

PaymentCardXpress™ - Executive Overview



CFXWORKS, INC

2015

<http://www.cfxworks.com>

PaymentCardXpress™ - Executive Overview

A credit card processing gateway that runs on any Java enabled platform capable of running Apache Tomcat, WebSphere or JBoss.

A token based solution that is out-of-scope for PCI DSS and validated on many platforms including: Windows, Linux, UNIX and IBM's iSeries.



Software Version	17.0
Document	PCX_User_Guide.pdf
Published	12/22/14
Updated	02/08/15

CFXWorks, Inc
303 Arbor Green Lane
Alpharetta, GA 30004
678-455-0952

Email: sales@cfxworks.com

<http://www.CFXWorks-Enterprise.com>

Printed in the United States of America.



1. INTRODUCTION 3
 BACKGROUND 3
 PCX ACRONYM..... 3
 WHAT IS PAYMENTCARDXPRESS?..... 3
2. EXECUTIVE VIEW 5
3. DEPLOYMENT SCENARIOS 9
4. BRIEF PCX OVERVIEW 11
5. DEPENDENCIES 12
6. RESELLERS AND INTEGRATORS..... 12
7. REASONS TO BUY PAYMENTCARDXPRESS..... 13
APPENDIX A - DEFINITIONS 14

1. Introduction

Background

For over 22 years CFXWorks has been developing security solutions that support encryption, digital signatures and secure messaging technologies. Our solutions targeted “data-at-rest” and “data-in-flight” data confidentiality and data integrity requirements in cross platform environments involving Windows, Linux, UNIX (Solaris, AIX and HPUX) and IBM’s iSeries platforms. In year 2000, CFXWorks began developing payment card gateways. We have developed and shipped credit card gateways that support: Global Payments Direct, Elavon, Vital, Paymentech, Authorize.Net and Bank of America’s VirtualPay.

We have over 500 users of our payment gateways. Our customers include merchants from various business sectors including: retail, wholesale, manufacturing, education, government (state and local), legal and insurance.

Our **PaymentCardXpress (PCX)** solution is a new offering that supports Global Payments Direct.

For your convenience, Appendix A contains definitions for a number of terms and acronyms that are used in the credit card industry.

PCX Acronym

PaymentCardXpress is referred to our documentation either by its formal name or as **PCX**.

What is PaymentCardXpress?

PCX is payment card (credit, debit and purchase) solution that supports tokenization. **PCX** supports direct, secure submission of transactions to Global Payments Direct Extended Payments Gateway (EPG).

PCX is designed to be capable of receiving payment card requests from any program written in any programming language capable of sending HTTP/HTTPS requests. **PCX** is also capable of supporting native iSeries applications and communicating with these

applications using data queues. **PCX** also provides programmers access to strong encryption capabilities that can be used by the merchant for whatever purpose they choose.

PCX is considered "out-of-scope" for PCI-DSS because:

1. **PCX does not store the PAN.** It does store a masked version (first 6 and last 4 digits of the number) of the PAN. Most importantly it stores the token returned from the processor which can then be used to submit reoccurring transactions.
2. **PCX does not transport card data.** Card data is transported by code internal to ones operating system. This code is not internal to **PCX**. The receiving server, Global's gateway server, controls the encryption algorithms and keys. **PCX** exercises no control over the transport process.
3. **PCX does not process card data.** U.S. banking regulations prevent CFXWorks from being a "processor". **PCX** submits payment requests to Global Payments Direct who functions as the processor. **PCX** is not a "Processor".

What does the above mean to the merchant?

1. **Reduced PCI DSS Scope** - It means that many issues that the merchant normally would have to address to be PCI DSS compliant are off the table.
2. **Lower Level Self Assessment Survey** - It means that most merchants using this solution can use for their annual Self_Assessment Questionnaire, Level C, therefore reducing the time, cost and effort required to fulfill this requirement.
3. **Lower Risk** - It means that the merchant has lowered their risk of exposing customers to fraud and identity theft.

2. Executive View

CFXWorks has had the opportunity to talk with many business and technical executives over the past 22 years we have been in business. A common thread among these executives is their dissatisfaction and frustration with 3rd party payment solutions as related to the following issues:

- Excessive 3RD party processor fees.
- Hidden 3RD party processor fees.
- Performance, reliability and security issues related to 3RD party processors..
- Lack of access to and control over detailed transaction data.
- Inability to create customized reports.
- Their responsibilities and how to implement the Payment Card Industry Data .Security Standards (PCI DSS).
- Lack of support from their vendors and processor.

Merchant Account

When a merchant establishes a “merchant account” they can do it directly through a processor, for example Global Payments Direct, or they can do it through a middleman referred to as a 3rd party provider. 3rd party providers are typically resellers of a processor’s services. 3rd parties may or may not have their server in the transaction processing pipeline. If they have their server in the pipeline, then they must relay transactions received from the merchant to the processor through their servers.

When dealing directly with the processor (for example Global Payments Direct) they are the processor not some 3rd party therefore:

- The merchant negotiates directly with the processor to establish their merchant account and all aspects of the fee structure assigned to the merchant account.
- No middlemen are involved in negotiating this relationship.
- No middlemen are involved in processing transactions. Transactions are sent directly from the merchant’s server to the processor.
- There are no middlemen fees or hidden costs in this environment because there are no middlemen.
- There are no performance, reliability or security issues caused by middlemen because there are no middlemen in the pipeline.
- **PaymentCardXpress solution is not a 3rd party solution environment.**

When dealing with a middleman 3rd party processor:

- The merchant negotiates with the 3rd party processor to establish their fee structure. In this scenario all transactions are ultimately passed to the processor! If this is the case then who pays the processor? Who pays the 3rd party? *Ultimately the merchant must pay both the “processor” and the “3rd party processor”.* This being the case, the merchant should carefully consider what additional services are provided by the 3rd party to justify the added cost.
- In most 3rd party processor situations, transactions are sent first to the 3rd party processor’s system and then relayed to the processor. This introduces one more point of failure in the pipeline and may create issues related to performance, security, and of course fees.
- When problems arise who’s at fault? Does the issue lie with the “3rd party” or the “actual processor”? With these two entities pointing their finger at each other, the Merchant can be left in a rather precarious situation. Meanwhile, until the issues/problems are resolved the merchant is losing sales as well as potential future customer relationships.
- **This is NOT the PaymentCardXpress environment.**

Other issues that may surface when using a 3rd party processor are:

- **Delayed receipt of funds** – a processor, for example Global Payments Direct, automatically settles the merchant’s account every night. Therefore, the funds are deposited in the merchant’s banking account the next day. A 3rd party processor may remit payments only once or twice a month.
- **Risk of non-payment** - Since the 3rd party delays payment for some period of time (sometimes several days), the merchant is exposed to loss if the 3rd party is not financially sound.
- **Chargeback risk** - Customers are far more likely to dispute charges on their credit card statements that do not clearly identify the source of the charge. When a merchant account is established directly with the processor, the merchant’s organization name and telephone number will typically be displayed on the customers' statement. Charges processed via a 3rd party will typically have the 3rd party's name, which is often not relevant to the cardholder. Often, customers will simply call their credit card company and dispute the charge. This is likely to result in extra charges (called Chargeback fees), as well as extra work for the merchant and the customer that may result in your loss of the sale.
- **Less information about customers** - Typically the online forms used by 3rd party processors are very generic and don't allow the merchant to collect additional information

about the customers that could be helpful in future solicitations and customer development.

- **Higher costs** - Typically 3rd party processors charge higher transaction processing fees, often 5 to 10 percent of the sale amount vs. the 2 to 3 percent you will incur if you negotiate directly with the processor. They may also hide a significant portion of their fees in what is commonly referred to as “**hidden fees**”. Hidden fees relate to monthly, quarterly and annual fees buried deep within the agreement signed by the merchant. For the unsuspecting Merchant these hidden fees can really add up quickly and bite into their bottom line.

Transaction processing fees can add up quickly even if the additional fee is only a few cents per transaction. A review of **Figure 1** reflects how a merchant’s processor fees can add up rather quickly.

Amount Lost Each Year				
Number of transactions	vendor fees per transaction			
	5 cents	10 cents	15 cents	20 cents
1,000	\$50	\$100	\$150	\$200
10,000	\$500	\$1,000	\$1,500	\$2,000
100,000	\$5,000	\$10,000	\$15,000	\$20,000
500,000	\$25,000	\$50,000	\$75,000	\$100,000
1,000,000	\$50,000	\$100,000	\$150,000	\$200,000

Figure 1 – Vendor transaction Fees

Note that “hidden fees” should not be taken lightly. They include monthly, quarterly and annual fees charged by both the processor and 3rd party processor. A potential “**hidden fee**”, which could be significant, relates to the **fee structure quoted to the Merchant**. The quote may only relate to a best case scenario. For example the quote may apply only to a very low risk transaction scenario (card-present, swipe or full AVS and CVV2). Merchants may choose to accept payment even though the customer does not present certain data as part of their transaction (i.e., AVS and CVV2). Therefore, they end up paying significantly higher transaction processing fees than what they thought they had committed to.

Merchant Requirements

Here is a checklist to consider when choosing a payment solution:

1. **Aggressive Fee Structure** - an aggressive fee structure from your processor with no hidden costs or fees. To negotiate directly (**NO 3rd party processor! NO middlemen!**) with your processor relative to all processing fees.
2. **Next Day Settlement** – transactions settled with funds transferred to your account on the next business day.
3. **Platform Support** - support for the merchant's platform of choice.
4. **Database Support** - support for the merchant's database of choice.
5. **Programming Language** - support for the merchant's preferred programming language.
6. **Reliability** - reliable processing of your transactions.
7. **Easy** – easy to acquire, install, integrate, maintain, support and use.
8. **Scalable Solution** – a solution that will scale to meet their need of your business as it grows without a major investment to redesign, rewrite and redeploy.
9. **Processing Speed** – an affordable way to process multiple concurrent transactions at the anticipated peak number of transactions per second with a response time less than 3 seconds.
10. **Audit Trail** – an audit trail for your own internal purposes as well as to respond to PCI DSS.
11. **Ownership of Transaction Data** – the ability to store and retrieve transaction data on your own systems, not in the cloud.

12. **Export of Transaction Data** – the ability to query the transaction database and create custom reports.
13. **PCI DSS** – a credit card solution that is implemented by their vendor consistent with PCI DSS.
14. **Comprehensive Solution** – a solution that supports many integration options so it can be integrated with their front office (for example shopping cart or order entry) and back office (shipping and warehousing) systems.
15. **Testing Capabilities** – the ability to run both test and production transactions against the processors system to support integration efforts and train employees.
16. **Assistance from their Processor** – to directly call their processor to resolve payment issues related to specific transactions. Avoid getting caught in the middle between a 3RD party and the processor.
17. **Services** – to be able to turn to experienced “services providers” who have the expertise to assist them deploy, integrate and manage their credit card solution.

While merchants processing a limited number of transaction with low dollar amounts per transaction tend to focus on only a couple of the above requirements, as their volumes increase they tend to add more of the above requirements to their “must have” list:

3. Deployment Scenarios

PaymentCardXpress was designed so that it can be deployed to almost any type of an environment. The following figure illustrates a common deployment scenario:

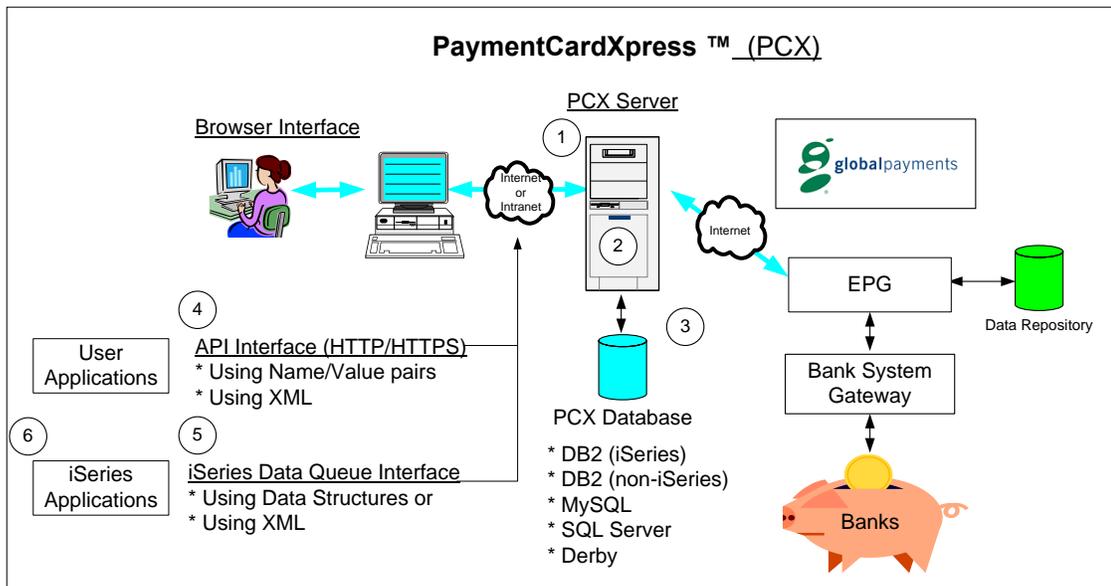


Figure 2 – Typical PCX Deployment Scenario

1. Platform Choice - PCX will run on any platform capable of running Java 1.7 or 1.8 and the Apache Tomcat, WebSphere, or JBoss Java Application Server. Typical systems include Windows (7 or 8), Linux (RedHat or SUSE), UNIX (AIX), or IBM's POWER 7 or 8 systems running AIX, Linux, or the IBM i operating system.
2. Access Control - PCX is built on top of an Identity Access Management System (IAM) that controls user authentication and authorization.
3. Database Choice - PCX supports many database engines including those listed in Figure 2. These databases can be installed on the system running PCX or on another system.
4. API Support - Programmable API that allows any HTTP/HTTPS capable language to submit transactions for processing.
5. - iSeries - Native iSeries applications have to option to access PCX using data queues.
6. - No iSeries Upgrades Necessary - Isolate iSeries from security exposures, performance issues and the need to upgrade.

4. Brief PCX Overview

PaymentCardXpress is a software solution that provides merchants the following capabilities:

- **PaymentCardXpress allows merchants to process payment card (credit, debit, and purchase card) transactions using the Internet to connect the merchant's system to Global Payments Direct.**
- **PaymentCardXpress sends transactions directly to Global Payments Direct for processing bypassing 3rd party processors.** By communicating directly with the Global Payments Direct, the merchant eliminates the costs and hassle involved with interacting with 3rd party processors. This also enables the merchant to negotiate their fee structure directly with Global Payments Direct rather than with a third party processor who typically adds additional processing and service fees.
- **PaymentCardXpress has been implemented consistent with the Payment Card Industries Data Security Standards.** Please see our comments about PCI DSS in *Section 1.3* of this document.
- **PaymentCardXpress provides users a browser based user interface that supports manual entry of payment card transactions.** This demo code would normally be tailored by the merchant to fit their specific needs. This demo code is a good fit for "card-not-present" transactions in a mail or phone order environment.
- **PaymentCardXpress supports Global Payments Direct's Extended Payments Gateway (EPG) for market segments "eCommerce", "Retail" and "MOTO".** The EPG gateway will support tokenization and the new EMV standard required by MasterCard and Visa. PCX currently supports the tokenized version of EPG for merchants not using Point-of-Sale terminals. In 2015 PCX will also support the "chip-on-card" version of EPG for merchants using Point-of-Sale terminals.
- **PaymentCardXpress supports many credit and purchase card transaction types including: SALES, PREAUTH, CAPTURE, RETURN, VOID, CREATE ALIAS, INQUIRY and SETTLE.**
- **PaymentCardXpress supports multiple merchant accounts and multiple terminals per merchant account.**
- **PaymentCardXpress is built on an Identity Access Management (IAM) base to enforce user authentication and authorization.** For example, the merchant's PCX administrator assigns users to specific user accounts and assigns each user account a specific role. The role an account is assigned controls what activities and information the user has access to.

- **PaymentCardXpress supports the following security and quality control features:**
 - **Global Payments Direct certification**
 - **IBM certification** for Linux, AIX and IBM I V7.1 and V7.2.
 - **Data confidentiality features** - sensitive data encrypted using the AES algorithm with 256-bit keys and 128-bit initialization vectors.
 - **Data integrity features** – selected data is signed using MD5.
 - **PAN** - PAN is not stored. Tokens are stored and can be used for reoccurring transactions. **PAN is masked** in all displays and logs
 - Credit card numbers are validated using the **LUHN formula (Mod 10)**.
 - **Logs implemented consistent with PCI DSS standards**
 - Support is included for the **Address Verification System (AVS)**. Full and partial AVS is supported
 - **Support is included for CVC2/CVV2/CID.**

5. Dependencies

To use PaymentCardXpress in “**TEST MODE**” **the merchant does not need to purchase an Global Payments Direct merchant account.** Therefore, the merchant can install PaymentCardXpress, run test transactions, and integrate it into their shopping cart before making a purchase decision.

To use PaymentCardXpress in “PRODUCTION MODE” the merchant must purchase a Global Payments Direct merchant account.

6. Resellers and Integrators

Integrators can assist merchants with their payment solution by providing the skills and resources necessary to:

1. Design, build and integrate front office and back office capabilities with PaymentCardXpress.
2. Design, build and integrate features and functions unique to a given Merchant.
3. Provide services that achieve maintaining consistency with the PCI DSS standards.

4. CFXWorks maintains relations with several integrators who can assist merchants install, customize and integrate PaymentCardXpress with their legacy systems. If you need assistance, please call CFXWorks and perhaps we can assist you find a match.

7. Reasons to Buy PaymentCardXpress

1. Affordable.
2. Easy to buy, install, administer, maintain and support.
3. Implemented consistent with PCI DSS.
4. Built on an identity access management system that provides access control and authentication.
5. Includes detailed transaction logging capabilities.
6. Web interface for users needing to process card-not-present payment transactions.
7. Will run on Tomcat, WebSphere or JBoss Java Application Servers.
8. Certified by IBM to run on their POWER 7 and 8 platforms.
9. Certified to Global Payments Directs network.
10. CFXWorks will work hard to get your business and keep you satisfied.

Appendix A - Definitions

Acquiring Bank - An acquiring bank (or acquirer) is the bank or financial institution that accepts payments for the products or services on behalf of a merchant. The term acquirer indicates that the bank accepts or acquires transactions performed using a credit card issued by a bank other than itself.

Annual Fees – Some processors charge merchants an annual fee. This fee typically ranges from fifty dollars per month to about one hundred and fifty dollars per month. It is in addition to the discount rate, monthly fees, quarterly fees and transaction fees paid by the merchant.

AVS - Address Verification System (AVS) is a system used to verify the identity of the person claiming to own the credit card. The system will check the billing address of the credit card provided by the user with the address on file at the credit card company.

Batch - Transactions received during each 24 hour period are accumulated by Global Payments Direct in a batch. When the record number for a current batch reaches 950, Global Payments Direct will automatically close the batch, increment the batch number, and open a new batch returning a new record number of 001. Normally a merchant elects to have Global Payments Direct automatically settle transactions each day. In this case at 2:30 PM EST Global Payments Direct “settles” the batch through the banking networks.

Card Association - A card association is a network of issuing banks and acquiring banks that process payment cards of a specific brand.

Card-Present – A payment card transaction where the card is physically presented to the merchant.

Card-Not-Present –A payment card transaction where the card is not physically presented to the merchant. For example a phone or mail order is a card-not-present transaction.

CVV2 - The Card Security Code (CSC), sometimes called Card Verification Value (CVV), Card Verification Value Code (CVVC), Card Verification Code (CVC), or Verification Code (V-Code or V Code) is a security feature for credit or debit transactions, giving increased protection against credit card fraud.

Discount Rate - The fee a merchant pays its acquiring bank/merchant bank for the privilege to deposit the value of each day's payment card purchases. This fee is normally quoted in the range of two to three percent of purchase value. However, the quote is likely to be for a specific type of transaction only under specific conditions. For example it may only apply to “card present” transactions when both AVS and CVV2 are present and verified. Therefore, accepting any quotes discount rate merchants should verify that the quote fits their specific transaction type and mode of operation.

Extended Payments Gateway (EPG) – EPG is Global Payment's name for their new payments gateway that supports tokenization and the new European MasterCard/Visa standard. Some literature refers to EMV as "the chip on the card". Merchants not using point-of-sale (POS) devices are being pressured to move to token based solutions. These are solutions that store tokens rather than store the "Sensitive Card Data" as defined by PCI DSS. "Sensitive Card Data" includes the primary card number or PAN. Merchants using POS devices must move to payment solutions that support EMV. EMC is also a token based solution but it requires POS devices that support the new EMV feature. This move involves changes to the point-of-sale equipment as well as the merchant's software solution. The deadline for implementing for most merchants is 10/01/15.

Issuing Banks - An issuing bank is a bank that offers card association branded payment cards directly to consumers.

Line of Credit - A line of credit is a credit facility that allows a borrower to take advances, during a defined period, up to the preset limit and repay the advances at the borrower's discretion (with the exception that the entire principal balance plus accrued interest is due on the maturity date.

LUHN - The Luhn algorithm or Luhn formula, also known as the "modulus 10" or "mod 10" algorithm, is a simple checksum formula used to validate a variety of identification numbers including payment card numbers. It was created by IBM scientist Hans Peter Luhn and described in U.S. Patent 2,950,048.

Merchant Account – A merchant account is a contract under which an acquiring bank extends a line of credit to a merchant, who wishes to accept payment card transactions of a particular card association brand. Without such a contract, one cannot accept payments by any of the major credit card brands.

Monthly Fees – Some processors charge merchants a monthly fee. It probably is reflected on the merchants account statement as "Other Fees". This fee typically ranges from a couple of dollars per month to about thirty dollars per month. It is in addition to the discount rate, quarterly fees, annual fees and transaction fees paid by the merchant.

Payment Card - Typically a payment card is backed by an account holding funds belonging to the cardholder, or offering credit to the cardholder. Payment cards can be classified into types depending on how this account is managed. PaymentCardXpress supports credit, purchase and debit cards. In the future gift card capability will be added to PaymentCardXpress.

PABP – Payment Application Best Practices (PABP) is a set of recommendations developed by Visa to assist software vendors create secure payment applications that help ensure merchant compliance with PCI DSS.

PCI DSS – The Payment Card Industry Data Security Standards (PCI DSS) - PCI DSS is a set of requirements for enhancing payment account data security. It was developed by the founding payment brands of the PCI Security Standards Council, including American Express, Discover

Financial Services, JCB International, MasterCard Worldwide and Visa Inc. Inc. International, to help facilitate the broad adoption of consistent data security measures on a global basis.

Payment Processor – an organization like Global Payments Direct that offers payment processing solutions.

POWER – POWER is the name used by IBM to identify the processor architecture they originally called Reduced Instruction Set Computer (RISC). This technology was originally introduced by IBM in 1981 on the system they called The RTPC. As of 10/01/14, IBM no longer markets or distributes any platform using Intel chips or one that is capable of running Windows. All IBM platforms are now based on IBM's "POWER" architecture. Why POWER? The intent of the RISC architecture was to improve performance while reducing power consumption and therefore heat. IBM POWER systems are capable of delivering 2x-3x the performance of equivalent Intel based systems and will scale from workstation like to mainframe like capacity.

Processor - A processor **authorizes** and **captures** payment card transactions and submits these transactions to the bank system gateway that links the processor to the banks. The submission of transactions to the bank system gateway results in the transfer of funds for the customer's account to the merchants account.

Production Mode of Operation – A user of PaymentCardXpress can choose to run test transactions or production transactions. Production transactions are added to the current production batch and are settled following each business day. Production transactions normally result in the transfer of funds.

Quarterly Fees – Some processors charge merchants a quarterly fee. This fee typically ranges from a couple of dollars per month to about fifty dollars per month. It is in addition to the discount rate, monthly fees, annual fees and transaction fees paid by the merchant.

Test Mode of Operation - A user of PaymentCardXpress can choose to run test transactions or production transactions. Test transactions are added to a current test batch and are not settled. Test transactions are used to test connections and for training purposes. Test transactions never result in the transfer of funds.

Terminal ID – To use PaymentCardXpress in a production mode each merchant must establish an account with Global Payments Direct (see Section 3 of this document). Global Payments Direct assigns to each merchant a Merchant ID (MID), one or more Terminal IDs (TIDs) and a Bank Identification Number (BIN) for identification purposes.

TID File – This is an encrypted file created by CFXWorks and sent to the merchant that contains the authorized Terminal IDs and BIN numbers.

Transaction Fees – Some processors charge merchants a fee for each payment card transaction. This fee can range from a few cents to perhaps as high as thirty cents per transaction. It is in addition to the discount rate, monthly, quarterly, and annual fees paid by the merchant.

CFXWorks, Inc.

303 Arbor Green Lane

Alpharetta, GA 30004

678-455-0952

<http://www.cfxworks.com>

<http://www.cfxworks-coldfusion.com>

<http://www.enterprise.com>