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Standard Procedure for the Performance Evaluation and Load Forecasting Metrics of Real-Time A/V Processing.

ABSTRACT - Masterthesis

Advancement in technology and faster data transmission in IP Networks made it possible for the migration of distribution of broadcasting signals from the dedicated standards to distribution over IP. This migration also resulted in the change of hardware equipment. Standard Network hardware equipment that is used for data transmission over IP Networks is now being used to distribute the broadcasting signals. With this migration, the signal analysis has also migrated from the standard waveforms to packet analysis. As an example, access to 10GbE IP made it possible to accommodate several 1.5 Gbps uncompressed High Definition (HD) signals. Even with this migration, already available structure of transmission can be utilized. The equipment performance is increasing and the price is reducing. With this migration, companies can provide End-to-End distribution over IP. This has also lead to the distribution of 4k signal on a single channel with less compression. The combination of different Internet protocols and the new encoding techniques for the compression of audio and video content into extremely small packets of data made it more feasible for streaming.

Headend, which is a part of broadcasting system is an A/V processing unit that takes an uncompressed input and provides a compressed output. The focus of this Thesis is to provide a standard procedure to perform analysis of real time A/V processing of different IT servers. Various factors are taken into consideration for performing this analysis, but of them Encoding type, Bitrate and Resolutions have higher influence on the load of server. Another term that will be often found in this thesis is Performance points. Performance Points are used to define how many channels can a broadcasting system run. These are calculated for different binaries (SPU Binaries) that have a load on the server. These metrics (also termed as calculations) are based on the single thread performance (STP) of processor. Before measuring and analysing performance points, initially broadcasting systems are evaluated and single thread performance value is measured. Based on this STP value, the performance points of the services are evaluated. A set of metrics or equations and values are provided in the end to predict the performance points usage of different AVHE (Audio Video Headend) 100 configurations.