

Abstract

One of the interesting things about the World Wide Web (WWW) is its ability to incorporate images and other media with text. But the image may take hundred times longer than text to download and display, which is the main problem for slow networks.

The trivial solution to solve this problem is to decrease the size of the image by decreasing its quality, and that means loss of some of the image raw data. This lost data can not be recovered if the client wants higher quality.

Fortunately, image data are suitable for processing, but little efforts had been made to take advantage of this property. This thesis will use this advantage of the images to achieve a reduction of network traffic, and conserve the bandwidth link without losing any data of the image or affecting its quality.

This approach is based on a client/server model to deliver large images over slow networks. We called our model “Progressive Transmission of Images over Slow Networks (PTIS)”. PTIS is implemented by using a RabbIT2 proxy server (Java open source proxy for HTTP/1.1), which is modified to meet PTIS algorithm.

In PTIS a client forwards a request to RabbIT2; the RabbIT2 may in turn forward the request to its own client program that sends a request to the target web server to retrieve the image. The image is returned back to RabbIT2, which is processes the image to get four slices, sending the first slice to the client, and waiting for another request in case client wants a better quality image.

The division of the image is done once in the server side per each image, no matter how many times it’s transmitted to the clients.

The advantage of PTIS is that if the quality is not adequate, the client can ask for more image data and combine it with what was received previously. That is, PTIS constructs higher quality image by progressively combining newly received data with earlier lower quality image. It is worth mentioning that by transmitting images in this way we are not introducing any overhead in data transmission. No image data is sent twice through the network. Repeated client requests for more data, if needed, are the only overhead which is, for all practical purposes, negligible. So this results in fast download time and conserves the bandwidth of the link especially when lower resolution images provide sufficient

quality for the clients at the image review stage. Even in case of which client wants high quality image (request the four slices) PTIS gives reduction in network traffic, because the size sum of the four slices is smaller than the size of the original image (and a little bit larger than the size of the compressed original image).

PTIS is applied to BMP images and lossless JPEG and is extended to be applied to images in Portable Data Files (PDF) by separating the pictures from the text in the PDF file, and sending the pictures in progressive transmission. Also, PTIS model is extended to be applied to lossy JPEG images, but we didn't get satisfactory results since in lossy compression already a lot of data were be lost during coding and decoding the data.