PPG Invoice Image Recovery Project

# About PPG:

At a Glance

Founded in 1883 as Pittsburgh Plate Glass by Captain John B. Ford and John Pitcairn and in Pittsburgh, Pennsylvania. Today, PPG is a global supplier of paints, coatings, optical products, specialty materials, glass and fiber glass.

Through leadership in innovation, sustainability and color, PPG helps customers in industrial, transportation, consumer products, and construction markets and aftermarkets to enhance more surfaces in more ways than does any other company.

Employees:

* Worldwide: ~42,600
* North America: ~17,800
* Europe, Middle East and Africa (EMEA): ~14,800
* Latin America: ~1,800
* Asia Pacific: ~8,200

Financials:

Total Net Sales 2013: $15.1 Billion. PPG is ranked 182 on the Fortune 500

Sales by Segment (Millions):

* Performance Coatings: $ 5,872\*
* Industrial Coatings: $4,845\*
* Architectural Coatings – EMEA: $2,062\*
* Optical and Specialty Materials $1,262\*
* Glass $1,067\*

Sales by Region (Millions):

* United States and Canada: $ 6,926\*
* Latin Americas: $718\*
* EMEA: $4,865\*
* Asia Pacific: $2,599\*

Manufacturing Operations:

* Worldwide: 156 manufacturing facilities\*
* United States: 45 sites (19 states)
* Other Americas: 14 sites (10 countries)
* EMEA: 64 sites (29 countries)
* Asia Pacific: 33 sites (12 countries)

Primary research centers:

* PPG Coatings Innovation Center (Allison Park, Pennsylvania)
* PPG Glass Business and Discovery Center (Harmarville, Pennsylvania)
* Monroeville Chemicals Center (Monroeville, Pennsylvania)
* Fiber Glass Science and Technology Center (Shelby, North Carolina)

# Background Information:

PPG Architectural Coatings, North America, has over 1000 retail locations in three different countries. After every retail transaction, a PDF image of the signed transaction (invoice) is generated by one of our 4000 point-of-sale (POS) machines (PC’s that essentially serve as very high functioning “cash registers”) and are stored on the local hard drive of the POS. This amounts to approximately 50,000 PDF’s per day, 355 days a year. PPG is required by law to store a copy of every one of these invoices for a minimum of seven years. Throughout every night, an aggregation server called, Afaria, moves a copy of the invoices from each POS to one of four different servers. Each morning another application moves yet another copy of these invoices (redundancy) from these servers, onto a single server, into store specific folders. From these folders, a number of different enterprise level applications access the PDF’s in order to display them to our internal and external customers over both intranet and the Internet.

# Problem Statement:

Due to the sheer volume of invoices, even if the above described process works at a 99.9% accuracy rate, it still results in more than 1000 missing or corrupted invoices every month. This is due to:

* network outages at the retail locations
* network latency
* file corruption during the original generation
* file corruption during copying between servers
* bugs in and the imperfection of the Afaria process

Unfortunately, PPG does not currently have a process in place to automatically detect missing and/or corrupted invoices. Therefore, when an invoice is reported missing or corrupted by either an internal or external customer, a PPG IT personnel manually locates the missing invoice(s) and moves copies of them into their final destination.

# Requirements:

We need a way to locate specific invoices (up to 100 at a time) in any of the locations where they could have gone missing or corrupted and copy them into their appropriate final destination folders. In addition, the application must provide the user the option to combine the FTP’s into a single FTP and/or bundle them into a ZIP file.

PPG is a Microsoft technology development center, and therefore, the application must be:

* written using Visual Studio 2012, .NET Framework 4.5, C# (C Sharp)
* a Windows Forms Application