So first of all, if you want to migrate to IPTV systems, you need to know some basics about the Transmission of TV and Radio streams over IP. I am trying to describe this here as easy as possible...

Forget about TCP because this protocol initially was designed for IP-packet transport regardless of the transmission path and intended to use for streaming. TCP/IP packets can be routed through different hubs and different pathways. Example: You sent an email and its packets can go like: 1st packet via Frankfurt, 2nd packet via Tokio... The receiving Server or client will get these packets almost in non-correct order as they were sent out and will sort it back to the correct order to keep the complete data together and consistent.

IPTV streaming uses UDP regardless of losing some packets on its way. In addition to UDP there is RTP, used as a mechanism to 'mark' the right order number or “timestamp” into these packets so that the receiver can re-organize them if necessary – of course that needs extra processing capabilities and buffers.

Do not mix it up with 'pull' mode IP video watching, which e.g. Youtube is using when you click to start streaming a stored video from WebPages. IPTV is continuously linear TV streaming where the client needs to 'jump' into an existing stream. These streams can be organized as P2P (Point to Point - Unicast) or P2MultiP Multicast. Both methods have their own advantages and disadvantages. I.e. Unicast saves bandwidth but needs intelligent CPE and Server communication skills, while Multicast outsources this intelligence to the Ethernet switches by IGMP usage (almost Layer3 technology – increased cost for Switches).

Please make yourself familiar with the above described abbreviations and the underlying technology since there are a lot of things to consider and you have simply scratched the surface of IPTV.

Please don’t think that you can provide high UHD quality streams over the public Internet w/o appropriate adaptive bitrate technology and a CDN in the background.

Before you IPTV, consider the needs and technology as well as cost and network structures
The IPTV Headend

is -of course- the SOURCE for all of your streams. Here you should not cut any corners in your investment since this is the most critical piece of the system:

- Securing the reception,
- decryption (if necessary),
- stability,
- encoding,
- long-term design,
- quality of components and services,
- redundancy (PSU's and reception, processing) functions,
- lower maintenance cost
- availability of additional features (EPG, Channel-Lists by SAP, ...)
- Picture quality assurance: this is one of the key requirements for consumers
- Zapping (channel switching) time must be much lower than 3 seconds
- only live real-time streaming or additional capabilities such as PVR, Timeshift, CatchupTV, VoD, additional social media...
- People are used to DVB-TV (or ATSC in US) and expect the same features or even more from IPTV

So please rely on professional Headends and do not buy anything from cheap or crappy sources... to reduce OPEX.

Design a Headend:

First of all: What and how do you need to receive your programs?

- From Satellite? (DVB-S/S2)
- From Terrestrial? (DVB-T/T2/ISDB-Tb)
- From CATV (DVB-C) or analog channels?
- Do you need to use SetTopBoxes with embedded decryption and smartcards (re-encoding)

We from Blankom/IRENIS are often asked:

**Do you have IPTV?**  
- YES WE CAN!

Next question comes as usual:

**How much does it cost for 100 channels?**  
- Needless to say 100 Bucks per channel or anything else

So you see the problem? How can you calculate a system, if you have no detailed and exact information about the reception, processing, maybe decryption, eventually re-encoding and even the selection of the programs that could be received via DVB-T/T2/S/S2/C Sat-Transponders and then cherry-picked from a host of available TV services?
So it is essential to know

- **The Number and orbital positions of the Satellites that carry the desired TV services** (ASTRA 19.2°, Eutelsat, Hotbird, Nilesat, Arabsat, etc...) because there are hundreds of Satellites with thousands of 'channels' - *in this case 'channel' means RF - Transponders*
- **The data of every transponder to be received** (High- or Low-Band, Vertical/Horizontal, Frequency) -> needed in the calculation of the number and sizes of SAT-dishes as well as the determination of necessary Satellite Matrixes or Multiswitch ports
- **The details of every TV-Service** (**Service** is the right terminology – do not use channels or programs) you want to select from these Transponders for streaming to IP
- **The need of EPG data** to be streamed along with it or skip this as a basic packet does not do
- **The availability of Multi Service Decryption** (MSD) CAM’s from the encrypted content provider (PayTV operators)
  - If only **embedded decryption** is possible: you need to determine which SetTopBoxes you can use, which Smartcards are available and which requirements are coming from the Content providers?
  - So we can go for **Encoders**... we have several different types, from single to multiple ones... Almost useful to insert own information channels like HotelTV, Restaurant, GYM, SPA, ...
- **If Transcoding is necessary:**
  - Because of Limited Network speed, or Middleware capability or streaming method (MC or UC) and load
  - Is OTT or Multiscreen a must or a nice to have?
  - Are the same data needed for Transcoding? The exact number of streams and the conversion from which input format into what output format as well as the sampling rates (Picture Quality!) must be determined as they impact License cost and Hardware + SW capabilities
- **If Eventually Re-encryption** (Verimatrix / AES or others) is required as embedded in the STB

Furthermore, if the system is to be installed at a Hotel, you need to check whether a PMS-Interface is required that is compatible with the on-screen display of the in-room TV’s (e.g. viewing and paying of the bill, Restaurant and Spa information, Information channel, etc...). You also need to determine if you want to provide a wireless access point (WIFI) in the rooms for Guest Internet connections.

If you are involved at the time of the set-up of the infrastructure of e.g. a new building or during a complete renovation, it is often worth to consider a fiber installation at least within the building to all of the floors because CAT-cable has limitations.

For an example of a TV Services Reception sheet see [http://lyngsat.com](http://lyngsat.com), Kingofsat or [http://satbeams.com](http://satbeams.com) for gathering detailed SAT-information
Choose your region and satellites:

Get the transponder information data:
Check the reception and footprint of the sat-beam for your location to calculate the size of the dishes:

And finally prepare a SAT-and Service –listing like:

It might be a good idea now to choose a Unicast or Multicast system. It’s a question of balance: Many IPTV Clients are online to the same time: Multicast is better. Only a few will be almost online: Unicast would be an advantage -> every user gets its own stream -> so you see: It’s a question of bandwidth. Multicast needs IGMP management by the network switches – while Unicast don’t because the stream will be addresses individually directly from the streamer source: The Headend
Having this data, we are able to provide you the appropriate professional HEADEND design, which may look like this system:

![BASIC IPTV SYSTEM](image1)

or this

![HYBRID IPTV SYSTEM](image2)
The final step is the question of additional services for your IPTV system:

Scalable IPTV systems are available in different sizes like:

- A **basic** linear TV 'only TV Zapping’ system (almost possible w/o any Middleware-Server)
- A **midsized** system providing add-on features like PMS-Interface, Info-Channels, basic Interactivity (Server needed)
- A **Premium 5-star** system with features like PMS, Timeshift, OTT, PVR, CatchupTV, VoD, ...) incl. WIFI to the rooms
  - One or even more servers needed
- A **Hybrid system** of DVB-C over Coax and additional IPTV and it's different services

All these have different approaches in technology and implementation as well as after-sales service and support considerations. Please do not expect a MERCEDES for the price of a FIAT 500.

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**Example for a BLANKOM Headend in a German 3 *** Hotel:**

2 SAT-Positions

SAMSUNG HotelTV sets as clients

Older BLANKOM devices mixed with a new one

Layer 2+ Networks Switch with IGMP V3

Streaming to the floors as Multicasts

appr. 100 TV services and several Radio streams

No Middleware server

No VoD

WLAN management on top

Reserved Space for more Receiver/Streamer for later upgrades
More questions? Please contact our international Team from IRENIS - BLANKOM:

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