Cloud Computing: Implementing NAS in Directing Digital Images without Local Storage

J.C.Rosaline Christi
PG Student
Sri Manakula Vinayagar Engineering College
Pondicherry

R.Ilakkia
PG Student
Sri Manakula Vinayagar Engineering College
Pondicherry

M.Gowri
Associate Professor
Sri Manakula Vinayagar Engineering College
Pondicherry

ABSTRACT

Cloud computing provides the facility to access shared resources and common infrastructure, offering services on-demand over the network to perform operations that meet changing business needs. It is a ubiquitous, convenient, network access (storage, applications and services). In this paper, we investigate that the photographs can be directly emerged into the cloud. . Compared with the traditional software theory and application, Cloud computing have a lot of benefits that cannot be replaced and representation of the revolutionary ideal. A camera should be able to operate without local storage over a home Wi-Fi network. A local memory cache would, of course, be needed, but our tests show that a small 32 MB cache would be quite effective and anything larger would be a bonus. It is desirable that latest generation 802.11n networking technology is used.

Keywords

Cloud Computing, Wi-Fi enabled card, PTP, NAS.

1. INTRODUCTION

Naturally, storage would not go away, or perhaps it will go away—quite a distance from the device. Most likely, it will end up on a cloud somewhere out on the network. For a

Fig 1: Basic Cloud Diagram

collection of images is on shared network storage where everyone can access and contribute to the image collection.

So, we consider 1) the current art in device connectivity; 2) the current status of digital imaging devices and image/video data requirements; and 3) A proof of our concept is to test the hypothesis that cameras do not really need local storage, but we actually use the photographs directly into the clouds.

2. CLOUD COMPUTING MODELS

Cloud computing models can be broken into three basic designs, which are shown here and described below.

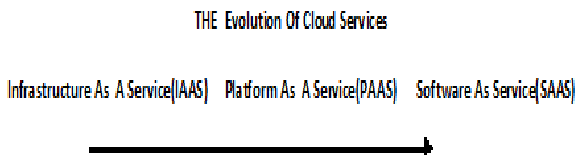

Fig 2: Infrastructure as a service (IaaS) supplies computing.

Infrastructure as a Service (IaaS) supplies computing resources and storage resource for users. Platform as a Service (PaaS) is in the middle part of the cloud service layer, it can give users better performance and more personalized hardware and software services, and a lot of infrastructure module, such as remote call module, distributed data module, etc. These modules can be used by the Software as a Service (SaaS).

3. EVOLUTION OF CAMERA CONNECTIVITY

In early 2000s, researchers have tried to find new ways to improve the connectivity of digital cameras and reliably move the pictures from the camera local storage to an end destination. After the introduction of universal serial bus (USB) technology in digital cameras, the picture transfer protocol (PTP) standard provides increased transfer speeds, implementing easy management of capturing and transfer operations.

Client End Server End Online Storage Archived Storage

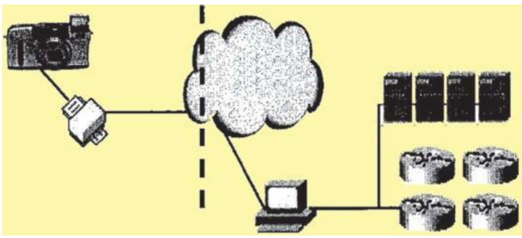

Fig.3(a) Digital Photography System Server

Figure 3(a) and (b) shows an early outline of two-tier and three-tier network architectures for digital photography.

Client End Middleware Server End Online Storage Middleware Server Archived Storage

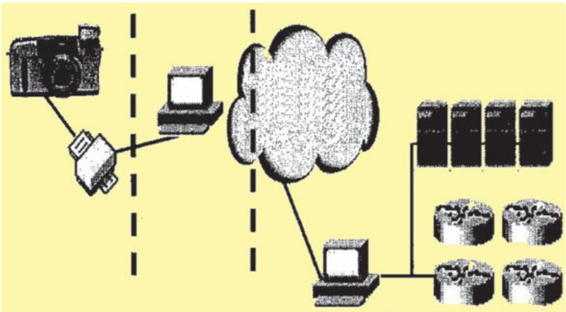

Fig 3.(b) Digital Photography System Server

Eventually, PTP was standardized using an underlying transmission control protocol/Internet protocol (TCP/IP) transport over wireless local area network (WLAN) and local area network (LAN) networks.

4. DIGITAL CAMERA ARCHITECTURE

The digital still camera (DSC) architecture requires the most significant changes as illustrated in Figure 4. First, several software components within the camera are modified to allow control of the quantity of data produced: video bit rate or the interval between successive image capture events for still image capture. Thus, the video recording subsystem is replaced by a video data producer, and still image capture is replaced by the still data producer software module. Second, a number of software subsystems are added to the digital camera. Data are removed from the RAM buffer by the network storage client module. The data removal rate varies with the wireless network conditions. The control module monitors the utilization of the RAM buffer, TCP buffers, and the wireless link speed. Based on the monitoring of these three subsystems, control module adjusts the data production rate(s) of the video and still image subsystems.

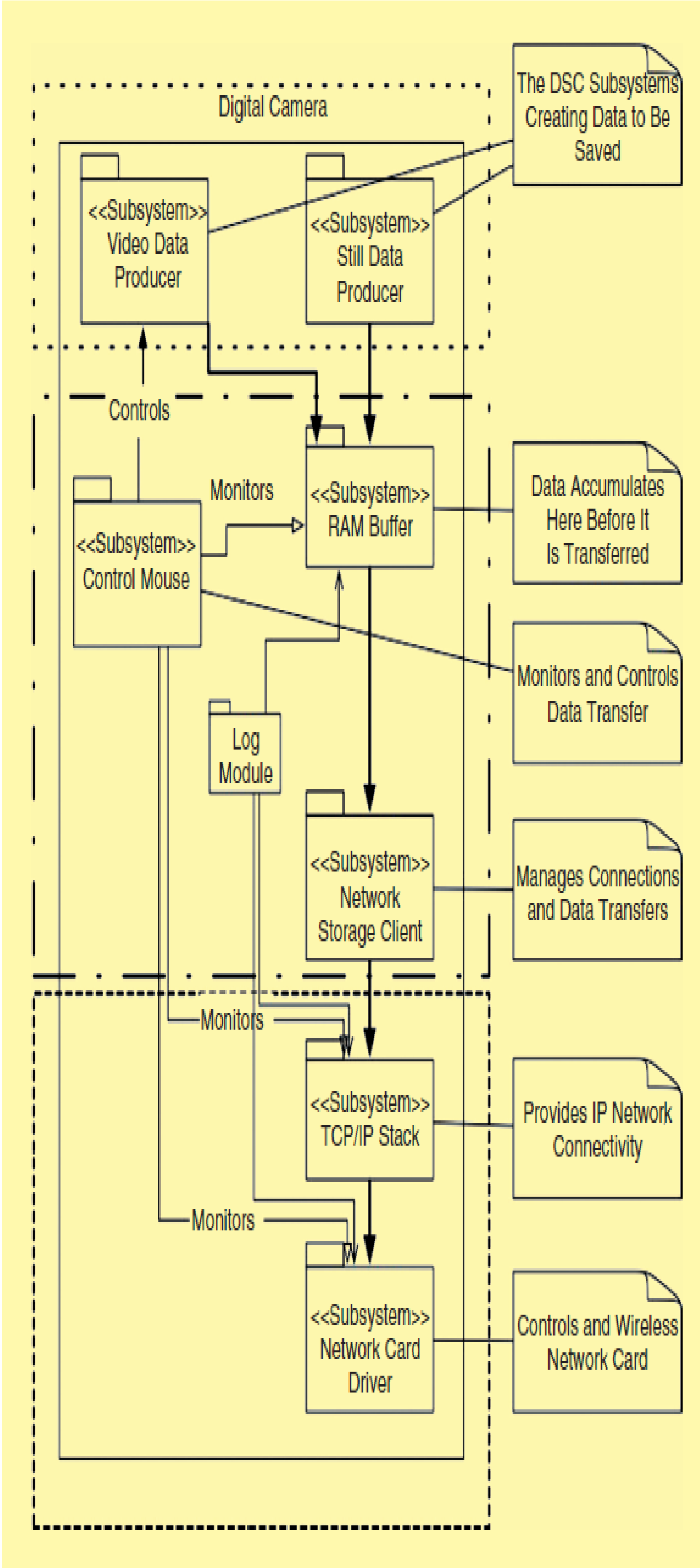

Fig 4.Digital Camera Architecture

Third, hardware and software subsystems are added to the DSC platform to enable the actual data transfer. These are the TCP/IP stack, the wireless network cards, and the wireless network card driver.

5. NETWORK CONNECTIVITY STORAGE

The basic idea of these devices is that photographs and video content is captured on the local digital storage in the card, which also contains a Wife radio that allows the content on the card storage to get transferred automatically through the network to a network storage device in the local (home) wireless network. Some examples of these products are the Eye-Fi and Trek Flu Card shown in Figure 3. Since SD flash memory cards are the most popular camera card format, both the Eye-Fi and Flu Card are available in this format. These devices can provide a way to automatically sweep content from the card to the network. Usually, a local network storage device is the target for this transfer as this generally allows faster data rates than storage in the Internet and is available even when Internet connectivity is not .

Fig 5. Flash Memory

However, moving the content through the Internet to a cloud storage service or to a personal cloud is another option. There are disadvantages to providing automatic content transfer over a local network that is not part of the underlying architecture.

Since the camera does not know that the wireless card is transferring data, it may shut down the camera (and thus the power on the card) while the card is still transporting images or video. In addition, if the WiFi enabled card is not being used in the camera, the data will not be transferred to the local network storage. An interesting alternative to the home network attached storage (NAS) device is to have the camera upload content to a mobile wireless NAS device. This allows the user to use either camera or card-based WiFi content transfer for transferring the content to a local mobile battery powered NAS device

The means of transferring the pictures from the camera to local network storage, once this content is transferred, it can be uploaded to other storage networks, e.g., a personal cloud device can be copied to a home NAS storage system. The content or some part of it can also be uploaded to storage services in the Internet and shared with others— probably in your trusted network—through content sharing services (such as Facebook, Picassa, or Flikr) on the Internet or in a cloud storage service. Products that allow a local network storage device to serves an Internet accessible device have been on the market for a while. These are basically NAS devices that are also accessible through the Internet through a URL. These devices introduced by many major home NAS providers such as HP, Seagate, Western Digital, and others often used an external Web site as the authentication site that supported the access URL that would then direct a client to the home server.

Fig. 6. Personal Cloud Storage Device

These services would often charge some annual fee to maintain access through the URL to the home NAS storage. More recently, home NAS devices have become available, which allow more direct access to the NAS without this level of external authentication from a connected client. Some of the products offering this sort of home "cloud storage" are shown in Figure 5.

6. THE USER EXPERIENCE (Requirement Analysis)

Probably, the greatest inconvenience of digital cameras is keeping track of memory cards. Typically, images can be uploaded from the camera to a PC, or a new memory card can be inserted and the old card read, again into a computer. Some cameras feature a dedicated network cradle that will offload pictures after the camera is placed in the cradle. Of course, all of these methodologies complicate the use of the camera, as the user has to manage memory cards, cables, and cradles. If you own a digital camera, and who does not these days, you will be familiar with at least one of these unduly complex user environments. In an ideal world, consumers would upload and sort their images regularly on a local PC, but this is rarely what happens in practice. Our busy lives mean that we shoot pictures until our memory cards are full and then buy another memory card because its so cheap and we do not have time to sort all those images. The camera is often one of the last items to get packed when going on vacation, and my own desk is littered with a handful of SD and SD high-capacity (SDHC) memory cards from a handful of different cameras and video capture devices.

7. CONNECTIVITY AND BANDWIDTH

The answer is that all these things are in fact quite possible. The major barrier to date has been the difficulty in providing an easy to use connectivity solution with good availability to link the camera to the network. Ironically it, has taken the emergence of a new category of device— smartphones and tablets—to break down this barrier. Now users are familiar with linking these devices to their wireless router, and so adding an imaging device (or using one of these devices as your imaging device) has become more of an everyday occurrence for many consumers.

It would also be a reasonable comment that the network speed and the range of Wi-Fi technology has improved significantly since earlier work. Today, most wireless routers are either enhanced 802.11g or better still, 802.11n. Typically, a single access point covers a normal single-family home. Sustained throughput rates of 60–80 Mb/s (this is the practical data transfer rate in most home environments; while higher rates may be quoted they are rarely achieved in practice and certainly not at some distance from the router) or higher can be achieved with 802.11n technology.

However, we need these high throughput rates. Let us consider a typical 12 megapixel raw image; by the time it is compressed into a JPEG, it is reduced to 4 MB in size. At a data rate of 10 Mb/s, this image would take about 3.5 sec to transfer off the camera. As most cameras have a clickthrough time of about 1–2 s, this is actually not fast enough, and so we can estimate a minimum bandwidth requirement of about 20 Mb/s for still images to complete image transfer within our 2 s time window or close to 40 Mb/s for a 1s transfer. For video, we are more concerned with sustained throughput rates, rather than the burst transfers for still images. For good quality SD video, a bit rate of 8Mb/s is needed, and for HD video (720p), bit rates of 16 Mb/s are essential.

8. CONCLUSION AND FUTURE WORK

In this paper, we investigated that the photographs can be directly emerged into the cloud. Compared with the traditional software theory and application, Cloud computing have a lot of benefits cannot be replaced and representation of the revolutionary ideal. a camera should be able to operate without local storage over a home Wi-Fi network. A local memory cache would, of course, be needed, but our tests show that a small 32 MB cache would be quite effective and anything larger would be a bonus. it is desirable that latest generation 802.11n networking technology is used. It is also true that we did not test with more than two cameras operating simultaneously, but these are issues that can be dealt with through robust systems design.

9. REFERENCES

[1] P. M. Corcoran and I. Raducan, "Practical aspects of video data transfer to network storage using 802.11 WLAN technology for lowend consumer digital cameras," IEEE Trans. Consumer Electron., vol. 49, no. 4, pp. 902–910, Nov. 2003.

[2] P. Bigioi, A. Ionas, G. Susanu, and P. Corcoran, "Connectivity solution to link a Bluetooth camera to the Internet," IEEE Trans. Consumer Electron., vol. 47, no. 3, pp. 294–299, Aug. 2001.

[3] Hakan Erdogmus. "Cloud Computing:Does Nivaana hide behind the Nebula?" IEEE SOFTWARE,2009.

[4] Yan Han . "On the clouds: A new way of computing". Information technology and libraries,2010.7:p86-22.

[5] P. M. Corcoran and I. Raducan, "Real-time network-storage for digital cameras," to be presented at IEEE Int. Conf. Consumer Electronics (ICCE 2012), Jan. 2012

[6] P. Bigioi, G. Susanu, E. Steinberg, and P. Corcoran, "PTP/IP—A new transport specification for wireless photography," IEEE Trans. Consumer Electron., vol. 51, no. 1, pp. 240–244, Feb. 2005