

Ambleside Weather View Camera

Design and Implementation



This picture is taken by a webcam pointing northward, situated slightly south of the centre of Ambleside at OS grid reference NY 3753 0415, from under the eaves of our home in Birch Road One of its purposes is to provide a view of Ambleside for the webpage of Above Stock, our Holiday Let apartment half a mile away. You can see the result at <http://www.abovestock.co.uk/amblesideweather.php>.

The purpose of this document is to record my experiences in designing and implementing this system, for my own benefit and perhaps to help anyone else who is considering installing a similar system. It assumes familiarity with concepts such as **ftp**¹ and **html**².

The past

This document describes a replacement camera, which I have installed in the last month. I installed one in 2011 which worked, most of the time, until 2020. I chose a very elaborate implementation in order to avoid any server-side programming because I believed, incorrectly, that it would lead to security problems. I arranged for the camera to download the picture every 10 minutes to a **ftp** program on a dedicated Windows laptop, where a Visual Basic program, scheduled by Windows Scheduler, ran every 15 minutes to archive the picture and use a **ftp** client program to send it to the Above Stock web server, giving an up-date-view of Ambleside. It gave constant problems, because although the laptop had a battery it often failed to recover after a power outage, and the system then had to be restarted manually. And I hated Visual Basic – it is a badly designed language with elephantine commands. Eventually the laptop packed up and I couldn't make the system work satisfactorily on a shared machine. Last year the camera itself packed up.

I bought a new one this year and, after testing out the new system on the view of our sitting room chairs, I persuaded our local electrician to bring his long ladder and replace the camera under the eaves. Much to the surprise of both of us, it worked instantly.

¹ **ftp** (File Transport Protocol) is a standard method of sending files across the Internet. Foscam uses it to upload files to the web server, and I use it to upload **html** pages.

² **html** (Hypertext Markup Language) is the language used to write web pages. Normal text is interleaved with commands about format, spacing, etc, and it can contain links to files and other pages.

1. Requirements

Primary requirement. To provide potential guests at our holiday accommodation in Ambleside, and friends and relatives, with a view of the fells so that they can see the current weather. There is a good view from our house at the top end of Birch Road in Ambleside, facing north towards Fairfield:

The camera is mounted under the eaves of our house to get the best view, which requires it to be weatherproof.

I wanted to upload the picture to our holiday accommodation web site and to show the picture in more-or-less real time. I decided that “real time” would be satisfied by renewing the picture every 15 minutes, because the cost of providing a moving picture was likely to be excessive in both my effort and broadband bandwidth. In any case, even when the wind is strong the clouds don’t move very fast. A relatively static picture is enough to meet the primary requirement.

Availability. The system has to be available to users without needing human intervention, even after power failure. The only intervention should be to change parameters or occasionally reconfigure.

Reliability. The system should have as few components as possible, all with known reliability.

2. System Architecture

The system architecture is dictated by the choice of camera type.

2.1 Camera Connection Method

USB Webcams are cheap and readily available and so are security cameras which connect to a monitor through coax video cable, but I didn’t see how either could be made to meet the need to provide a regularly updated picture at a remote host.

Cameras are available which offer direct connection to a router and it is the method that I have chosen because it minimises the number of components in the system, and both the camera and the router recover without intervention after a power failure. Connection can be via an Ethernet cable or WiFi and I have chosen cable because I already had a weatherproof Ethernet cable in place from the previous installation, and my experience is that cable is more reliable than WiFi.

Several suitable cameras are available. I bought a weatherproof Foscam FI9912P for about £75. There was already a mains power cable in place; otherwise I would have bought the POE (power over Ethernet) version, which does not need mains power. Foscam have given me prompt and effective support throughout, though their online manual can be a little difficult to understand – they are based in China.

2.2 Foscam

Physical Characteristics

The camera is supplied in a waterproof housing on an adjustable bracket. It has about 1 metre of waterproof cable terminating in sockets for mains power and Ethernet.

The problem of weatherproofing was solved by fixing a weatherproof box next to the camera under the eaves of the house, and housing the waterproof cable termination in it. Power was supplied by a cable through the loft to a 13 amp socket.

Initial setup

The camera setup is controlled by the supplied Foscam VMS software, which runs on my Windows PC³.

I registered with Foscam, and supplied a UserId and password. After logging on you can see a picture in real time. This is useful for adjusting the field of view and picture quality.

There are adjustments that can be made in VMS to the picture, including resolution, brightness and contrast

2.3 Displaying the Pictures

Uploading pictures

Foscam can be set to upload a regular snapshot picture of the camera's view.

Our router has a Firewall. Before setting up the camera it was necessary to change the router settings to allow outward traffic from the camera to my web server.

Two separate steps were necessary to set up the camera:

- Set up the **ftp** connection to my web server with the server's name and password, and a destination directory name.
- Specify the file name to be used and the frequency of upload, setting the hours during which it was to happen. I have set it to upload every 15 minutes during daylight hours.

I specified FairfieldView.jpg as the file name but the software adds a date and time, and this action cannot be altered. Each file that is uploaded has a name of the form FairfieldView_yyyymmdd-hhmmss.jpg, showing the date and time when the snapshot is taken. This creates a problem because the **html** that defines the contents of a web page has to be given a fixed file name for the picture that it is to display. It was therefore necessary to carry out processing at the web server site in order to supply a fixed file name.

The Web Server

My web site has always had web pages written in simple **html**, using a text editor on my PC. After writing and testing the web pages on the PC, I upload them to the server using **ftp**. I have not changed this process, but I now needed to include additional commands to process the files that had been uploaded to the server by Foscam. I did this by inserting a small amount of PHP code into the **html**.

PHP

PHP is a high-level programming language geared toward web development. It accepts a series of commands which look a little like English, and interprets them when it is invoked. It is implemented on many servers, including the one used by Above Stock.

PHP is written as an insert in an html page, with start and end markers so that the PHP interpreter knows which is PHP code and which is **html**. The server recognises by the page name extension, **.php**, that the page must go to the interpreter for processing. After processing, the server removes the PHP code and downloads a pure **html** page to the user's browser.

³ Also available for Mac & mobiles

Preparing the Page Using PHP code

The name of the page is `amblesideweather.php` which tells the server to run the PHP code that is embedded in it. The task of the code is to find the most recent picture and change its name to `FairfieldView.jpg`. The code does the following:

- It goes to the directory in which the Foscam picture uploads are stored
- It works through the uploaded files from earliest to latest, changing the name of each one to `FairfieldView.jpg` and overwriting the older one. When it has finished working through the list, the file named is now the most recent one.

The server runs the PHP code and obtain an up-to-date `FairfieldView.jpg` picture which it can download to your browser for display on your screen. It then removes the PHP code from the page so that the page becomes pure `html`.

Viewing the Web Page

When you request your browser to display the Ambleside Weather page, although you requested a `.php` page you receive page which your browser can display.

3. Summary

Second time around, I did not encounter many unexpected problems, but if you are thinking about doing this kind of thing, the following points may be useful

- You need a suitable place for the camera, where it will get an unobstructed view. One factor is making sure that it cannot appear to be overlooking your neighbours; but our next-door-neighbour does not object to the camera having a view of her roof and TV aerial.
- If you have it high up, you need to get up there and make sure that it is pointing in the right direction. The best way of doing that is to send someone else up the ladder while you view a real-time picture.
- The total cost of equipment is around £100, for a Foscam camera, waterproof housing for the terminating sockets and an external grade Ethernet cable. If you use Power Over Ethernet you don't need mains power to the camera and wouldn't need to install a mains socket close to the camera.
- I created the first page of the Above Stock website about 15 years ago, when website builder software was less developed than now. I have always used the CoffeeCup HTML Editor, which is a text editor with support for `html` tags and preview & upload facilities. I do not know how you would incorporate PHP code into the pages created by a website builder, but there is a hint in the Fasthosts (my service provider) documentation, that WordPress can incorporate PHP code.
- PHP is not the only language which is suitable for website development, but it is offered as part of a package by Fasthosts. It was a new language for me, but is quite widely used, so I chose it. Its syntax is straightforward. However, I encountered two problems:
 - The standard online manual describes the syntax of PHP 8, but Fasthosts provides PHP 7.4. It turned out that some of the commands that I learned from the manual were new to PHP 8. I reverted to a second-hand copy of PHP 5 for Dummies and used that for reference.

- I did all of my development on the remote host and all errors, whether syntax, runtime or resource failure, were reported by the same uninformative response System Error 500. I would have been better off installing PHP on my local machine and doing my debugging locally.
- At the moment, no pictures are archived, but some are quite striking. I shall look at possible methods of archiving and display, as a future enhancement.