

## A Study on ONVIF Proxy Server

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**Abstract.** For the standardization of management and control of the video surveillance systems, the ONVIF (Open Network Video Interface Forum) standard group has proposed the ONVIF standard protocol. However, the legacy video surveillance systems have not supported the ONVIF protocol in general. Therefore, in this paper, we propose a method for making an ONVIF proxy server which can support the ONVIF protocol of legacy video surveillance systems.

**Keywords:** ONVIF, NVT, Proxy, Proxy server

### 1 Introduction

At present, we can discover numerous closed circuit televisions (CCTVs) in a number of areas. In addition, the development of networks has enabled anyone to manage CCTVs easily. Numerous users intend to obtain information by having access to each CCTV and every CCTV should provide services to users which are requested by them. However, a larger number of users have required a larger amount of load given to CCTVs and a larger amount of bandwidth in networks connecting CCTVs. To resolve this problem, this study intends to have CCTVs only information transmission capability to a proxy server and have users provided with services by receiving information from the proxy server by using a reverse proxy server. In addition, it aims to improve versatility by implementing the proxy server in a manner that satisfies ONVIF standards.

### 2 Related Work

The CERN proxy [2] is a web proxy and used three methods to determine the expiration time of objects. And, Wessels proxy server does not use the fork system call and uses multithreading. The performances of the Wessels proxy server and the

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CERN proxy server were compared in [3]. Wessels proxy server shows slightly better performance because in the case of multithreading, it does not have to pay high expenses for the overhead context switching and the creation of the thread. Wessels proxy server consists of three sub-modules: cache\_mgr, web-proxy, reached.

Squid proxy [4] performs non-blocking I/O to avoid the overhead that creates a process whenever a new request comes in. A single process handles every request. A three-phase structure is cached in disks. 16 total sections cache files into 256 subdirectories, and fingerprinting is used for the mapping of the URL and the names of objects.

### 3 Architecture of ONVIF Proxy Server

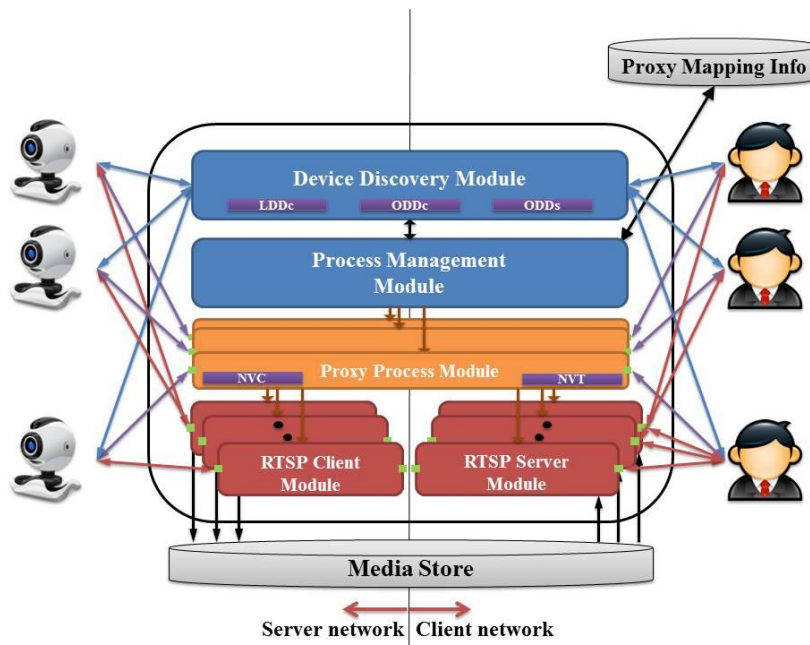


Fig. 1. Proxy server architecture

Figure 1 is a big picture of the proxy server. The left side shows the server network in which network video transmitters (NVTs) are located. The right side shows the client network in which network video clients (NVCs) are located. The device discovery module (DDM) finds NVTs in the server network side and sends discovery messages to NVCs in the client network side. The DDM was implemented based on WS-Discovery. The process management module (PMM) serves the role of managing various proxy process modules (PPMs). Moreover, it has mapping information between NVTs and corresponding PPMs. Therefore, if an access request comes from NVCs, it delivers its IP and port number mapped with each NVT. Mapping information includes each NVT's IP, the client network side's IP:Port of the PPM

corresponding to the respective NVT, and the last renewal time. One PPM is produced for each NVT, and each PPM appears to be a NVT to clients. In addition, as PPMs should look like clients to NVTs and look like NVTs to clients, they should be able to play the roles of both NVCs and NVTs. If PPMs are created, their connection with NVTs is carried out. If the connection is carried out without problems, the RTSP client module (RCM) and the RTSP server module (RSM) are produced. The RCM and the RSM relay the streaming between NVTs and NVCs. The RCM stores image information received from NVTs in media storage, and the RSM obtains image information stored in the media storage and transmits it to users.

#### 4 Conclusion

In this paper, we show the architecture of ONVIF proxy server. If the ONVIF proxy server is used, we can support the ONVIF protocol even to the legacy video surveillance system. For the future work, we will design and implement the ONVIF proxy server in detail.

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