



Technical Connectivity Guide

for

U.S.

Version 1.1

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Abstract

This document describes the connection alternatives available to connect to The Clearing Corporation (CCorp) from US cities.

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1 Introduction

This document describes the ways in which CCorp clients located in the U.S. can establish a technical connection to the CCorp systems.

To make an informed network choice, CCorp clients must first understand the various data components transmitted between CCorp and its clients. Data types will be outlined and network alternatives will be presented.

CCorp clients must have a minimum of 64kbps bandwidth dedicated to CCorp. CCorp offers clients a choice of connectivity options for machine-to-machine communication:

- Internet VPN solution using Corente software
- Frame relay solution hosted by AT&T
- Private line solution from Radianz

Only one connection per CCorp client is required; any of the three (3) aforementioned methods is acceptable. The Clearing Corporation believes that the connectivity alternatives described here will deliver superior performance while allowing customers to leverage existing network investments, schedule network migrations to meet their own priorities, and meet diverse service level and price objectives.

2 Clearing Corporation Data

CCorp supports three types of data traffic: GUI, MQ, and FTP. Each transport has its own technical characteristics and is best suited for a particular type of business transaction. All CCorp data utilize Internet Protocol (IP) transport.

2.1 Graphical User Interface (GUI)

All of the CCorp user interfaces are web-based GUIs. The Allocation and Claims Transactions (ACT®)¹, New Trade Management (NTM), and Give-up Accounting (GAINS®)² systems are browser-based.

GUI traffic is more bandwidth-intensive than other CCorp data traffic, and is secured with encryption provided on a commercially available browser.

Due to the bandwidth-intensive nature of the GUI applications and the high cost of leased lines, CCorp strongly recommends that GUI access traverse the public Internet. CCorp user interfaces can be accessed via any commercially available web-browser that supports 128-bit encryption. Most CCorp customers access these applications over the Internet and are comfortable with browser-based encryption for security. If additional security is desired, the Corente VPN solution scales to any bandwidth and will provide enhanced security to the browser.

Customers who require only GUI application access (no MQ or FTP) can communicate with CCorp via a web-browser and the public Internet, without any additional software, hardware, or network connection.

¹ ACT® is a registered trademark of The Clearing Corporation

² GAINS® is a registered trademark of The Clearing Corporation and the Chicago Mercantile Exchange

2.2 MQ Series

All trade and post-trade management transaction interfaces are supported through IBM's MQ Series messaging software. These interfaces include:

- Back-office system trade feeds
- Give-up/take-up actions
- Trade notification
- Position management

MQ Series is a futures industry standard because it is highly efficient and guarantees message delivery. When a message has been transmitted, MQ software on the receiving machine acknowledges receipt and the sending machine goes to the next transaction. If the receiving machine is unavailable, MQ software on the transmitting machine holds the message until that machine becomes available.

A standard CCorp message is 1500 kilobytes. One message is required for each transaction. A secured connection of at least 64 kbps, which can also be shared with FTP communication, is recommended for MQ Series traffic.

CCorp clients transferring data through MQ are responsible for acquiring and installing MQ software on their systems.

2.3 File Transfer Protocol (FTP)

All file transmission interfaces are FTP-based. FTPs sessions are initiated by the client's back-office systems, which "PUT" files to and "GET" files from a dedicated CCorp FTP server. The bulk of this data is transmitted after trading hours. FTP software is standard on all operating systems that support Internet protocol.

CCorp client files to be downloaded from CCorp vary in size from 4 kilobytes to 4 megabytes, depending on file type and trading activity. Larger files are transmitted after completion of end-of-day processing. A single secured 64 kbps connection may be used for MQ Series and FTP traffic.

3 Clearing Corporation Network Options

CCorp offers several connectivity alternatives for its clients. Those alternatives are:

- Public Internet via VPN software from Corente
- Private line hosted by DBS
- Private line hosted by Radianz

These options were developed to enable CCorp clients to make network decisions based on cost/benefit to their organizations. If it becomes apparent that the solution set needs to be expanded, CCorp will attempt to add choices.

Transport for all CCorp traffic is the Internet Protocol (IP). The optimal connectivity choice depends on data type, transaction volume, and customer policy. A secure connection to each clearing CCorp client can be facilitated via the Internet or private line.

MQ and FTP traffic can be transported via an Internet Virtual Private Network (VPN) or private line. Alternatives for MQ and FTP traffic include a hosted and monitored Internet VPN solution, the AT&T

private frame relay network, and the Radianz Financial Industry Network. The Internet VPN is the least expensive option and can provide the highest bandwidth. Private line alternatives provide more consistent performance and enable CCorp clients to leverage their investments in provider infrastructures.

3.1 Network Structure

Network security and high availability are cornerstones of the CCorp design. IP network connectivity with rich security offers a compelling cost proposition especially as the bandwidth is increased and international connections are factored in. In the past few years IP networks have become a very tried and tested technology option to support business-critical trading options. Private line connections segregate traffic and are supported by strong SLAs for availability and response times. These lines may be encrypted. Internet connections *must* be encrypted.

Customer connections are aggregated by a network provider and delivered to CCorp through lines that are redundant on two levels. Both Internet and private line connections have redundant feeds into CCorp's primary data center in Chicago. Additional fail over is provided at the CCorp disaster recovery site, located in a Chicago suburb. To ensure the highest level of availability, all network connections are monitored 24 hours a day.

Public Internet Connections

The Clearing Corporation's Public Internet offering provides the following features:

- Software-based Virtual Private Network (VPN)
- Minimum of 168-bit 3 DES encryption
- End-to-end connectivity monitoring
- Issue management and escalation

The connection is the responsibility of the customer to implement and support. The network provider will assist the customer with any configuration issues that might arise.

Private IP Connections

The Clearing Corporation's private network connections offer the following features:

- Redundant leased circuits
- Guaranteed bandwidth
- Diverse network providers where possible
- Route diversity where possible
- End-to-end connectivity monitoring
- Issue management and escalation

3.2 IP VPN Connections

The Clearing Corporation's Secure IP Network offering can be used for all CCorp traffic. This is the least expensive solution for MQ and FTP data. Using software from Corente, this offering leverages the participant's existing private IP and public Internet infrastructure. Bandwidth is governed by the client's Internet connection, competition for that bandwidth from other firm traffic, and the performance variables

that influence other Internet-based applications. One advantage of this solution is that firms with high bandwidth Internet connections may experience faster response times than those with lower bandwidth private circuits. This connection is the responsibility of the client to implement and support. Corente provides monitoring, software updates, security credential distribution, and alerts; CCorp provides IP address resolution.

The Corente Solution is designed to scale to address various networking challenges. The basic software solution offers the following capabilities:

- IP VPN connectivity
- Credential creation, distribution and revocation
- High security and tamperproof administration
- Automated software upgrades
- Easy to configure NAT rules to address conflict resolution

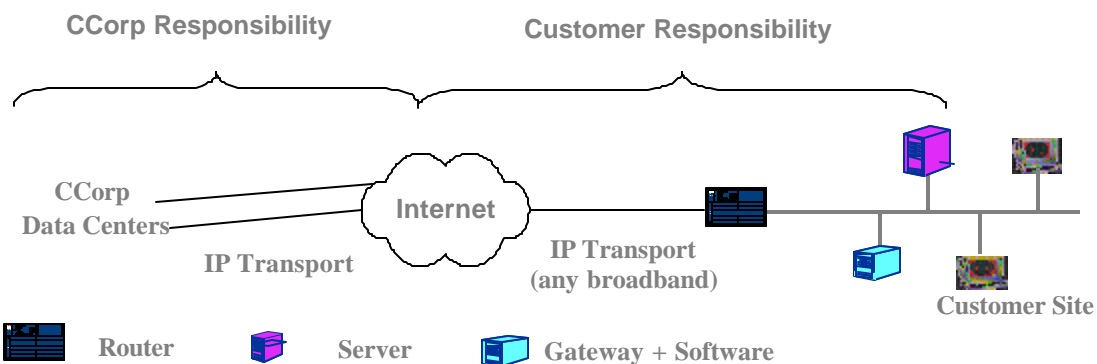
Additional features may be enabled to address additional networking challenges:

- Stateful firewall
- Business continuity/hardware failover
- End-to-end application performance monitoring and management reporting
- Remote access capabilities
- Connectivity to other CCorp partners

The Secure IP Network solution requires a gateway server at the CCorp clients location. Corente software running on the server provides the security capability and is required for the 24x7 monitoring and centralized management of the secure tunnel.

With the Secure IP Network solution, CCorp manages the IP address scheme. CCorp will ship a pre-configured gateway to the participant. The participant will install the machine, and Corente will monitor connectivity between the participant and CCorp. If a problem occurs with the network connection, the network service provider works with the participant to resolve the issue. If a problem occurs with the gateway, Corente and CCorp work with the participant to resolve the issue. Corente performs software upgrades as part of CCorp's monthly fee.

Public Broadband Network / Software VPN Design



Characteristics:

- IP Transport: Broadband Internet
- Corente monitors IPSec Tunnel (security tunnel)
- CCorp manages IPSec Tunnel
- Customer interfaces with its carrier of choice (ISP) – any existing Internet connection with at least 64kbps unused bandwidth is adequate.
- Customer uses its existing router(s) – devices used for Internet connection above
- Customer owns gateway hardware
- CCorp provides access to its facilities (ISP)
- Bandwidth is controlled by customer Internet connection

Notes for the VPN alternative:

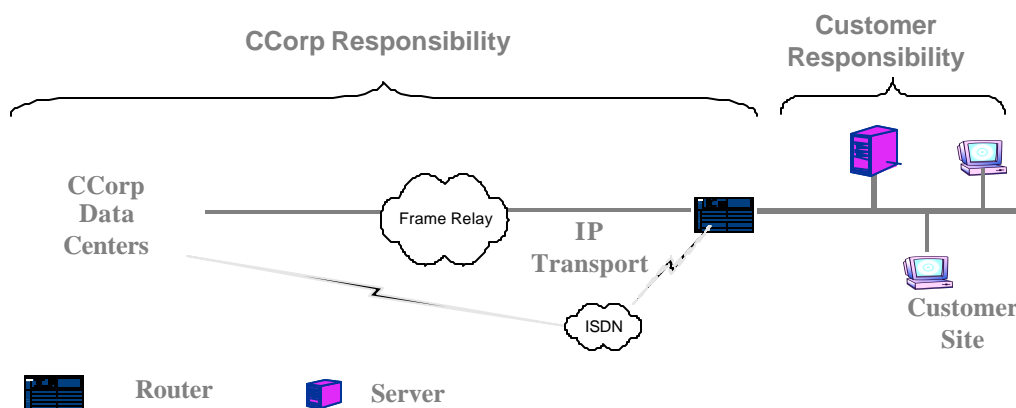
- Gateway Software: Provides security capability (168 bit 3 DES encryption) and supports the 24 x 7 network monitoring.
- Appropriate firewall rules may need to be added to the customer's existing Internet connection to allow traffic through port 551.
- CCorp will designate IP addresses for network termination.
- A public IP address must be provided from the participant's Internet provider.

3.3 Private IP Connections

CCorp offers several private network choices. These alternatives are more expensive than the Internet-based solution, but provide guaranteed bandwidth. The primary domestic leased-line providers are AT&T and Radianz, LLC. With these providers, Clearing Link participants may be able to build on the infrastructures they use to communicate with other businesses. The provider assumes monitoring, management, and performance responsibility for the network from source to destination.

3.3.1 Private Line Solution – AT&T Frame Relay Network

CCorp Frame Relay Network Design



Characteristics:

- CCorp/AT&T provides private Frame Relay circuit through AT&T
- CCorp provides a switched backup link
- CCorp/AT&T manages routers
- Customer subscribes to bandwidth as needed

Notes:

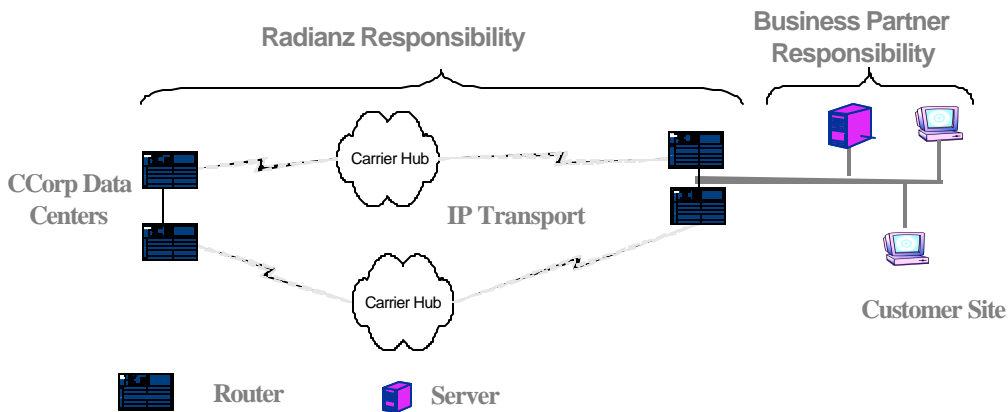
- Fully managed solution
- IP Transport: Private Frame Relay
- Backup Transport: ISDN BRI (included in price)
- Management Transport: POTS (included in price)
- Appropriate firewall rules may need to be added to the customer’s existing Internet connection to allow NTP protocol, protocol #50, and UDP port 500.
- The Clearing Corporation will configure hardware. Physical or remote access to the equipment must be provided to CCorp.

3.3.2 Private Line Solution – Radianz

Participants choosing to leverage the Radianz Financial Industry Network for US clearing data will be required to have at least 64 kbps dedicated to CCorp. The Radianz network may have previously been installed at client offices for the purpose of delivering Reuters or other data. Higher bandwidths are available for firms desiring to use a private line for GUI transport.

The Radianz solution guarantees a minimum bandwidth but permits customer traffic to burst to use any unallocated bandwidth on the connection, typically an E1 that may also be leveraged by other companies. In this offering, the network provider installs, configures, and manages the redundant routers that reside on the clearing participant premises. Radianz assumes responsibility for the circuit through the Ethernet connection into the clients network.

Radianz Network Design



Characteristics:

- Radianz provides two fully redundant dedicated circuits

- Radianz provides two fully redundant dedicated routers
- Radianz manages end-to-end connectivity
- Radianz manages and escalates carrier issues
- CCorp client subscribes to bandwidth as needed (minimum 64 kbps)

Notes:

- Fully managed solution
- Primary IP Transport: Static E1 or E3 through primary carrier
- Backup IP Transport: Static E1 or E3 connection through secondary carrier
- Management Transport: IP transport mentioned above
- Appropriate firewall rules may need to be added to the customer's existing firewall to allow NTP protocol, protocol #50, and UDP port 500. Verification of appropriate firewall rules should be made with the CCorp technical staff.
- Radianz or its agent will configure and install hardware. Physical access to the equipment must be provided to Radianz for service.

4 Support

CCorp will be the initial point of contact for all clearing-related support inquiries. Specifically, CCorp clients should contact CCorp with any concerns about CCorp applications, the Internet VPN, or private IP connections. Please refer to Section 6 for contact information.

4.1 Public Internet connections

CCorp clients should work directly with an Internet Service Provider (ISP) to obtain a public Internet connection. Any ISP may be used, but CCorp recommends a bandwidth of 512 kbps or higher.

Issues that CCorp clients have with their public Internet access should be directly addressed with the ISP.

4.2 Installations, changes, and disconnections

The Clearing Corporation will be the initial point of contact for all orders and changes. Customers should follow the procedures outlined in Section 6 of this document.

Following order form submission, CCorp will work with the customer and network provider to coordinate the required work and follow up with an end-to-end test. CCorp will coordinate all provider visits to customer locations.

4.3 Network problem diagnosis and troubleshooting

CCorp network connections are monitored 24 hours a day, 7 days a week. If a customer experiences any difficulty accessing CCorp applications, the customer should notify CCorp immediately. CCorp will troubleshoot the issue and, if required, work with the appropriate provider to resolve.

4.4 Application problem diagnosis and troubleshooting

Any concern with CCorp application availability or performance should be directed to CCorp.

5 Pricing

CCorp clients who require only GUI access and use CCorp applications via the public Internet and a browser can do so at **no charge** to the clearing participant.

CCorp clients who require MQ and FTP access must obtain it via either the Internet VPN or private IP network. Pricing for these networks varies by connection type, clients location, and bandwidth required. Generally, 64 kbps bandwidth is sufficient for MQ traffic and file transfers.

5.1 Terms

It is generally expected that customer connections will be maintained for at least a period of 12 months. Installation and disconnection fees will be assessed for each type of private network connection. The VPN has an installation fee associated with it, but no disconnect fee.

The Clearing Corporation will bill all fees.

5.2 Internet IP VPN

To install the Internet VPN, the clearing participant notifies CCorp that it wishes to use the Corente Internet-based solution. CCorp client contracts with a CCorp-certified value-added-reseller (VAR) to purchase a machine that will be configured as a gateway. CCorp works with the VAR to configure the gateway. The gateway is shipped to the CCorp client. The CCorp client's technical staff, with assistance from CCorp or Corente, installs and supports this connection.

The basic CCorp offering includes all functionality required to transact business with CCorp:

- IP VPN connectivity
- Credential creation, distribution and revocation
- High security and tamperproof administration
- Automated software upgrades
- Easy to configure NAT rules to address conflict resolution

* Gateway hardware pricing may range from \$600 to \$2000, depending on customer model and style preference.

Partners wishing to take advantage of Corente software to address additional networking challenges may do so for an additional monthly fee. Additional services offered by Corente are stateful firewall, business continuity/hardware failover, connectivity to other Clearing Corporation partners, remote access capabilities and end-to-end application performance monitoring and management reporting.

5.3 Private Network Pricing

CCorp will bill all fees. The key pricing determinants are location and bandwidth.

5.3.1 AT&T Frame Relay Network

US locations are priced in 2 categories: Chicago area and Other US.

AT&T Frame Relay Network Pricing available by contacting the Clearing Corporation.

All prices include a single frame relay connection to a single customer site; e.g., specific building address, a single router, an ISDN BRI for backup, and a POTS line for management. CCorp and AT&T configure the router.

5.3.2 Radianz Network

Most Radianz network connections can be ordered through The Clearing Corporation. When CCorp orders and owns the circuit, CCorp will bill the client and is the point of contact for the client on problem escalation.

Some clients have chosen to convert multiple circuits to an existing Radianz T1 or T3 and order those connections through Radianz. If the client orders the circuit, the firm is the circuit owner of record, is billed for its end of the connection by Radianz, and is responsible for problem escalation and management with Radianz. In this case, CCorp will bill the client an access fee which covers the client's share of CCorp access.

Most circuits are expected to be 64 kbps, bursting to T1. Radianz network pricing is available by contacting the Clearing Corporation. All CCorp pricing includes a pair of redundant private connections to a single customer site; e.g., specific building address and two routers. Radianz furnishes and configures the routers.

CCorp access fees for firms who choose to order connections directly from Radianz.

5.3.3 Alternatives

If one of the above-mentioned networks cannot be expanded to a clearing participant site in a cost-effective and time-effective manner, CCorp will attempt to locate another network provider to deliver the requested service. Pricing for special-case locations may deviate from the tables above. Any custom solution will be priced as cost effectively as possible.

6 Order and Disconnect Process

To order any network connection, or change or disconnect an existing VPN connection, contact a Clearing Corporation Client Services and Support (CSS) representative.

Private network installation orders require a minimum lead time of six weeks; Internet VPN orders require a minimum of two weeks.

CCorp Business Systems Group	
Phone	312-786-5718
Fax	312-986-3445
email	css@clearingcorp.com

A sample Order/Change/Disconnect form follows. Form changes may be made independently of updates to this document. Please verify version level with your account representative, or download the form from the CCorp web site: <http://www.clearingcorp.com/>.



Please return to: Client Services and Support
 227 W. Monroe Suite 1500
 Chicago, IL 60606
 312-786-5718
 css@clearingcorp.com

Network Request Form (Domestic)

Function: Request new connections or removal of existing connections from The Clearing Corporation

Type of connection (circle one):

- a.) Corente Internet IP VPN
- b.) Frame Relay Network – AT&T
- c.) Private Network – Radianz

Date: _____ Request (circle one): Installation or Disconnect

Customer name: _____

Customer address: (street or post box, floor, city or town, and zip code of installation location):

Customer contact (responsible for telecom, network hardware, and network software implementation at customer location):

Name: _____ Phone: _____ Email: _____

Name: _____ Phone: _____ Email: _____

Circuit speed (if applicable): _____

Implementation notes (Specify any unusual requirements or time frames that could affect circuit or network hardware implementation):

PLEASE NOTE: Installation & disconnect fees apply to all network connections.

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