Metering Over IP

Metering Over Internet Protocol

(aka Metering Over Fiber)

Introduction

This is a concept document. It will describe some of the pertinent characteristics of an engineering solution to allow a utility provider to acquire metering data through an Internet Protocol connection. The metering data in this case is water usage.

This document will first describe the concept of the basic system architecture, then present slightly more detailed information relevant to implementation.

Internet Protocol (IP)

IP is the principle means by which data moves on the Internet. It is a scheme by which 2 hosts can communicate information. Here the word "hosts" means any computer, server, router or other electronic device that has the ability to connect to the Internet in some way.

IP data (sometimes referred-to as traffic) can ride on top of copper wires, fiber optics and other media. Here the word "media" refers-to the underlying physical or spatial carrier of the IP data. If the media is copper or fiber, then we would call it "physical". If the media is a laser beam, carrying data from the rooftop of one building to the rooftop of another building, then we would call the media "spatial".

These are important characteristics and distinctions for the following reasons.

Various individuals interested in this possibility have referred-to it as "metering-over-fiber". While IP can travel over fiber, it is more correct to refer to this as metering-over-IP because of the confusion and distortions that can and indeed, have occurred.

NOTE: In a fiber optic cable, the actual "fiber" is a very thin strand of glass. This will often be referred-to simply as a "strand". Within an overall fiber optic cable, there can be, and typically is, a number of these fiber strands

If this solution is referred-to as "metering-over-fiber" then someone might say that an additional fiber strand is required, going to every customer, and that would be expensive. Indeed that would be expensive, but such a system concept, of **employing an additional strand, is entirely un-needed and indeed undesirable**.

For the water customers who have an existing IP connection, in other words – an Internet connection, whether it is fiber-based or copper-based, they have an existing IP capability that can be used for metering data. It will not result in additional charges from the carrier (local Internet company). People use their IP connection for browsing the web, email, audio and video streaming, and various other services. This metering-over-IP will just be one more service, and the amount of traffic it uses will be very small.

Therefore, **discussions of an additional fiber strand is not pertinent to this concept and only serves to confuse and mislead non-technical individuals**.

Furthermore, **discussions of having an additional wavelength of light on an existing fiber strand are equally inappropriate to this concept and only serve to confuse and mislead non-technical individuals**.

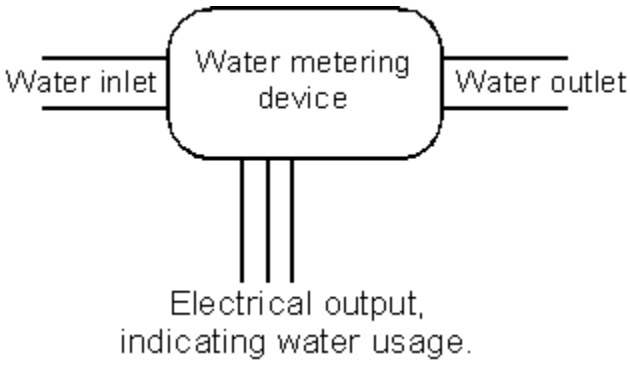
Water Metering Devices

Various manufactures have water-metering devices that have an open electrical output. This electrical output provides water meter usage data, on copper wires. This electrical output can be connected to another electronic system, usually called an "interface" or "interface box".

A partial list of the water-metering device manufacturers whose devices are compatible with the interface box are:
Badger
Schlumberger
Sensus
ABB Water Indexes
Kent Water
Meinkie
Gyr and Landis
Neptune

The interface box will work with just about any pulse or encoder devices.

The following figure shows a depiction of a water-metering device with an electrical output on copper wires.

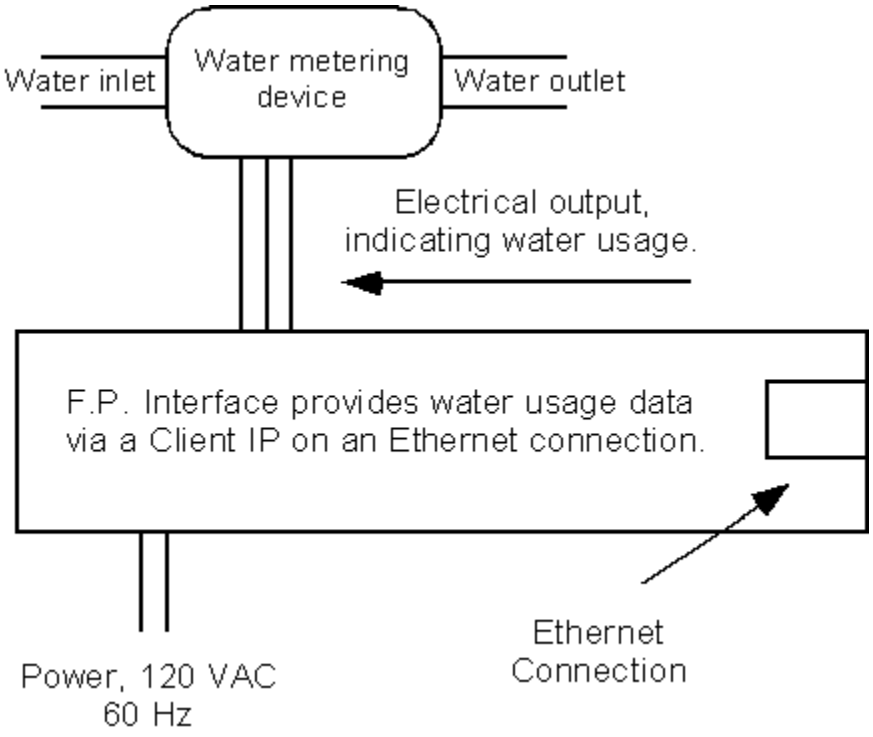


The Interface Box

The interface box that connects to the water-metering device, can send along the water usage data by a variety of means. This document addresses the approach of the interface box being a "client" in the well-known Internet software approach called Client-Server Computing.

This means that the interface box will actually have a small microprocessor that knows how to "speak" IP (Internet Protocol) as a "Client" and will be "talking to" a "Server". The Server will be at the water utility headquarters.

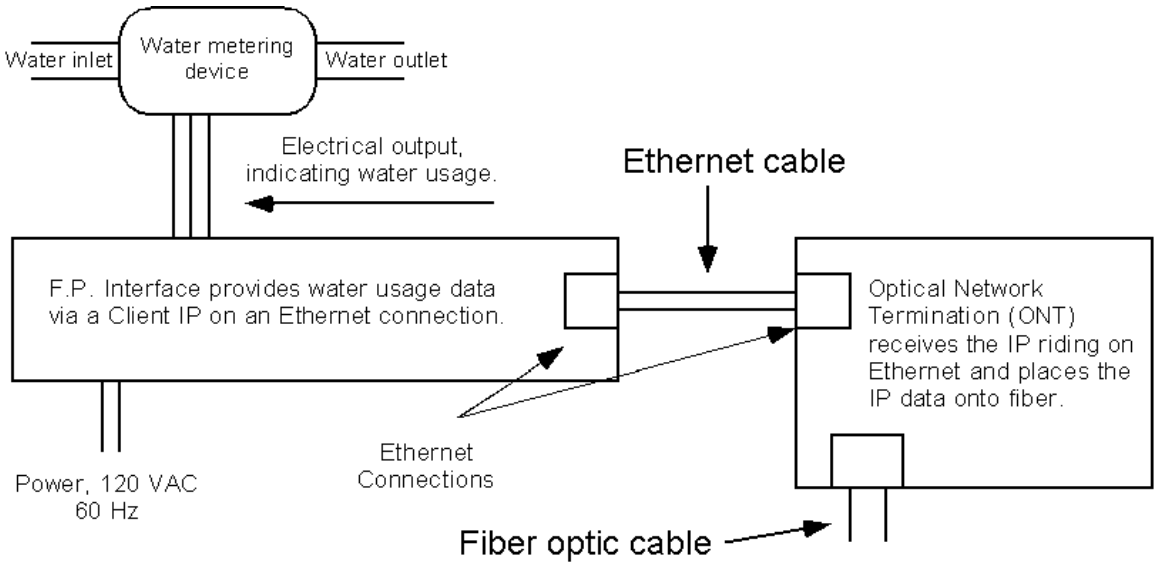
Here is a depiction of the water-metering device connected to the interface box.



Connection To The Local Internet Service Company

The interface box will connect to the Optical Network Termination (ONT) box that is provided by the local Internet service company. This connection will be via the well-known Ethernet connection.

So in the following figure, the Client IP water-meter-usage-data, changes from traveling over an Ethernet cable to traveling over fiber.

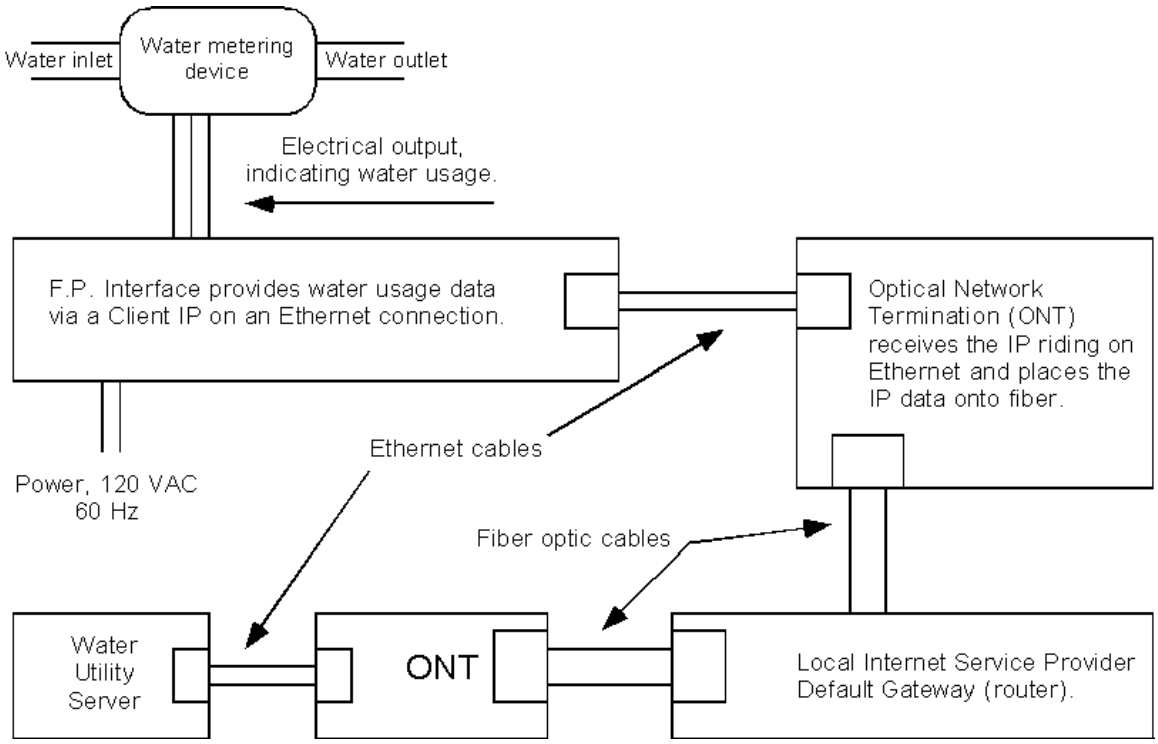


Connection To The Water Utility Server

The final connection path for the water usage data will be from the ONT on the customer premises, to the water utility server, via the usual IP packet routing performed by the Default Gateway (router) provided by the local internet service company. This is the very same Default Gateway that is serving the customer for all of their Internet, email, web browsing, etc. traffic.

This water meter usage data (IP packets) is simple a very small additional amount of total monthly traffic.

The following figure depicts the entire system of this metering-over-IP concept.



Notes On Installation

The following notes are in reference to the above figure.

Water Metering Device Installation

This will be typically performed by water utility personnel. Alternately, the water utility could certify certain private plumbing contractors to perform the installation.

Interface Box Installation

This task involves physically installing the interface box and connecting it to AC power and to the ONT. The connection to the ONT is an Ethernet connection.

The skills required for this installation are common to the telephone/internet industry. Therefore any private telephone installer (commonly called an “Interconnect”) could handle this installation. Alternately the water utility could handle this installation.