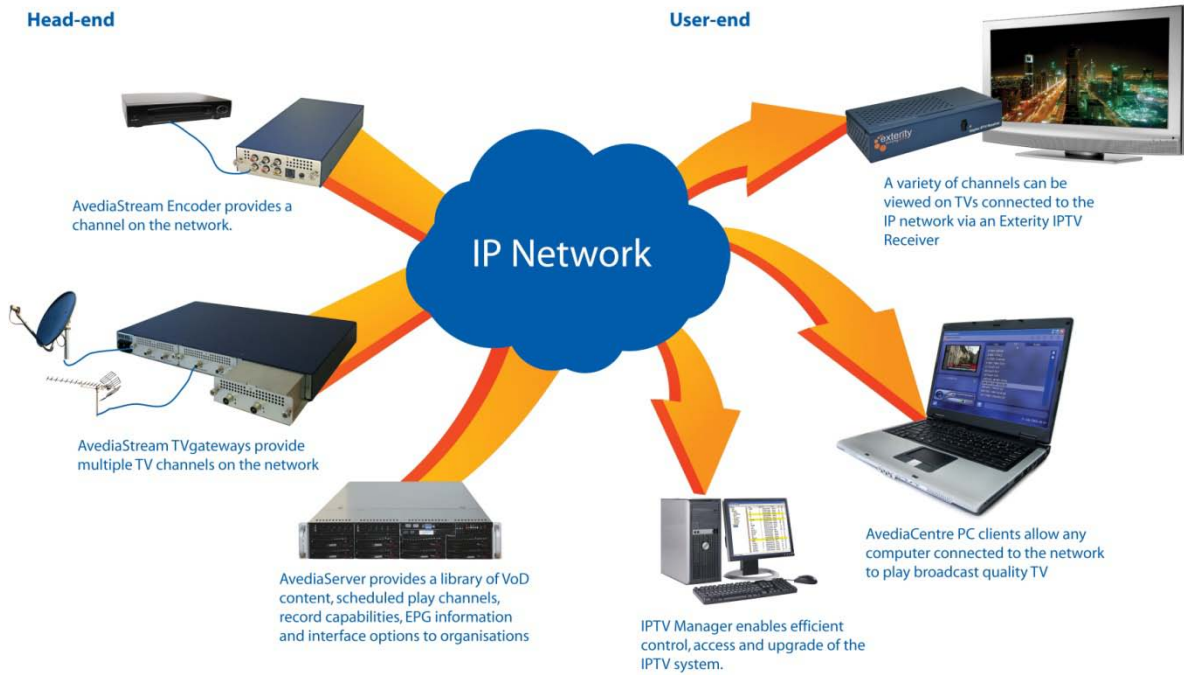


Figure 1: Example of an end-to-end building IPTV solution

An existing network can be turned into a complete IPTV solution and adapted to fit any size organisation, from a single school, office building or hospital right up to a geographically-dispersed enterprise or college campus with global connections. Within an organization, almost any device with a screen can be turned into a networked television using IPTV technology.

Sources of multimedia content are located on what is referred to as the “**head-end**.” The head-end is a collective term for devices that make content available for distribution: **TV gateways**, **encoders**, and **IPTV servers**. These are simply connected to the network to make broadcast media and non-broadcast AV sources available for consumption by encoding their output into standard MPEG formats, which are then available as “streams” on the network.

For those curious about the types of encoding used for IPTV, the common formats for streaming broadcast quality content are: **MPEG-2**, the predominant standard globally for TV transmission and DVDs; and **MPEG-4 H.264** which is designed to deliver the same quality at lower bitrates. **MPEG-4 H.264** is finding particular application in High Definition (HD) TV broadcasts and High Definition content encoding.

A **TV gateway** takes the output of a broadcast media source such as a **digital satellite (DVB-S/S2)** or **terrestrial (DVB-T)** service. It splits the broadcast signal into separate channels on the network using MPEG encoding.

An **encoder** converts the output of non-broadcast AV sources such as a video camera, a video player, or DVD player for streaming on the network.

An **IPTV server** deliver Video On-Demand (VoD) services from files stored on the network like any other form of content. They may also supply an Electronic Programme Guide (EPG) and a customisable user interface for accessing the content.

Once all this IPTV content is available on the network, it can be received by various AV devices such as PCs, televisions, and projectors. On PCs, **IPTV software** is used to view content. For TVs and other AV devices, **IPTV receivers**, also known as **set-top boxes (STBs)**, are used to decode the content that was sent over the network by the head-end. They convert the MPEG-encoded data into a format which can be understood by the receiving AV devices. Where a facility requires IPTV, phone, and internet in one place, a **“triple-play” set-top box** is used. It requires only one network connection. The TV, phone, and PC are all connected to the triple-play set-top box.

**IPTV Management software** facilitates the efficient administration of the IPTV system. It provides tools for discovering, configuring, and managing all the IPTV devices such as encoders, TV gateways, and set-top boxes. This includes the ability to filter viewing permissions and track who is watching what content.

Many IPTV solutions will integrate with existing AV and IT systems. Examples include control systems that allow channels to be selected from a control panel in an auditorium or integration with an intranet system which requires controlling access rights to varied content.

For smaller organizations with an existing network, an **end-to-end**<sup>2</sup> IPTV solution can be installed and put into use in a single day. Larger implementations may require weeks or months. However, so long as the network is configured in advance in accordance with the IPTV manufacturer’s recommendations, the installation time should NOT be lengthy.

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<sup>2</sup> “End-to-end” refers to an IPTV solution that includes all the hardware and software needed to run IPTV. Not all IPTV solution providers sell an end-to-end solution. Some will sell only part of a solution such as IPTV set-top boxes.

## ABOUT EXTERITY

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Exerity Limited was formed in 2001 to create products that deliver broadcast quality digital video over IP networks within buildings. Exerity's products represent a significant advance over the coaxial cable systems in common use today and are viable for deployment in both small and large-scale TV and video distribution systems. Exerity is headquartered just north of Edinburgh, Scotland, UK with additional offices in Reading, England, UK and Dubai, UAE.

Exerity equipment is exported to 17 different countries and territories, and to date, is installed in over 1,000 different organisations; these range from small schools and boutique hotels to large multinational corporations such as news agency Reuters HQ in London.



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