

A Network Pluralist’s Approach to Online Video Stores

Helge Backhaus, Denis Martin, Hans Wippel
Institute of Telematics, Karlsruhe Institute of Technology (KIT)
{backhaus, martin, wippel}@kit.edu

I. INTRODUCTION

Today, many different online services are consumed from a multitude of heterogeneous devices. TCP/IP and HTTP are used as the protocols of choice for many services due to their availability and simplicity to use: HTTP provides a simple RESTful API and a powerful runtime environment on client systems – a web browser. It is ubiquitously available on devices that are connected to the Internet and its usage avoids many service reachability problems like NAT-, firewall-, and proxy-traversal. However, HTTP’s strong dependency on TCP and its request/response characteristic enforce a client/server paradigm in the design of services. Additionally, encapsulating everything in HTTP results in high overhead.

In the future, network virtualization will enable the operation of different networks in parallel that are tailored to the individual needs of an application. This offers application developers means to access a multitude of specialized networks and protocols, and even enables service providers to deploy new ones. Using an appropriate API and network virtualization techniques, it is possible to combine HTTP’s ease of use with highly efficient transport protocols and/or new communication paradigms. The NENA [1] framework aims at providing appropriate abstractions to achieve these goals. In this demo, we show how NENA supports transparent access and usage of application-tailored network services offered by different virtual network architectures. The key features presented include: (1) transparent access to virtual networks optimized for different use cases, and (2) automatic network and protocol selection based on requested content and application requirements.

II. SCENARIO

The use case shown in this demonstration illustrates a scenario that might be common in the future (Figure 1): A user browses a web-based video-on-demand catalogue for movies that he or she wishes to watch. For the catalogue itself, a simple general purpose virtual network and a reliable transport protocol is used. The network serves the catalogue’s content in a RESTful style, much like today’s HTTP.

When selecting a specific movie, a preview of the video (e.g., movie trailer) is embedded in the web page. This preview, however, is not transported by the general purpose network, but streamed via another virtual network. This network’s structure and the protocols that are used in it are optimized for streaming to multiple users. For the application—in this

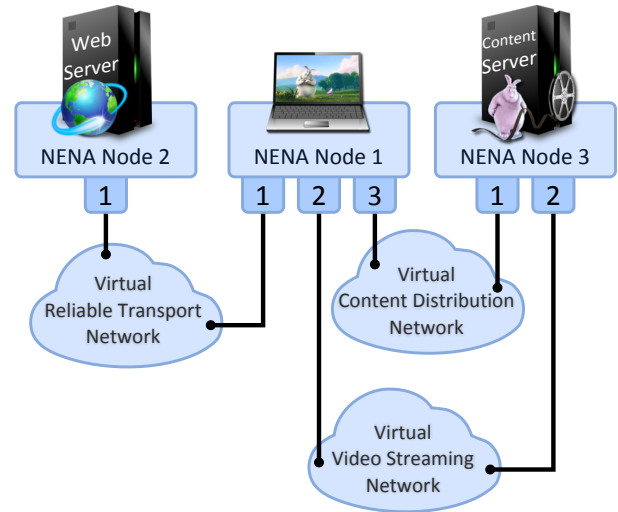


Fig. 1. Demonstrator setup

case a web browser—it does not matter whether the data of the web site and the preview come from different networks. NENA will hide the relevant details from the application. If the user decides to watch the movie immediately in full screen mode, the streaming protocol—available within the same video streaming network—is used, in combination with an additional RTSP-like stream control protocol. This time, the user can control the video by seeking to specific positions and/or pause the video. Alternatively, the user can decide to download a high quality version of the movie for watching it later. A third network optimized for content distribution will be used in this case. In each case, the user’s application specifies the user’s intent, i.e. whether to preview, stream, or download the requested movie. In our demo, this results in different requirements sent down to the NENA framework running on the user’s node. Based on these requirements, NENA then transparently selects and uses a suited protocol and virtual network for each user request.

REFERENCES

- [1] D. Martin, L. Völker, and M. Zitterbart, “A Flexible Framework for Future Internet Design, Assessment, and Operation”, *Computer Networks*, vol. 55, no. 4, pp. 910–918, Mar. 2011.