Cabletime’s MediaStar IPTV solution delivers media to distributed displays and desktops over Ethernet networks.

The IPTV network will need to be capable of sustaining high bandwidth, high availability multicast transport streams across multiple subnets, vLANs and sometimes WANS.

Ensuring you have the correct information to incorporate MediaStar’s IPTV solution to the network is the goal of this document. First by looking at the protocols used by IPTV in the Infrastructure then coming around to the needs of individual MediaStar products within that infrastructure.

A short section closes the document overviewing switch vendors and deployment considerations per vendor.

If you’re an engineer, project manager or consultant, this document is going to be a useful resource during the design, installation and commissioning of your IPTV solution.
The Media Manager software provides centralised management of the MediaStar IPTV solution with automatic detection of hardware, media streams and media file ingestion in a wide variety of formats. Media Manager provides full control over MediaStar devices with focus around content played by the Portal software and the 780 hardware players.

The IVOD Server facilities on-demand access to stored content distributed to the 780 hardware and Portal software players. All players have the ability to pause, resume and seek within played content.

The HLS Server distributes content to iOS or Android tablets, phones and other devices. Multiple Live Streams are supported to the server via HLS-enabled Encoders. Server storage facilities client rewind and pause.

The MediaStar IPTV Encoder is a bladed or standalone streaming media encoder. It supports SD and HD broadcast resolutions as inputs and encodes streams at SD 480i and 576i to HD 720P, 1080i and 1080p.

The MediaStar IPTV LAN-Caster is a bladed, chassis mounted Satellite, Terrestrial or Cable RF receiver. Each blade will stream to fifteen channels from a single RF multiplex with support for decryption via a CICAM module if suitable CAM decryption is available.

The 780 player is a versatile digital media decoder supporting network and local SD and HD media playback to broadcast standards. Dynamic tickers can be applied with timed and user selectable scheduling of media content.

Ports give users easy access to broadcast streams, HLS Live Streams and IVOD content via a simple graphical web page. Portal pages can easily be customised to match corporate logos and backgrounds.

Ticker Text software gives delegated users the ability to modify text displayed on the 780 player without access to Media Manager. A simple browser interface allows editing and generates the RSS feed downloaded by the player.
Media Multicasts
Media Multicasts are a bandwidth efficient method for distributing high bitrate media streams to many devices at the same time. Each media multicast is broadcast as a transport stream over UDP. Each is given a unique local multicast address and held in the IGMP configured infrastructure until a player makes an IGMP subscription to the stream address.

The infrastructure must ensure media multicast packets are not dropped or duplicated. UDP offers no end to end packet sequencing while PID sequencing within the transport stream only ensures correct assembly at the playback device.

Management Multicasts
Mediastar Management multicasts are low bitrate communications used for device discovery, sending control commands to batches of players, content sharing and synchronised media playback.

Mediastar management multicasts are broadcast on a reserved multicast address of 225.11.12.13 across a number of ports. All Mediastar devices and services IGMP subscribe to this address and can also issue these management multicasts.

The multicast destination ports range from 4318 to 4321. They are used by the receiving client to determine the type of request and whether to action instructions contained in the packet.

Device discovery multicasts are sent to port 4318.
Sipi commands for all devices are sent to port 4319.
Content sharing multicasts use port 4320.
Jump multicasts are sent to port 4321.

Multicast Convergence
Delivering media multicasts where an IPTV subnet has two bordering routers must not duplicate packets during convergence.

Multicast delivery mechanisms in an IPTV network must ensure there are no duplicate packets on subnets where IPTV is needed. Duplicate or dropped packets cannot be recovered and cause picture breakup or corruption.

IPTV media streams are delivered as multicast transport streams over UDP. UDP offers no end to end packet sequencing.

IPTV PROTOCOLS

Mediastar IPTV uses a variety of IPv4 protocols to deliver media and provide a unified content management platform.

IPTV can be configured on a single or multi-subnet LAN, with the recommendation that your design allows for routable communications to the wider corporate network from the outset. Even if it will initially be a dedicated LAN or vLAN.

MULTICASTS
Multicasts are the primary delivery mechanism for high bitrate IPTV media streams and low bitrate management communication. Both rely on IGMP for controlled delivery within the infrastructure.
IGMP
IGMP is a protocol made up of two switch based services that work to ensure only requested multicasts are delivered to network clients.

IGMP Querier
The IGMP Querier is a central and singular record of switch ports individual multicasts have been requested on.

The querier maintains a record of requested multicasts per switch port through join/leave requests and membership reports which are sent every few seconds to each port a stream is active on. Clients requiring the stream must respond to the membership report signalling ongoing requirement.

All IGMP communication to and from the querier are multicast 224.0.0.1, 224.0.0.2 with membership reports multicast to the stream address.

Snooping Querier
The snooping querier releases and closes multicast stream delivery to switch ports based on the communication it sees between the IGMP Querier and the clients.

The snooping querier is a service that needs to be active on every switch port in the IPTV network. It is entirely dependent on the communication between the IGMP Querier and the subscribed clients.

Streams are released on a port when an IGMP join is first received and continues to be released while membership reports for the stream are answered on the port. When a leave is received on a switch port the snooping querier waits for several cycles of membership reports to decide if there are still active clients for the stream on the port.

IGMP Fast Leave
Fast Leave assumes only one client is attached to any switch port. Any leave request results in immediate shutdown of the stream to the port.

Fast Leave is usually disabled by default. If Fast Leave is enabled for a port with multiple downstream clients a single leave request will shut down the stream to all clients connected to the port.

Fast leave should only be enabled by design.

MediaStar IPTV and IGMP
All MediaStar IPTV hardware and services support IGMP v2 and v3.

All MediaStar IPTV hardware and services will IGMP subscribe to the default management multicast of 225.11.12.13

MediaStar hardware and software players will IGMP join a multicast media stream when selected for playback. They will respond to ongoing IGMP Querier membership reports while playing the stream and send an IGMP leave when the stream is closed or deselected.
UNICASTS
Unicast delivers a single media stream to a single requesting client.

In a multi-client environment unicast places a higher load on the source hardware and network infrastructure. It is used for ad-hoc or on-demand media delivery.

Unicast media is delivered as a transport stream over UDP. Once more UDP offers no end to end packet sequencing. PID sequencing within the transport stream only ensures correct assembly at the playback device.

TCP
TCP protocols are used for client server, device to device and portal communication along with stream initiation and playback control.

Client Server (JAVA RMI)
RMI is used for JAVA communications between Media Manager and the browser client.

RMI is a bi-directional protocol with connections established from the client to server and from the server to client. 49152 is the default port used for both connections.

With each simultaneous client connection the port number is incremented by one.

Installing Java to a PC will add a firewall rule for RMI.

Device to device communication
MediaStar services and devices use several TCP protocols to communicate with each other.

SIPI
SIPI is a Cabletime proprietary command language used to initiate processes and control functions at MediaStar devices.

SIPI initiated processes include ad-hoc configuration changes, media and software updates. Sent to hardware players SIPI can change many playback including output volume, channel up and down or specific channel selection.

SIPI control commands can be sent and delivered over TCP by all MediaStar services and devices. Third party devices such as Crestron and AMX can also be used to send SIPI commands.

MediaStar devices listen for SIPI commands on TCP port 2026.

HTTP
HTTP is used by all MediaStar hardware to download configuration files and software updates.

All configuration, software, playlists and media are stored on the Media Manager server and accessed by devices via a co-installed web server.

IIS is the default configured Media Manager web server for Windows server and Apache for Windows desktop installations.

A limitation of simultaneous IIS connections on Windows desktop makes it unsuitable as a web server for commercial services such as Media Manager.
HTTP (Device Portal)
All MediaStar headend and hardware media players have a built in web portal.

The web portal is used to configure, manage and troubleshoot each device.

A device portal is accessed from any browser by entering the device IP Address or hostname as the URL.

EACH DEVICE portal listens for HTTP requests on port 80.

Playback Control
iVod and HLS offer playback control over TCP. Playback control covers initiating, pausing and jumping backwards, and forwards through stream content.

RTSP (RTP)
RTSP is used to for iVod stream delivery and playback control requests from the client. The stream itself is delivered over UDP as a unicast.

The iVod server listens on port 554 for client RTP connections then negotiates a client port for RTSP to stream the media.

HTTP
HTTP is used by the client at all stages of HLS stream playback.

The initial HLS media URL contains the path to a playlist that details where to find and download the media content. Once downloaded the media is assembled for playback at the client.

The HLS server will by default listen on port 53020 for incoming HTTP requests.

Jump Commands
Jump commands instruct batches of media players to begin playing the same media at the same time.

The jump command is a management multicast broadcast by a player in certain configured scenarios.

Players need to receive the MediaStar 225.11.12.13 multicast to action the jump request.

Content Sharing
Peer to peer media sharing reduces network usage in low bandwidth satellite offices.

When enabled content sharing prioritises downloading media from a local player before going to the wider network for the media.

When notified of new media content players send management multicasts on 225.11.12.13 requesting the file locally from other media players. The local download is completed over HTTP.
TCP ADDRESSING

Cabletime recommend IPTV Addressing be configured at the outset for routable communications to the wider corporate network even if this will not be the case initially.

**Headend**

Headend equipment should be configured with static IP Addressing. This encompasses LAN-Casters, Encoders and the Media Manager server.

The Media Manager server will not function correctly if it is assigned DHCP addressing.

**Hardware Players**

MediaStar hardware players will function with static or DHCP assigned addresses. The number of players usually makes static assignment impractical. DHCP is recommended.

**Software Players**

The software player functions within the configured TCP settings of its PC or MAC host. It is dependent on the host firewall releasing incoming UDP streams for media playback.

**Internet Access**

Internet access opens up remote support and content services to the IPTV network.

**Remote Support**

A licensed Teamviewer installer can be downloaded and installed on the Media Manager server.

URL: https://get.teamviewer.com/cabletime

An internet resolvable default gateway and DNS server must be entered to the Media Manager static addressing configuration for TeamViewer to work.

**Internet Services**

MediaStar hardware players can download and display basic web pages and RSS streams from the internet. Accurate device time for scheduled playlists can also be sourced from the internet.

Accessing internet services from the hardware player is dependent on the configured default gateway and DNS being able to resolve to the internet.

HTTP is used to access web pages and RSS feeds. Time is synchronised over NTP.
HTTP
The IVOD Server uses HTTP to download imported video from Media Manager to local storage.

The 780 Media Player uses HTTP to download configuration files, software updates, playlists and imported video from Media Manager to local storage.

Lan-casters and encoders use HTTP to download configuration files and software updates from Media Manager.

The Internal Portal on each hardware device listens for HTTP on port 80.

HLS Clients use HTTP to download playlists and video content.

Browsers use HTTP to initiate client connections to Media Manager.

HTTP Communication to Media Manager starts by passing through the co-installed web server listening on port 80.

HLS Clients talk to the live streaming server on port 53020.

Peer to peer content sharing between players is completed via HTTP after initial discovery over multicast.

JAVA (RMI)
Bi-directional RMI communication between the Browser Client and Media Manager are completed over port 49152 and then by increments of one for each additional simultaneous connection.

SIPI
Media Manager uses SIPI over TCP to communicate status and initiate system processes at MediaStar hardware. All devices listen on TCP port 2026 for SIPI instruction.

Media Manager uses SIPI over TCP to communicate media changes to 780 media players.

Media playback on 780 players can be managed by third party controllers using SIPI over TCP.

780 Media players use SIPI over multicast to initiate simultaneous jumps to specific media.

Peer to peer content sharing between players is initiated over multicast and completed via HTTP.

Unicast
Stream acquisition and playback control from iVod is managed over RTP/RTSP.

The IVOD Unicast stream is delivered over UDP to the client IP address and the negotiated port.

The software and hardware media players both play content from iVOD.

IGMP
IGMP holds Multicast streams in the infrastructure until they are requested by a client.

Multicast media streams are delivered over UDP.
The MediaStar IPTV solution is built on PAL and NTSC broadcast standards.

**OFF-AIR BROADCAST STREAMS**
MediaStar LAN-Casters de-modulate terrestrial and satellite broadcast transport streams, repackaging selected channels as multicast streams for delivery onto the network.

Each transport stream as broadcast contains multiple TV channels encoded to H.264/MPEG2/ MPEG1/AAC by the broadcaster. Configuration of the LAN-Caster determines which channels are stripped from the broadcast for delivery onto the network as a uniquely addressed multicast stream.

Each selected channel is assigned a unique multicast address and port which is used by software and hardware players to subscribe and receive the stream for playback.

Players subscribe via IGMP join/leave requests and membership responses confirming ongoing requirement.

**Bandwidth**
A single LAN-Caster can stream fifteen unique TV channels selected from a single broadcast transport stream. All encoding and bitrate is as originally broadcast.

Standard definition (SD) TV channels are typically encoded 2-5 Mb/s variable bitrate (VBR)

High definition (HD) TV channels are typically encoded to 5-12 Mb/s VBR

**ENCODED VIDEO STREAMS**
MediaStar Encoders support a variety of PAL and NTSC video sources to 1080P HD. The received video input maybe be scaled and then encoded to H.264/MPEG2/MPEG1/AAC to a selected bitrate.

The encoded video is assigned a unique multicast address which is used by software and hardware players to IGMP subscribe and receive the stream for playback.

**Bandwidth**
Depending on the selected encoding parameters video stream bitrates range from 2-15Mb/s

**HTTP LIVE STREAMING (HLS)**
HLS streams are received from HLS enabled encoders and buffered pending download to HLS clients.

**Bandwidth**
HLS streams are primarily aimed at handheld devices and have a maximum encoding bitrate of 4.5Mb/s
**IVOD**
The iVod server stores media files for ad-hoc playback when requested from media players. iVod content is first imported by Media Manager server and copied to the iVod server.

Media Manager supports a wide range of source video formats for importing. All are transcoded to H.264/AAC. Bitrate is automatically determined by the source and settings in Media Manager. Files are stored in Media Manager as transport streams with an .m2t file extension.

Players request individual media files which are then unicast to the player.

**Bandwidth**
Bitrate of the source video imported to Media Manager should be kept under 16Mb/s to support playback across MediaStar Portal and hardware players.

The network bandwidth required to stream the media to each requesting client will be equal to the media file’s encoded bitrate.

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**FILE STORAGE**
Media played from the hardware player’s local storage only takes up bandwidth during initial download from Media Manager.

MEDIA MANAGER supports a wide range of source video formats for importing. All are transcoded to H.264/AAC. Bitrate is automatically determined by the source and settings in Media Manager. Files are stored in Media Manager as transport streams with an .m2t file extension.

The files are downloaded to local storage on players.

**Bandwidth**
Bitrate of the source video impacts the files size with higher bitrate files taking the player longer to download.

Players prioritise playback of existing media over any downloads so it can take longer for larger files to fully download and be ready for playback.

Once playback from local storage begins there is no network overhead.
IPTV protocols viewed from the services and devices using them.

**MEDIA MANAGER**
Media Manager is the management hub of the MediaStar IPTV solution. It collects information about the installed MediaStar equipment and determines media playback in a wide number of options.

The server additionally transcodes imported media for download by the iVOD server and hardware players. The server itself does not stream media.

**Media Manager Service**
Media Manager is a Windows service running alongside a web server. The web server is Apache on Windows desktop and IIS on Windows server.

**TCP Outgoing**
Media Manager Communicates directly with MediaStar devices over TCP to port 2026 using Cabletime’s SIPI command language.

**TCP Incoming**
Devices connect over TCP to the server port 4318 confirming network and download settings.

Devices connect over HTTP to the web server port 80 to download playlists, configuration, media files and software updates.

**Multicast Outgoing**
The server will initiate global configuration MediaStar changes over the 225.11.12.13 management multicast to port 4319.

**Multicast Incoming**
The service will listen for device discovery multicasts addressed to port 4318 of the 225.11.12.13 management multicast.

**Browser Clients**
The Media Manager client is accessed from any browser supporting JAVA.

The browser clients connect to Media Manager over HTTP to port 80 OR 443 (SSL).

A bi-directional Java RMI connection is then established on TCP port 49152.
HLS (LIVE STREAMING)
The Live Streaming server is a Windows service buffering streamed HLS content from encoders and responding to HLS client requests.

Encoded Video Source
A HLS configured MediaStar encoder streams HLS encoded media files over HTTP to the server port 53020.

HLS Clients
HLS clients connect via a provided HTTP URL. The stream playlist and media is downloaded by the client from the Live Streaming server over HTTP on server port 53020.

TCP Outgoing
The Live Streaming server initiates outgoing TCP connections to Media Manager port 4318 to confirm configuration settings.

TCP Incoming
Media Manager will initiate TCP to the HLS server port 2026 to confirm configuration settings.

Handheld devices and MediaStar Portal players connect over HTTP to port 53020 on the server when initiating stream downloads.

Encoders deliver HLS encoded media to the server port 53020 over HTTP.

Multicast Outgoing
If no Media Manager server is available HLS will initiate device discovery using the 225.11.12.13 management multicast to port 4318.

HLS subscribes over IGMP to the MediaStar management multicast of 225.11.12.13.

Multicast Incoming
The HLS server will respond to 225.11.12.13 management multicasts received on port 4319 as part of a global notification or configuration change request.
IVOD (UNICAST STREAMING)
Running on Linux CentOS as an installed Daemon iVod functions as a central storage of media delivering content on demand via unicasts to handheld devices and Mediastar players.

TCP Outgoing
IVOD HTTP Connects to the Media Manager web server to download media.

IVOD Connects to port 4318 on Media Manager to confirm configuration settings.

TCP Incoming
Media Manager will notify iVod of new media availability over TCP to port 2026. It will use the same port to confirm configuration settings.

Handheld devices and Mediastar players request media playback over RTP/RTSP to port 554 on the iVod server.

Multicast Outgoing
If no Media Manager server is available iVod will initiate device discovery using the 225.11.12.13 management multicast to port 4318.

IVOD subscribes over IGMP to the MediaStar management multicast of 225.11.12.13.

Multicast Incoming
The iVod server will respond to 225.11.12.13 management multicasts received on port 4319 as part of a global notification or configuration change request.
LAN-CASTERS (MULTICAST STREAMING)
LAN-Casters strip broadcast TV channels from over the air transmissions and re-package them for delivery to the corporate network as multicast streams.

TCP Outgoing
The LAN-Caster initiates outgoing TCP connections to Media Manager port 4318 to confirm configuration, network and the availability of software downloads.

Channel configuration management on the LAN-Caster are directly communicated to Media Manager port 4318 over TCP.

TCP Incoming
Media Manager will initiate TCP connections to the LAN-Caster port 2026 confirming configuration.

The LAN-Caster management portal can be accessed from any browser to port 80 on the device.

Multicast Outgoing
If no Media Manager server is available over TCP the LAN-Caster will initiate device discovery using the 225.11.12.13 management multicast to port 4318.

Each configured channel to a total of fifteen is broadcast as a multicast with a unique address and port.

Subscribers over IGMP to the MediaStar management multicast of 225.11.12.13.

Multicast Incoming
LAN-Casters respond to 225.11.12.13 management multicasts received on port 4319 as part of a global notification or configuration change request.
ENCODERS (MULTICAST STREAMING)
MediaStar Encoders scale and encode digital and analogue video input, packaging the media for delivery to the corporate network as a multicast stream.

TCP Outgoing
The encoder initiates outgoing TCP connections to Media Manager port 4318 to confirm configuration, network and the availability of software downloads.

Channel configuration changes on the Encoder are directly communicated to Media Manager port 4318.

Encoders configured for HLS deliver content as an HTTP upload to the HLS server on port 53020.

Multicast Outgoing
If no Media Manager Server is available over TCP the encoder will initiate device discovery using the 225.11.12.13 management multicast to port 4318.

The configured stream will be broadcast as a multicast with a unique local address and port.

Subscribes over IGMP to the MediaStar management multicast of 225.11.12.13.

TCP Incoming
Media Manager will initiate TCP connections to the encoder port 2026 confirming configuration as a result of Refresh Selected Hardware from a client.

A command line interface is accessible to port 2026 on the encoder for configuration and status.

The encoder management portal can be accessed from any browser to port 80 on the device.

Multicast Incoming
Encoders respond to 225.11.12.13 management multicasts received on port 4319 as part of a global notification or configuration change request.
780 MEDIA PLAYER (HARDWARE PLAYER)
The hardware player outputs received multicast, unicast and local stored media to a connected display to HD resolutions.

TCP Outgoing
The hardware player initiates outgoing TCP connections to Media Manager port 4318 to confirm configuration settings.

Peer to peer downloads from other players are completed over HTTP to port 80.

Playlist, Media and Software updates are downloaded from Media Manager over HTTP to port 80.

NTP connections to local or internet time sources are initiated on boot to port 123.

Connection to local or internet web and RSS servers are initiated over HTTP to port 80.

Negotiates unicast delivery over RTP to port 554 of the iVod server.

TCP Incoming
Media Manager will initiate TCP connections to the player port 2026 confirming configuration.

The player management portal can be accessed from any browser to port 80 on the device.

Players will accept HTTP download requests on port 80 from other players.

SIPI control commands are accepted on TCP port 2026 from third party controllers.

Serial pass thru commands from third party controllers are received on TCP 2027 and delivered directly to the serial port.

Unicast streams from iVod are delivered to a negotiated port over UDP.

Multicast Outgoing
If no Media Manager server is available over TCP the player will initiate device discovery using the 225.11.12.13 management multicast to port 4318.

A configured player will issue a jump multicast on specific events.

Players look for local peers in configured scenarios using multicast.

Subscribes over IGMP to each multicast stream required for playback and the MediaStar management multicast of 225.11.12.13.

Multicast Incoming
Players respond to 225.11.12.13 management multicasts received on port 4319 as part of a global notification or configuration change request.

Multicast jump commands are received on 225.11.12.13 port 4321

Multicast content sharing requests are received on 225.11.12.13 port 4320.

Multicast media streams are delivered over UDP once the player has requested the stream via IGMP.
MEDIA PORTAL PLAYER (SOFTWARE PLAYER)
The Media Portal plays multicast and unicast streams via a web GUI presented to the user.

TCP Outgoing
The portal player downloads the Portal Page from Media Manager over HTTP port.

Negotiates unicast delivery over RTP to port 554 of the iVod server.

TCP Incoming
The portal page is a Javascript web page downloaded from the Media Manager server port 80.

Unicast streams from iVod are delivered to a negotiated port over UDP.

Multicast Incoming
Multicast media streams are delivered over UDP once the player has requested the stream via IGMP.
SPECIFICATION

IPTV networks place a constant and elevated load on the network infrastructure. Switches for IPTV deployments need to meet a specific minimum criteria.

Switch ports
A single chassis MediaStar headend will require nine switch ports.

The Media Manager Server when provided by the customer is often co-located with the chassis and will require a further single port or two if NIC teaming is to be used.

Cabletime 1U Media Manager servers are additionally optimised for HLS streaming. Two ports required for NIC teaming if HLS is specified. One if not.

The IVOD Server is optimised for unicast streaming and will require two ports for NIC teaming.

MediaStar devices are pre-configured for switch ports set to autonegotiate. If link speed settings are applied to the switch the Mediastar headend needs to be additionally configured to match.

Backbone
Connectivity between switches needs to exceed total streaming bandwidth (see switching capacity below) with a minimum 30% margin to avoid Ethernet contention.

Where backbone capacity exceeds 1GB then fiber via dual personality ports should be specified.

Link Speed
LAN-Casters support to 1GB
Encoders support 100Mb Full/Half
Hardware players support 100Mb Full/Half
IVOD/HLS 1GB teamed across two ports (2GB total).

Cabletime Media Manager 1U server 1GB teamed across two ports (2GB total).

POE
POE Class 3 is supported by hardware players and the 785 portable encoder (specified at order).

Switching capacity
Overall Switch capacity needs to exceed total streaming bandwidth with a healthy margin for expansion.

Lan-Casters output to fifteen streams simultaneously with a theoretical cap of 16Mb/s per stream.

A single encoder outputs a single stream to 15Mb/s.

IVOD servers stream to 2Gb/s.

HLS enabled Cabletime Media Manager servers can stream to 2Gb/s.

IGMP
IGMP manages IPTV multicast stream deployment to clients. It is usually a default specification in medium to enterprises managed switches.

MediaStar supports both IGMP v2 and v3.
VENDORS
Brand switch vendors offer different experiences in configuration and setup that may impact IPTV deployment.

Switch ports
Hewlett Packard’s ProCurve switches are tried and tested for dedicated or smaller IPTV installations. IGMP is enabled with an easy to use point and click GUI.

Accessing the GUI requires the switch IP address. Switches tend to be DHCP or LOCAL IP by default.

Finding the switch IP can be difficult during installation. Use a serial connection from a laptop to access the Switch command line interface which displays the IP and allows static configuration.

A USB to serial converter will be needed for modern laptops in addition to the serial cable.

IGMP is easily configured with a few mouse clicks once you have access to the GUI.

Hewlett packard switches can arrive with legacy firmware. Upgrade the firmware before development.

Netgear
NetGear ProSafe is increasingly visible in small to medium sized IPTV installations where a greater knowledge of IGMP is available for switch configuration.

Access the switch GUI via a cat5 connected laptop with local IP config. The switch local IP address is usually printed on the base of the switch.

IGMP configuration is GUI but not point and click. It requires familiarity with IGMP, vLAN assignment and Netgear’s implementation of both.

A network engineer familiar with IGMP configuration will be required.

Cisco and Juniper
Cisco and Juniper switches commonly pre-exist in Enterprise deployments. They are typically managed by a dedicated network team with vendor specific qualifications.

The network team need to be aware of the IPTV protocol requirements detailed in this document prior to deployment.