

IP Video and its bandwidth requirements.

### IP Video idea

The plan is to migrate video away from RF broadcast video and on the IP network. This allows use of all RF spectrum for data and removed the need of sharing the RF plant between video and docsis.

### IP Video design

The design is broken up into a few components. These are:

1. Back office
2. Origin
3. Transcoding
4. Caching
5. Set top

The back office, origin and transcoding are all located at the same location under the current design. After the video is transcoded it is pushed out to the market caches. These caches get one push of this video for each bit rate.

The Caches will be located in each Hub H location. The Caches store the video and they supply the video to the user when it is requested. This is live with a slight buffer delay for linear TV streams. The Caches will send the video streams to the set top boxes. At this point this is a unicast operation.

The set top boxes located at customer sites will be the source of the customer request for video. The request will be passed up stream to the back office (Via the Cache?). The back office will then signal the cache to allow the stream to the set top and the stream will begin. (Deatails Needed) The stream will consume 5Mbps to each set top box on average, with bursts up to 24Mbps. A hub, with 500 Sw!vel homes and 3 set tops each, can generate 7.5Gbps of traffic to that hub site and out to the CMTS Customers.



### Network Use

With a 5% customer penetration of Sw!vel, each 10K households equates to 500 Sw!vel households. 500 households can amount to 7.5Gbps of unicast traffic. So a market with 5 hubs plus the head end would have 5 x 7.5Gbps leaving the Head End cache cluster and another 7.5Gbps going directly into the docsis plant at the head end itself. This amounts to 45Gbps from the cache cluster and 37.5Gbps, in aggregate, leaving the Head end going to the hub sites.

### Network Impacts

In most cases this network growth will require a network augmentation in the markets. Our current growth plan included a 60% growth over the current year and this would more than double that in most cases.

In most cases we are comfortable with a growth of about 400 Sw!vel customers in a given market/Head End before we will want to be augmenting capacity.

### Capacity Planning

Overall, there will be many markets where the connectivity from the head end to the hubs will need to be increased ahead of normal organic growth.