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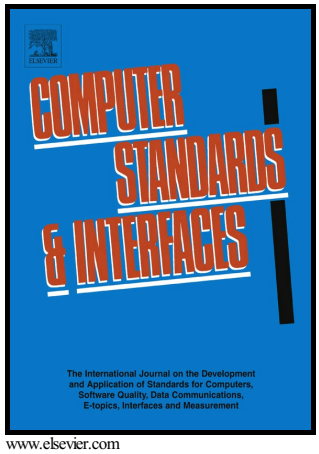

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PII: S0920-5489(16)30200-8
DOI: http://dx.doi.org/10.1016/j.csi.2017.04.005
Reference: CSI3218

To appear in: *Computer Standards & Interfaces*

Received date: 30 November 2016
Revised date: 5 April 2017
Accepted date: 27 April 2017

Cite this article as: Chia-Feng Lin, Hsin-Ta Chiao, Ruey-Kai Sheu, Yue-Shar Chang and Shyan-Ming Yuan, A Fault-Tolerant ONVIF Protocol Extension for Seamless Surveillance Video Stream Recording, *Computer Standards & Interfaces,* http://dx.doi.org/10.1016/j.csi.2017.04.005

A Fault-Tolerant ONVIF Protocol Extension for Seamless Surveillance Video Stream Recording

Chia-Feng Lin[1], Hsin-Ta Chiao[2]*, Ruey-Kai Sheu[2], Yue-Shan Chang[3], Shyan-Ming Yuan[1]

[1]Department of Computer Science, National Chiao Tung University, Hsinchu, Taiwan.

[2]Department of Computer Science, Tunghai University, Taichung, Taiwan.

[3]Department of Computer Science and Information Engineering, National Taipei University, Taipei, Taiwan

teralin@gmail.com

Joseph.Chiao@gmail.com

rickysheu@thu.edu.tw

ysc@mail.ntpu.edu.tw

smyuan@cs.nctu.edu.tw

* Corresponding author

Abstract

ONVIF (Open Network Video Interface Forum) is an importance industrial standard for the video surveillance field. There are over 8000 ONVIF-compliant IP cameras (i.e., ONVIF NVT) and network video recorders (i.e., ONVIF NVS) from various vendors listed on the ONVIF official website. However, because the current ONVIF specifications do not support any fault-tolerant functions to handle NVS failure, in this paper we propose a fault-tolerant solution for ONVIF NVS and try to minimize the modifications to the current ONVIF specifications in the proposed design. Besides, we also propose an extension to the ONVIF NVT for preventing the loss of captured NVT video data during the failover procedure triggered by NVS failure. Finally, we evaluate the following four performance metrics of the proposed fault-tolerant ONVIF surveillance system: the maximal video local cache time supported by an NVT, the response time for accessing an ONVIF web service, the interrupt duration of video recording due to NVS failure, and the live video black out time observed by a video management system. Since the experimental results are all within the acceptable range for a real fault-tolerant video surveillance system in the real world, the experiences provided by this paper is a good reference for improving the fault-tolerant capabilities of the ONVIF video surveillance systems.

Keywords: ONVIF, fault tolerance, surveillance

1. Introduction

During the past decade, the video surveillance equipment market was growing very quickly, at a double-digit rate annually [1]. Market research firm IHS also predicts that the growth of video surveillance market would be more than 10% in 2015. By 2018, IHS predicts the market will reach $23.6 billion USD [2], which is almost the double of the market size in 2013 (i.e., $13.5 billion USD).