

外汇交易系统设计



CFETS
The China Foreign Exchange Trade System

中国外汇交易中心 程晓松
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CHINA FOREIGN EXCHANGE TRADE SYSTEM
中国外汇交易中心
全国银行间同业拆借中心
NATIONAL INTERBANK FUNDING CENTER

Agenda

- ☐ Terminology
- ☐ Key Features
- ☐ Architecture Diagrams
- ☐ Key Workflows
- ☐ Components Overview

Terminology

Name	Description
Legal Group	Trading participant legal entity within CFETS. Trading permissions set on the group via banking licence.
Anonymous	Spot trading against the current best price (cparty hidden).
Bilateral	Trading with a known cparty (relationship required).
MRFQ	Multiple Request for Quote, RFQ submitted simultaneously to multiple cparties with follow up asynchronous trading on each.
Banking Licence	The permissions assigned to the legal group defining instruments they can publish/subscribe and trade.
Price Banding	Validation of incoming published rates that they do not deviate too much from current rates.
Price Blending	Merging of many published rates from different liquidity providers into a single best rate stream
SSO	Single Sign On – manual users login to CFETS website and automatically logged into the CFETS trading applets when launched.

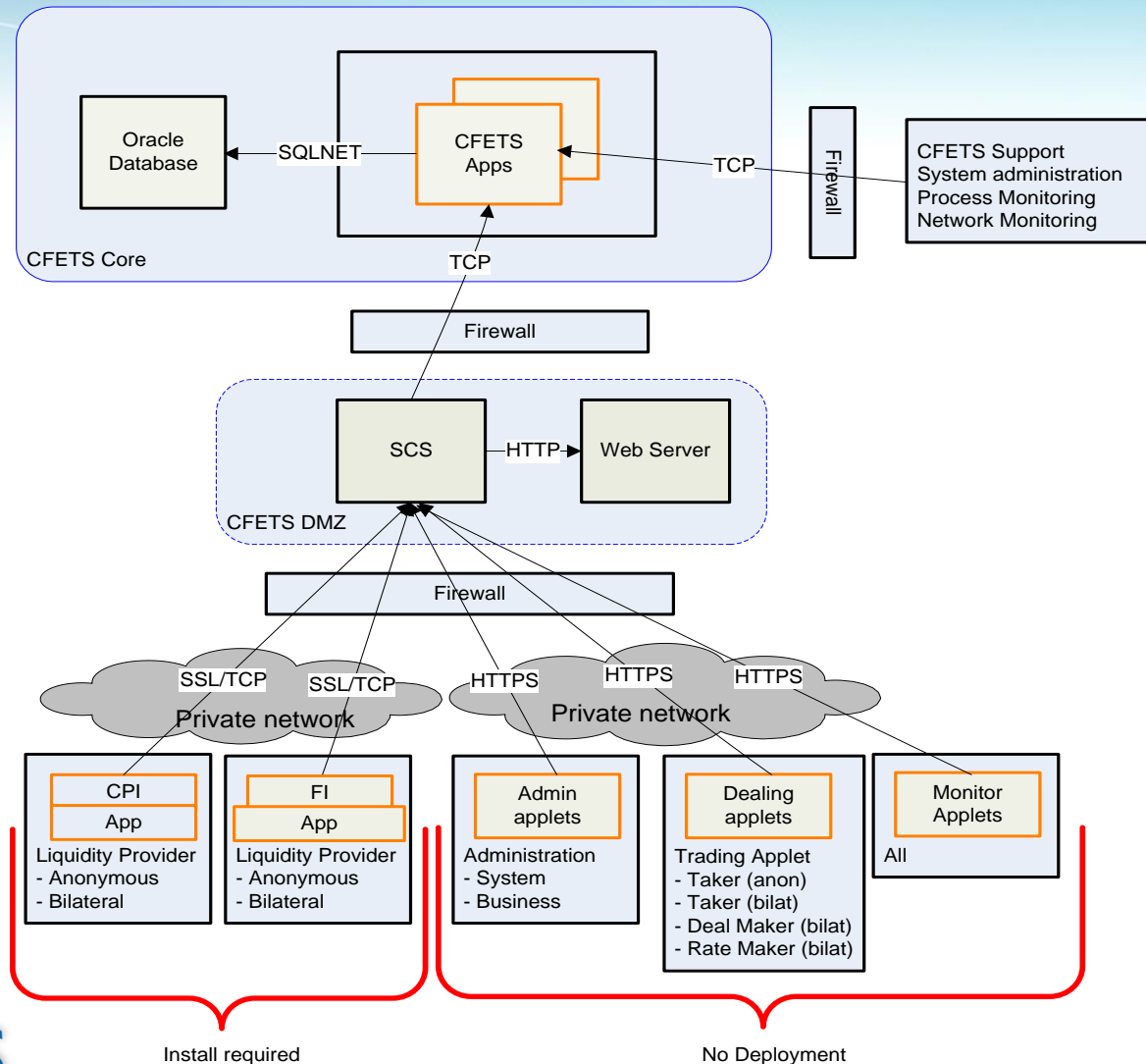
Key Features - 1

- ☐ **Anonymous trading**
 - ☐ FX Spot only
 - ☐ Price subscription to blended best rates
 - ☐ Deal types - One-click, limit orders
- ☐ **Bilateral trading**
 - ☐ FX Spot/Fwd/Swap/NDF, IRDV
 - ☐ Price discovery by bank
 - ☐ Price discovery best rate (with depth)
 - ☐ Deal Types – RFQ, CRFQ, MRFQ
- ☐ **Legal Group and Relationships**
 - ☐ Multiple trading accounts CPI and Deal maker
 - ☐ Managed trading relationships

Key Features - 2

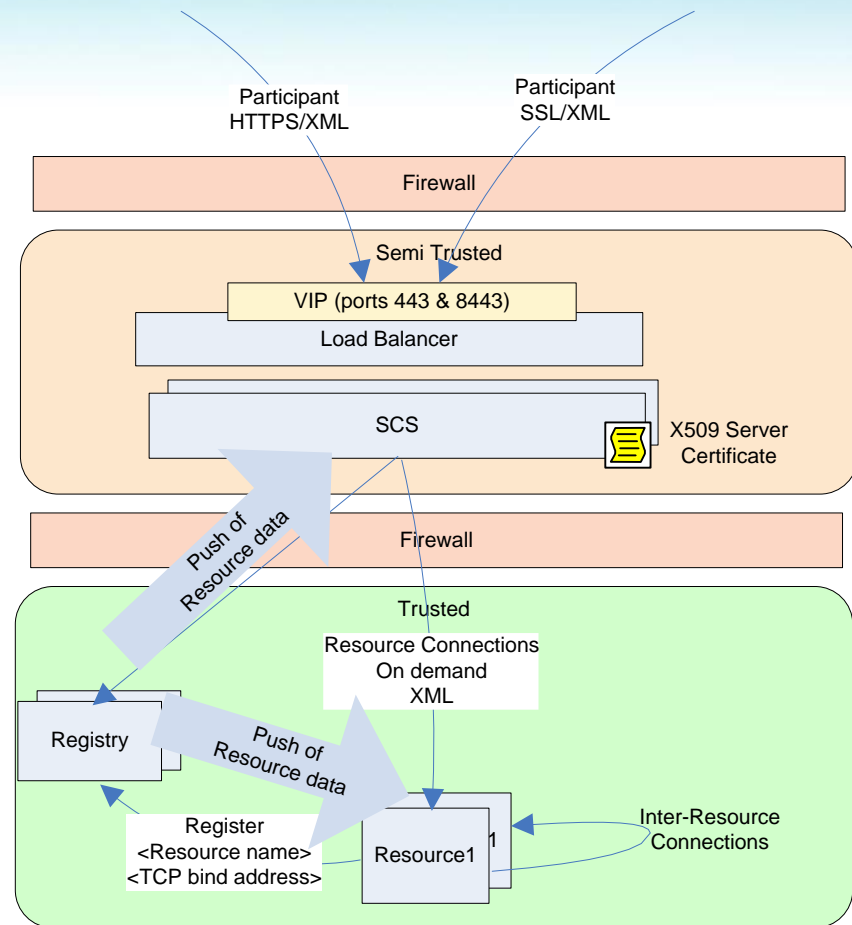
- ☐ Price banding control and monitoring
 - ☐ Min/Max rate fluctuations
 - ☐ Manual override GUI and event logging/alerting
- ☐ Banking license and filters
 - ☐ Features and trading type permissions by participant bank
- ☐ Best price blending
- ☐ Price contribution, overrides and control
- ☐ Dual server support for Load Balancing and High Availability
 - ☐ Resilience to single component failure
- ☐ Security
 - ☐ Authenticated & Encrypted links
 - ☐ Single Sign On (SSO)

Connectivity

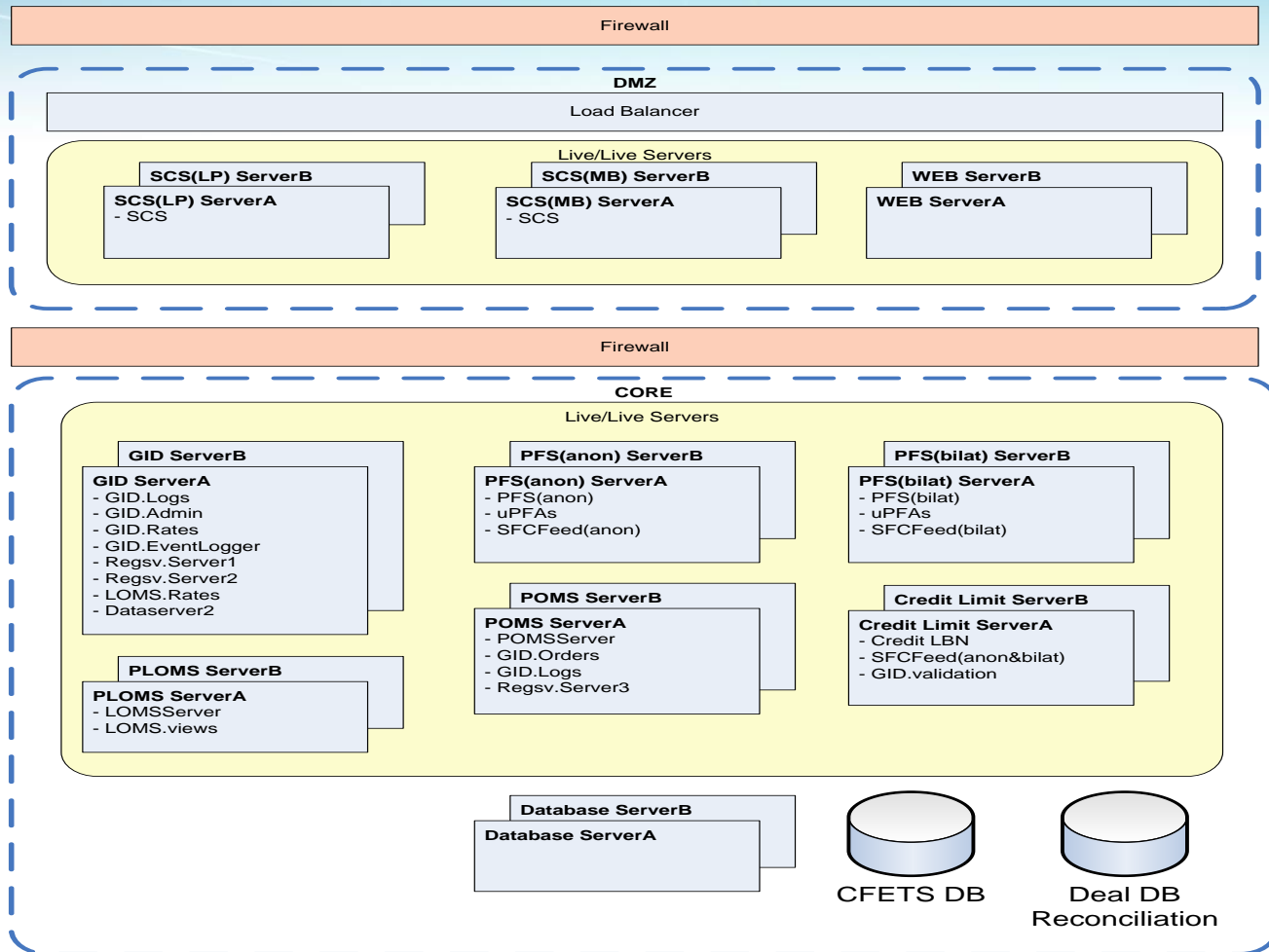


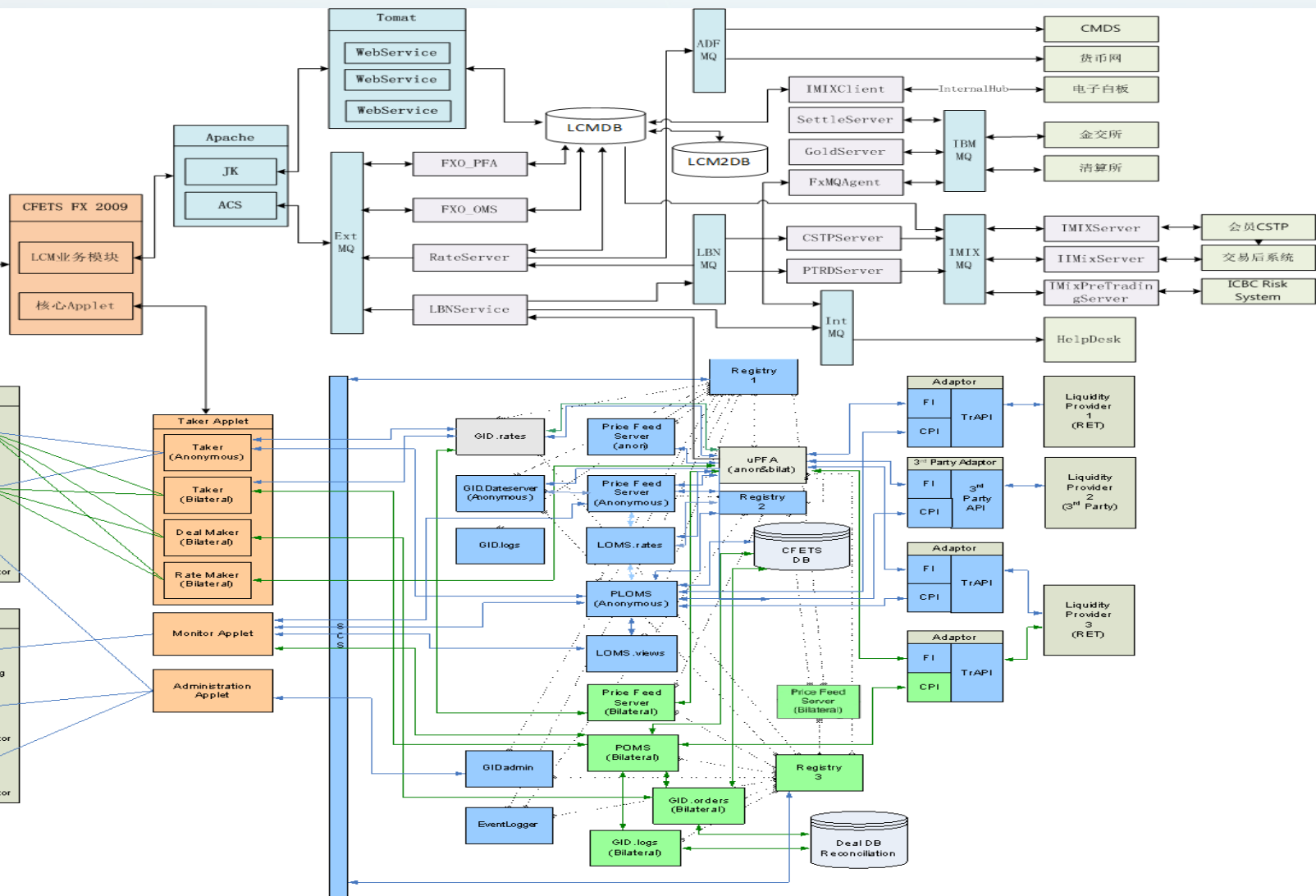
SCS, Registry and Resource Connectivity

- Registry
 - Always connected too
 - Two addresses
 - Resource registration
 - SCS connections
- Resource
 - Registers with registries
 - Existence of other resources
- SCS
 - HTTPS or SSL
 - Reverse web proxy for untrusted applets
 - Learns of resources available
 - Cannot register resources
 - Relies of F/W to block internal resources



Server Component View

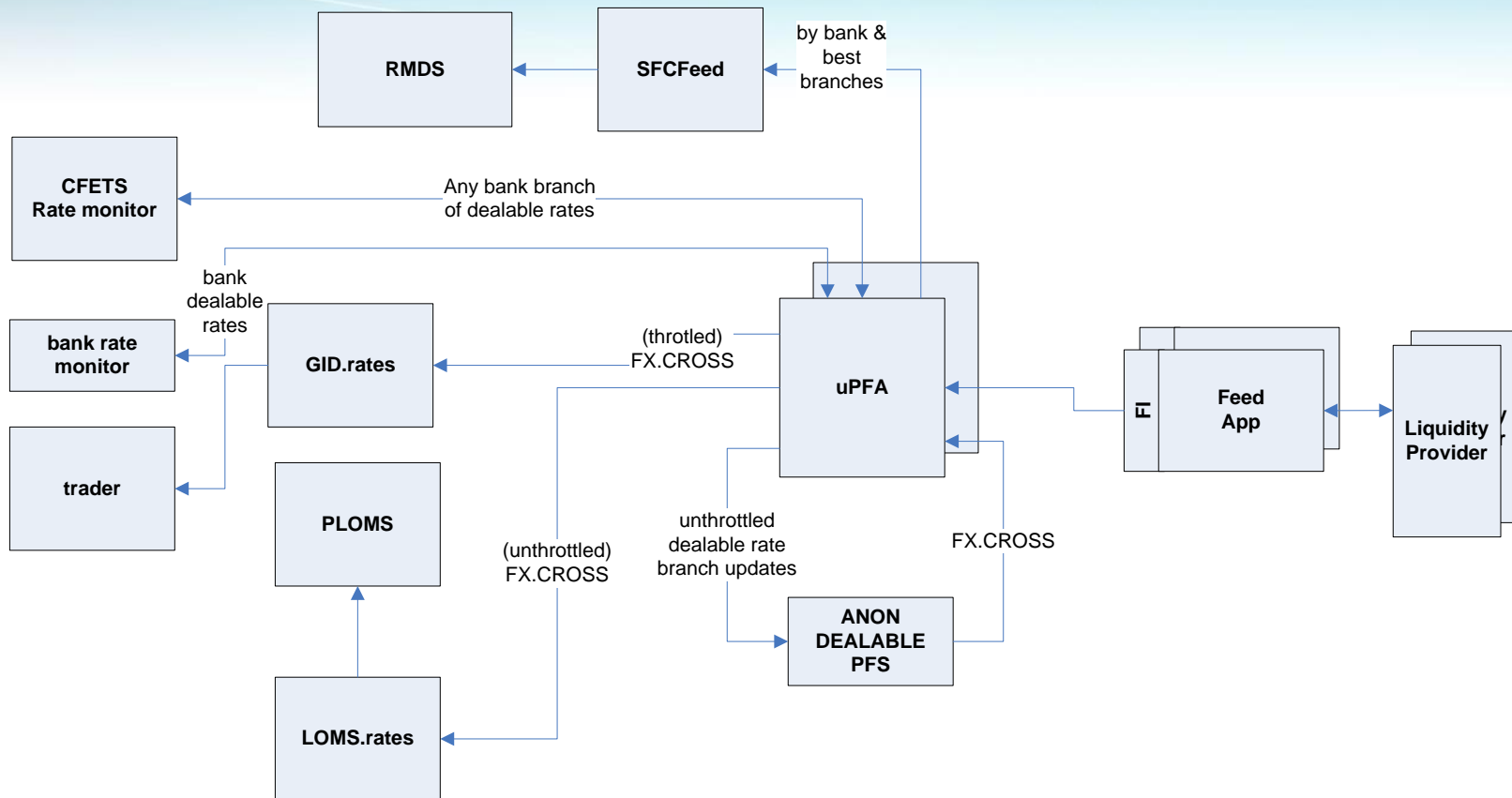




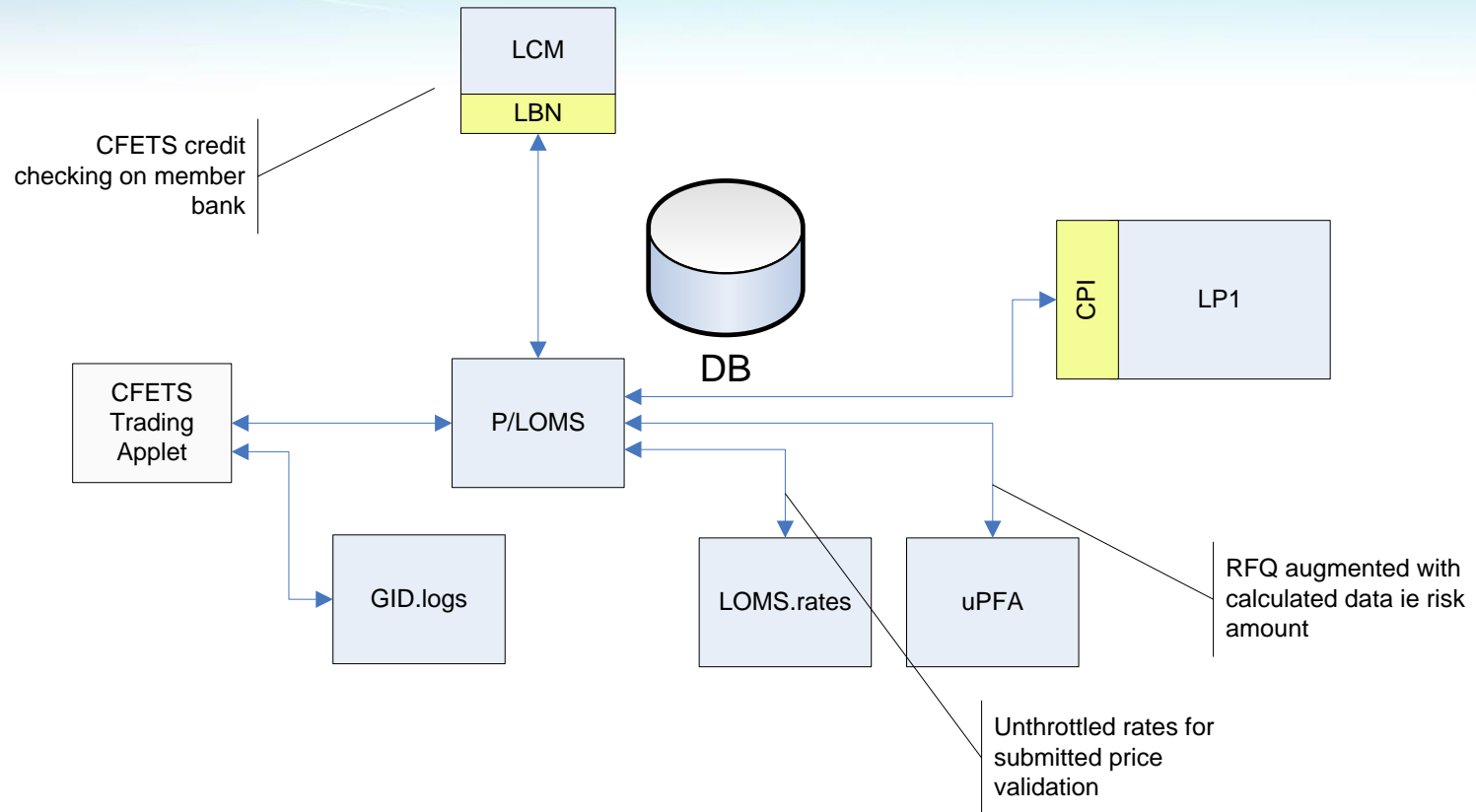
KEY WORKFLOWS

- ☐ Anonymous Price Discovery
- ☐ Anonymous Trading
- ☐ Bilateral Price Discovery
- ☐ Bilateral Trading
- ☐ Single Sign On

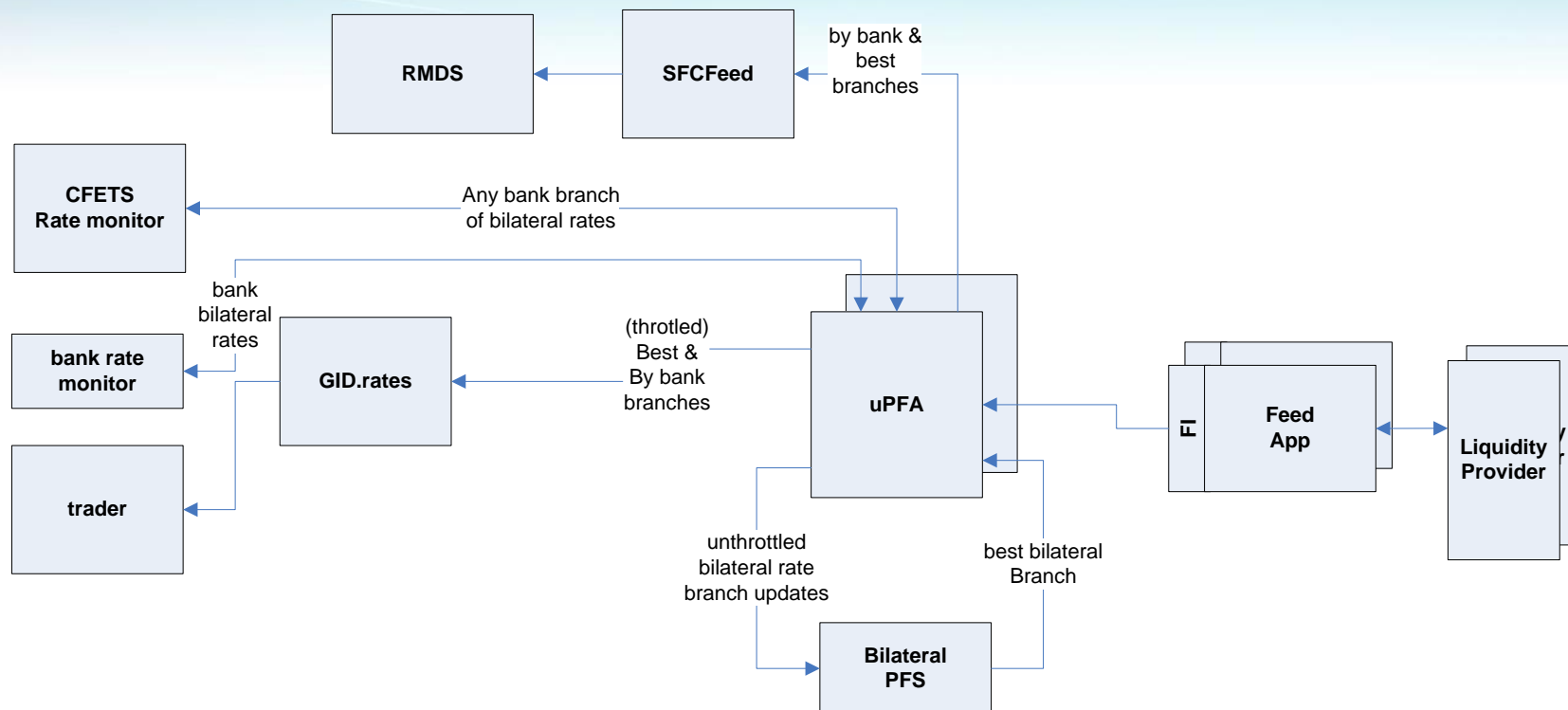
Price Discovery



Trading

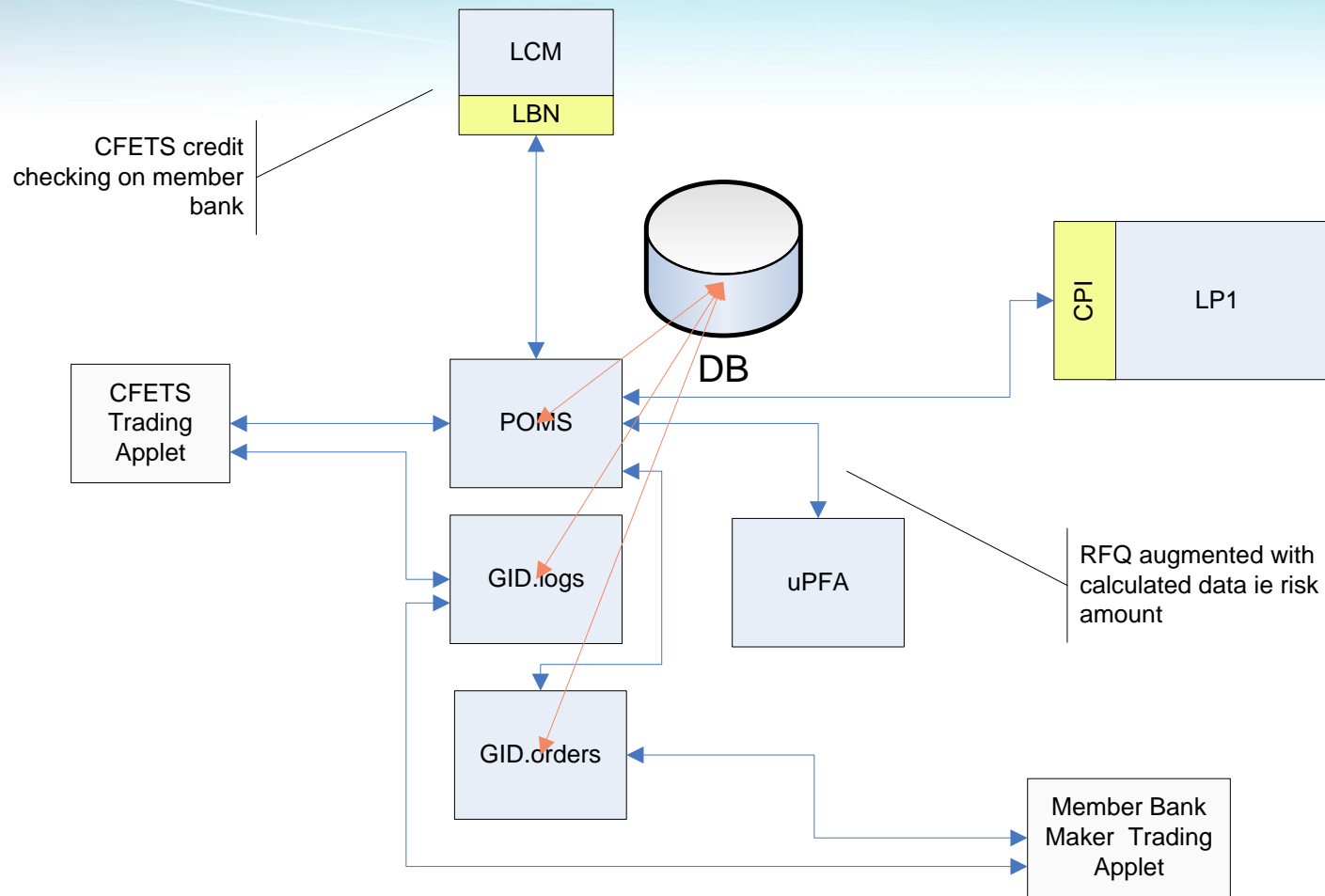


Price Discovery

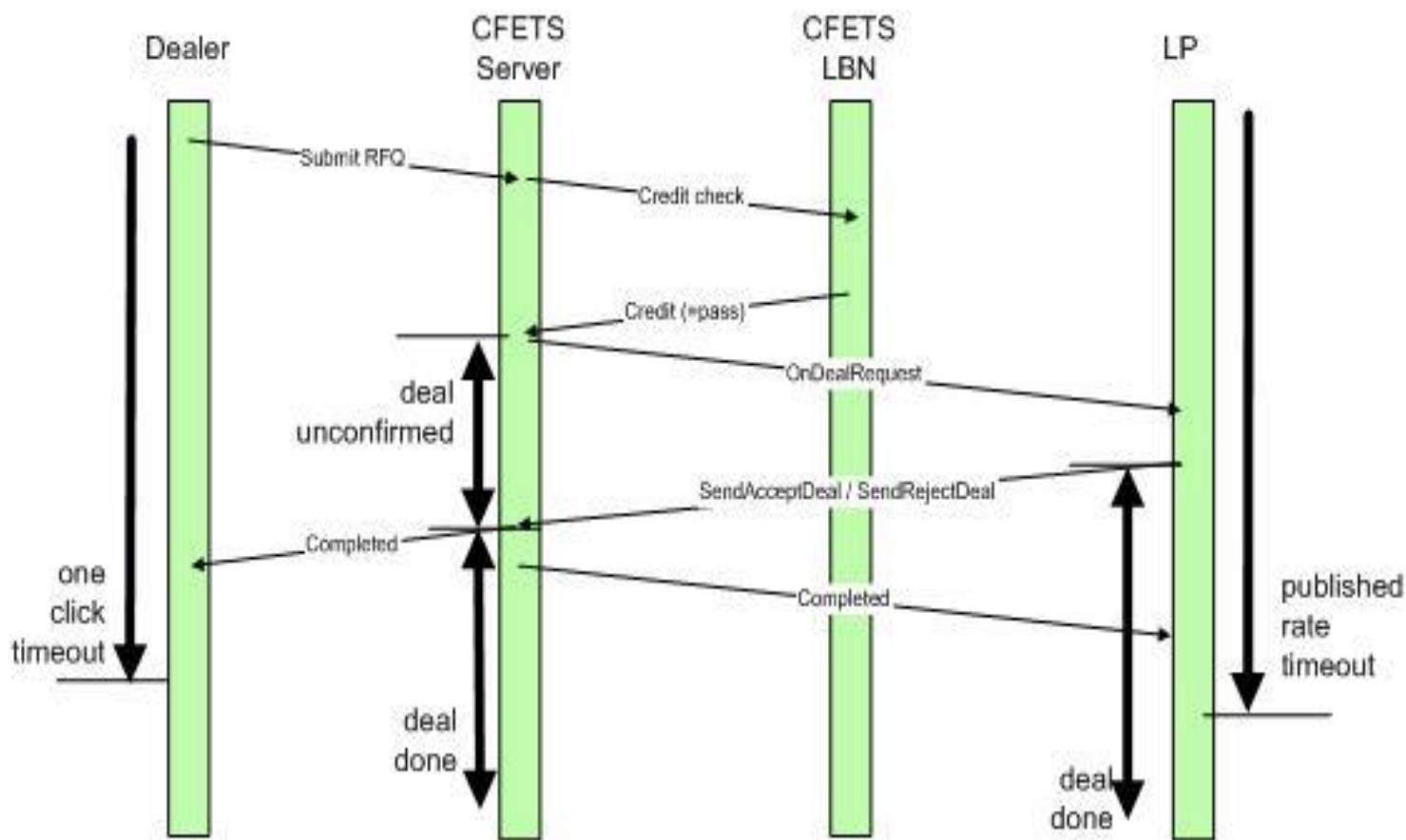


Bilateral Model

Trading

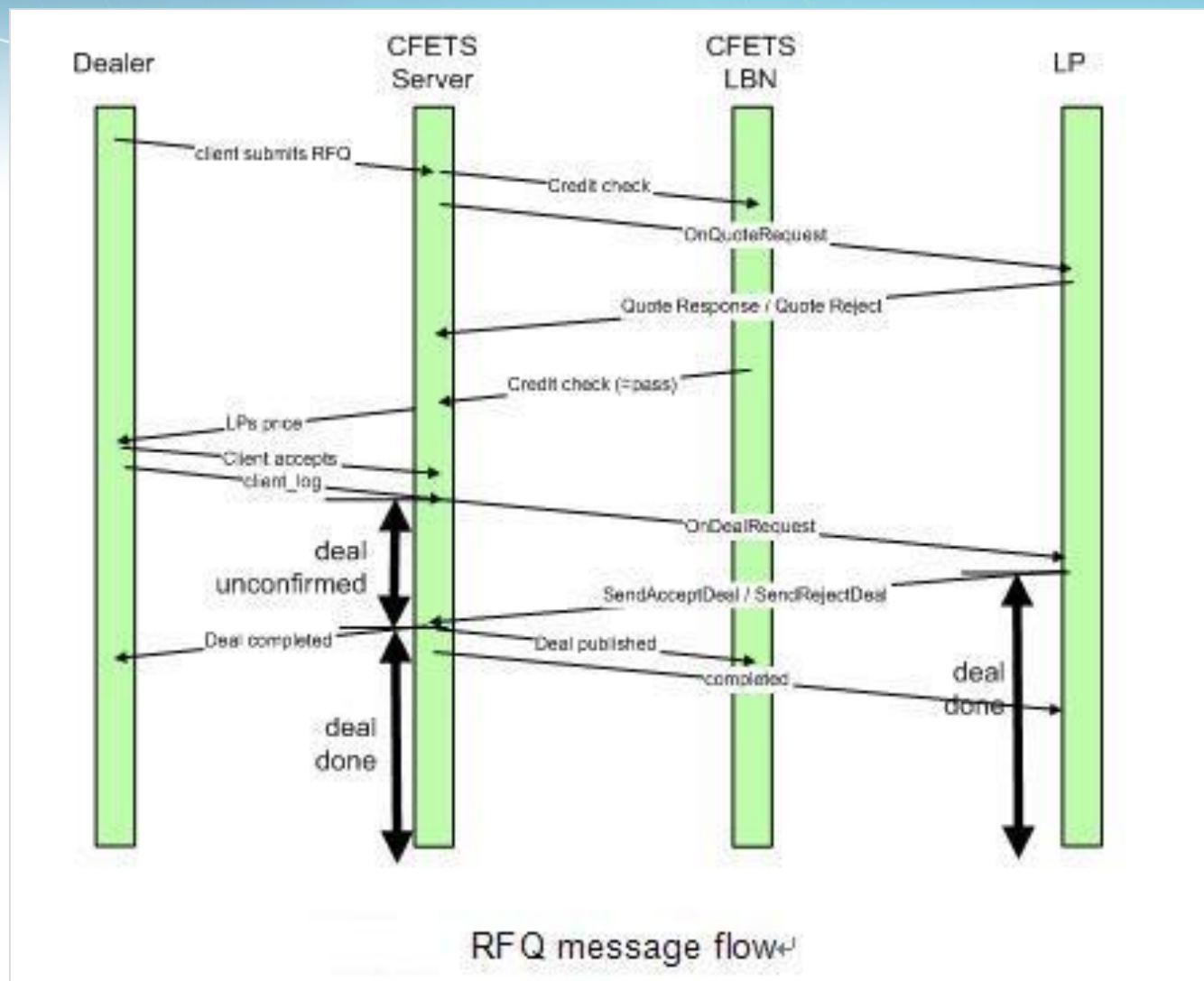


点击交易流程

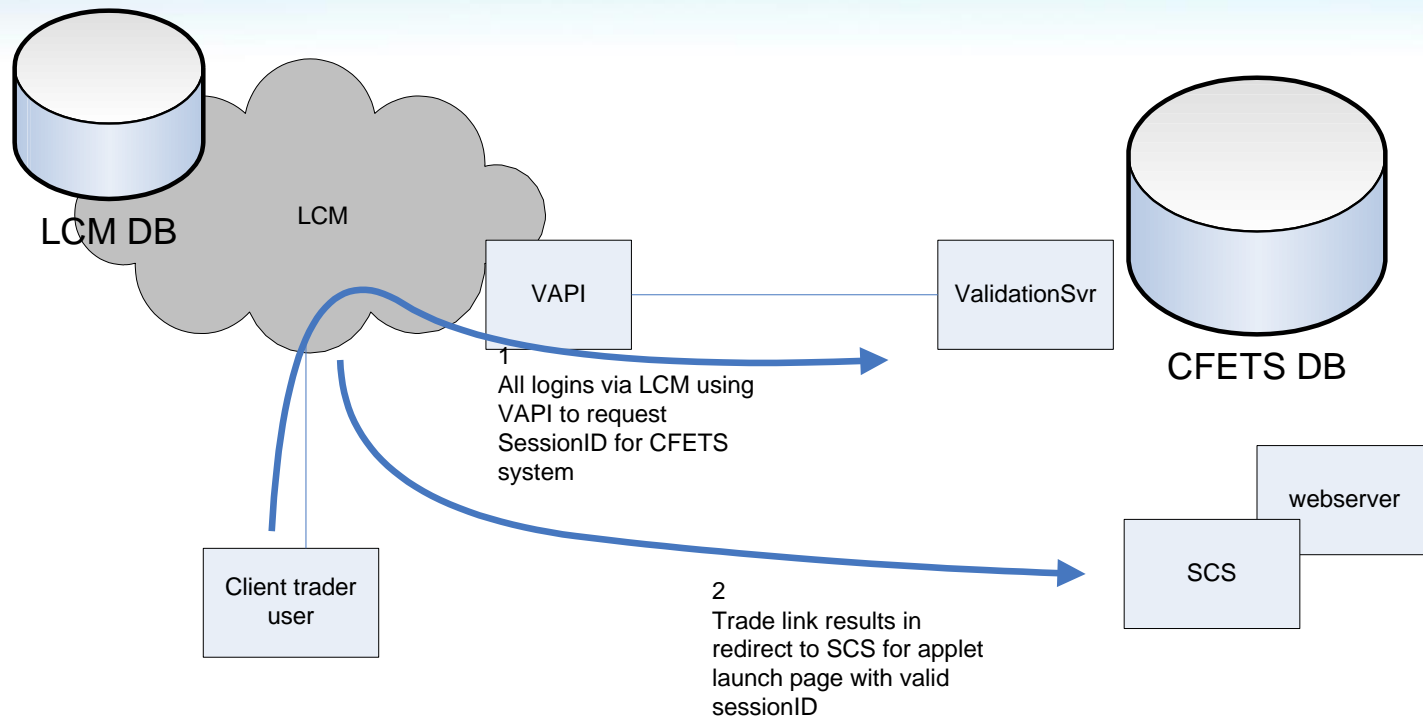


Limit order and 1-click message flow

询价交易流程

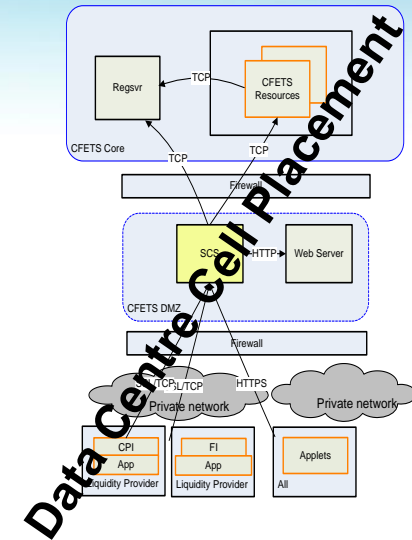


Single Sign On



COMPONENT DESCRIPTIONS

←Detail of Component Features→

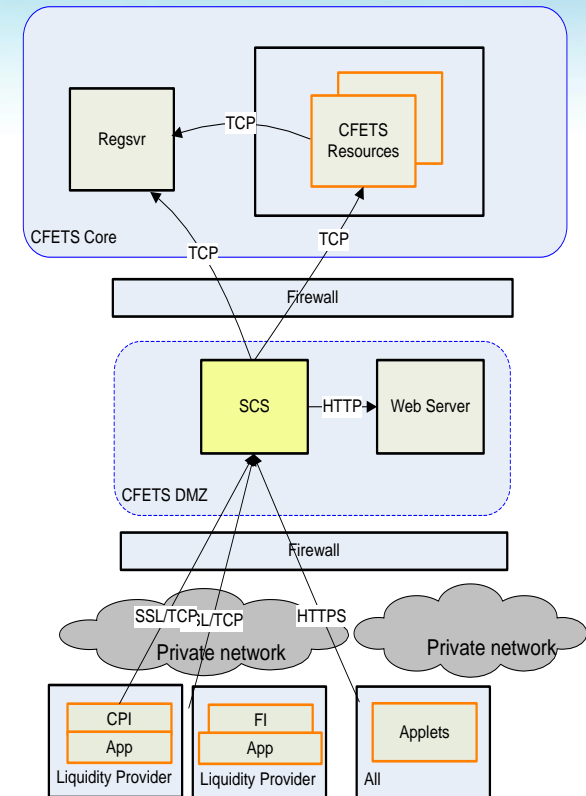


Resilience model	Live/Live Live/stdby
Peer Connection	Yes No
Remote Access	Taker Maker Admin CPI FI LBN Monitor

SCS



- SCS is a communications server which sits between the CFETS client site components and the data centre resource servers.
- It runs in DMZ.
- For member bank clients the SCS acts a reverse web proxy which relays applet downloads from a web server to the user's browser. It provides asynchronous HTTPS tunnelling of application data to/from the client onto the resource servers such as P/LOMS and GID.rates etc.
- It steps down SSL encrypted TCP links from CPI and FI applications running at LP sites and relays application data to/from these applications onto the resource servers.
- It sits behind a hardware load balancer

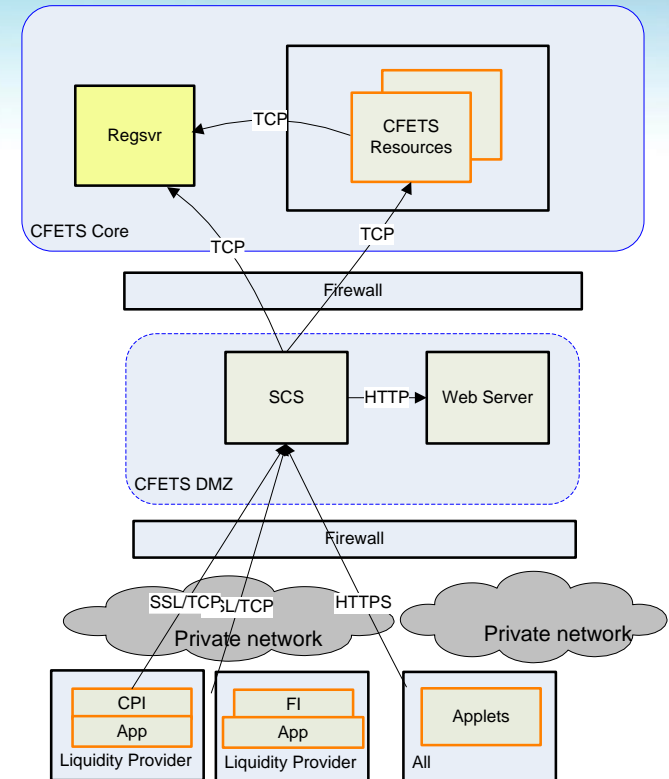


Resilience model	Live/Live
Peer Connection	No
Remote Access	ALL

Registry



- ☐ Provides connection information for any CFETS resource server processes.
 - ☐ Resource registration
 - ☐ Resource lookup by name
 - ☐ Load balanced connectivity
 - ☐ Duplicate resource detection (for peering)
- ☐ Allows IPC between resources
 - ☐ Consumption of a resource
 - ☐ Connection peering of duplicate resources
- ☐ Allows CFETS clients to connect to resources via SCS

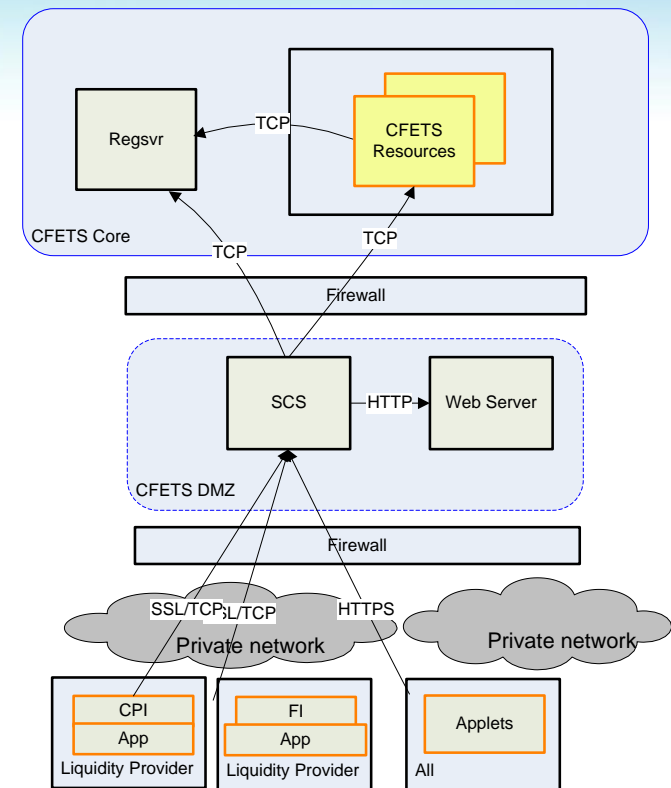


Resilience model	Live/Live
Peer Connection	No
Remote Access	None

DateServer



- ☐ Provides date information
 - ☐ Holidays by country/ccy database.
 - ☐ Tenor date calculation
 - ☐ Close of day offset calculation
- ☐ Used by several resource servers
- ☐ Used by CFETS participants to derive tenor dates

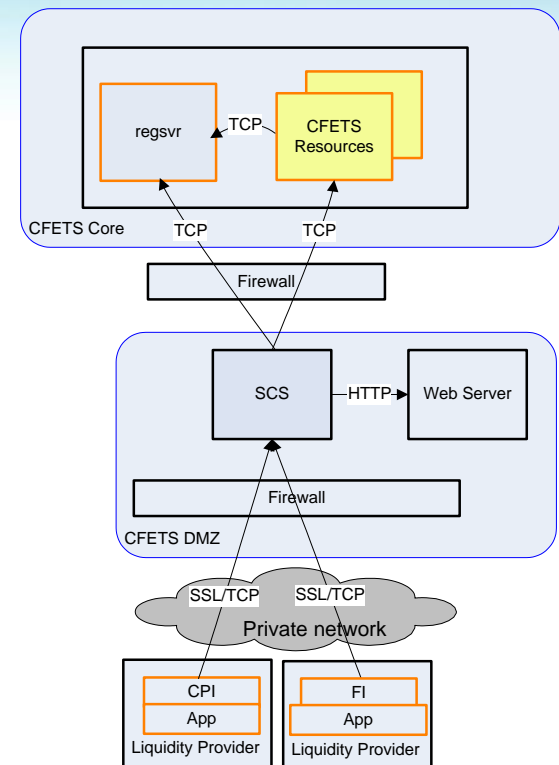


Resilience model	Live/Live
Peer Connection	No
Remote Access	Maker/Taker

EventLogger



- ❑ Used to capture events from the system and deliver to the local logging infrastructure. (A new socket based interface to this is added in ver 2.6).
- ❑ The detection of prices received out of the specified Min/Max banding will result in events being logged to the EventLogger. These events will be generated by the uPFAs on incoming rates and the PLOMS/POMS during deal negotiation of RFQs.

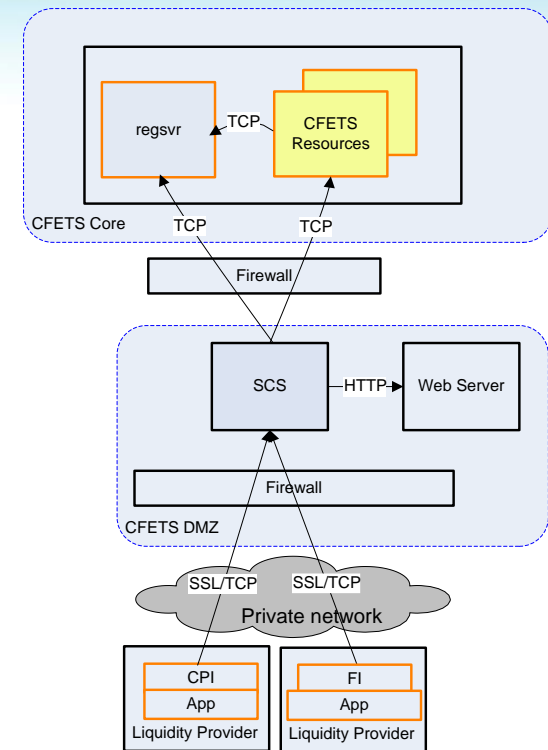


Resilience model	Live/Live
Peer Connection	No
Remote Access	No

GID.admin



- ❑ Administration Server for accessing user static data
- ❑ Create/Modify/Delete
- ❑ New Legal groups
- ❑ User accounts
- ❑ Permissions
- ❑ Changes are dynamic via Oracle Triggers to the resource servers that use the database.

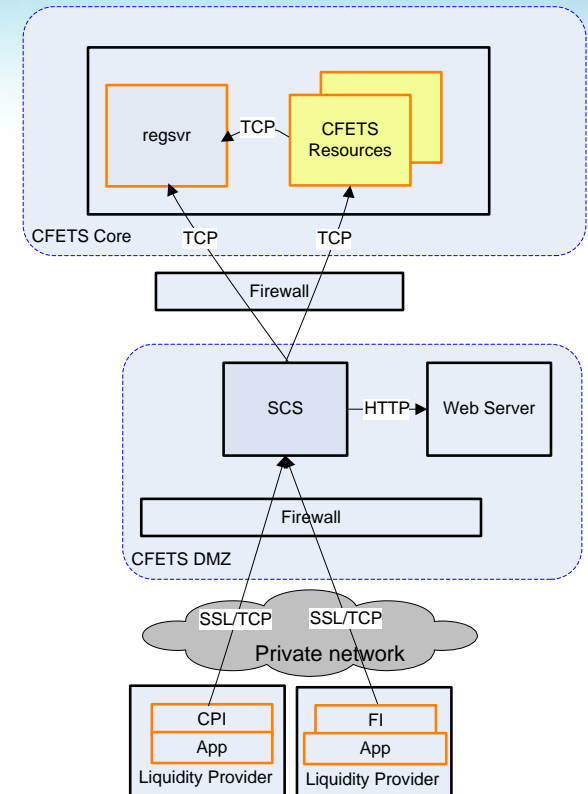


Resilience model	Live/Live
Peer Connection	Yes
Remote Access	admin

GID.Validation



- ❑ This server allows 3rd party authentication systems to integrate with the trading platform.
- ❑ User credential lookup over secured line.
- ❑ Generation of session IDs
- ❑ Lookup of session IDS to determine owning user credentials.
- ❑ Session ID timeouts
- ❑ Use to allow SCS to only accept SSO authenticated users

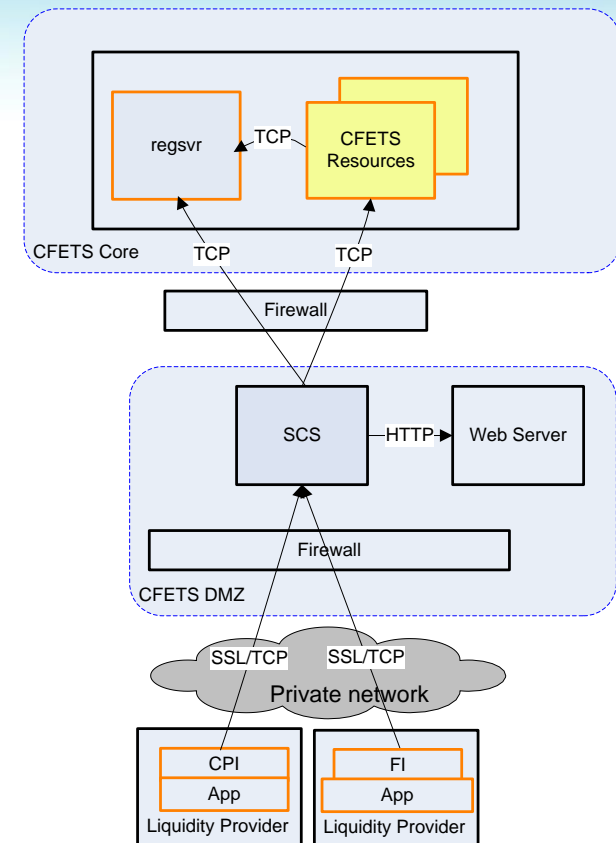


Resilience model	Live/Live
Peer Connection	No
Remote Access	Maker/Taker

GID.rates (LOMS.rates)



- ❑ Member bank users connect and login to GID.rates to subscribe to and receive a stream of
 - ❑ By bank bilateral rates
 - ❑ Blended best bilateral rate feed
 - ❑ Anonymous (blended) rate feed
- ❑ It authenticates user connections and polices their subscriptions.
- ❑ It is the fan out device of single rate streams to many users.

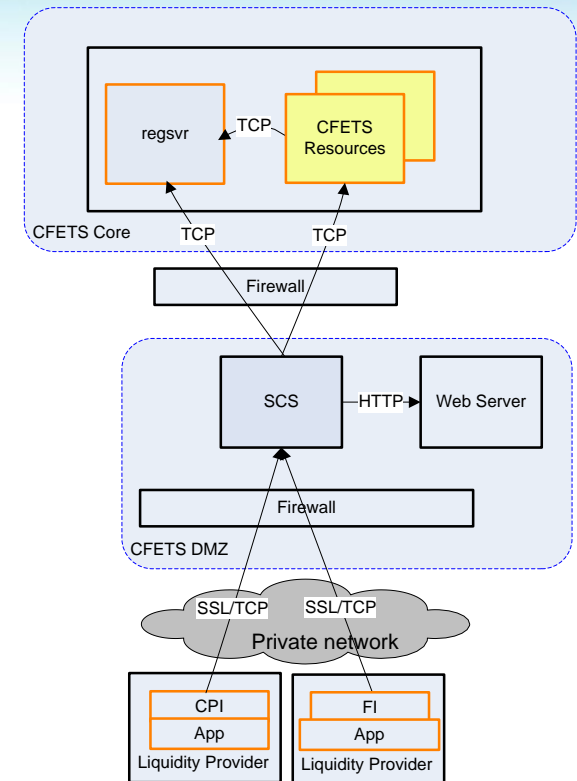


Resilience model	Live/Live
Peer Connection	Yes (login info)
Remote Access	ALL

UPFA



- ❑ Receives published rates from liquidity providers and makes available for:
 - ❑ subscription by users via GID.rates
 - ❑ Delivery to a PFS for best rate derivation
 - ❑ Throttling of rate delivery to users
 - ❑ Republishing of fed rates to local RMDS via SFCFeed
- ❑ Process horizontally scales to support 100's of branch price streams.
- ❑ Authenticates rate monitor users and applies updates and overrides received from these users.

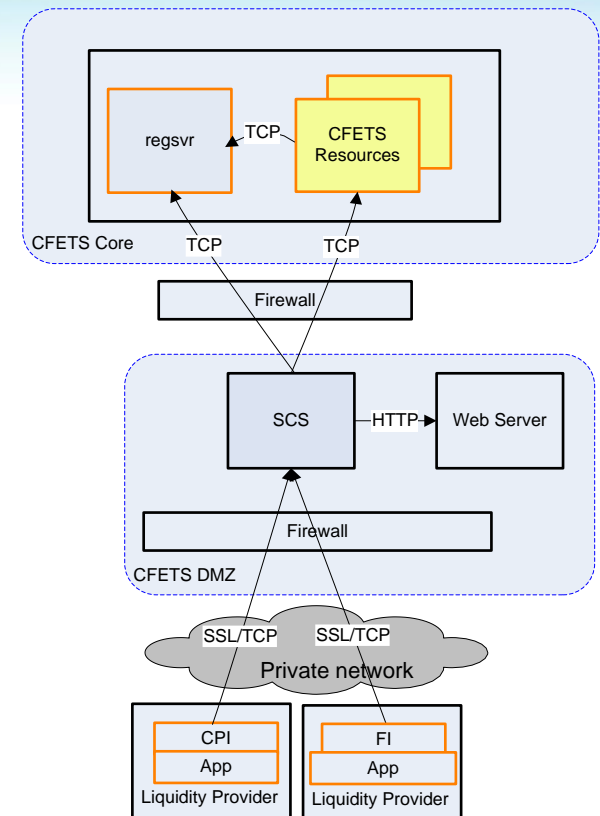


Resilience model	Live/Live
Peer Connection	Yes
Remote Access	Rate Monitor

PFS



- ❑ Two variants
 - ❑ Anonymous
 - ❑ Bilateral
- ❑ Calculates the best rate blend
 - ❑ Including depth of 3 for bilateral

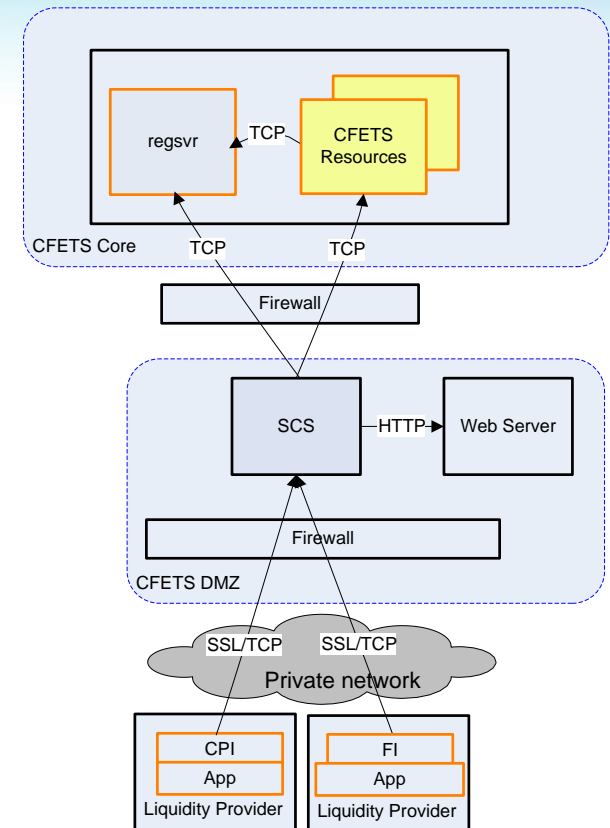


Resilience model	Live/Stdbby
Peer Connection	No
Remote Access	No

SFCFeed



- ❑ Provides the interface to local RMDS infrastructure for republishing fed rates and blended rates.
- ❑ Live/Live load balanced scaling and resilience

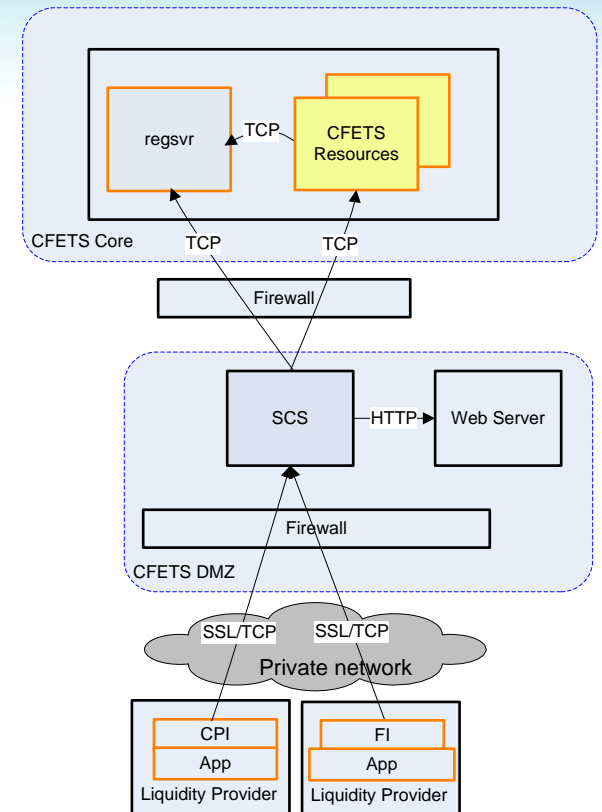


Resilience model	Live/Live
Peer Connection	No
Remote Access	No

LOMS.views



- ❑ Interface for Trader users to:
 - ❑ Monitor temperature of orders
 - ❑ Cancel orders
- ❑ The server authenticates users and permissions their requests.
- ❑ Live/Live horizontal scalability and resilience

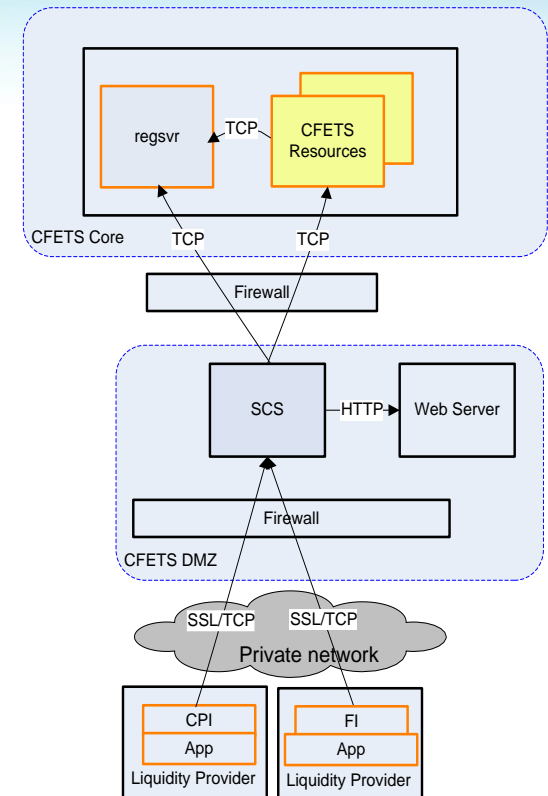


Resilience model	Live/Live
Peer Connection	Yes
Remote Access	Maker/Taker

P/LOMS (Anonymous Trading)



- ☐ This is the dealing and limit order engine for anonymous trading.
- ☐ It manages transaction flow
- ☐ It manages orders for order rate criteria being met.
- ☐ Member bank clients login to P/LOMS to:
 - ☐ submit deal requests
 - ☐ RFQs
 - ☐ Place limit orders
- ☐ LP CPI applications login P/LOMS to:
 - ☐ Receive orders against their contributed dealable rates

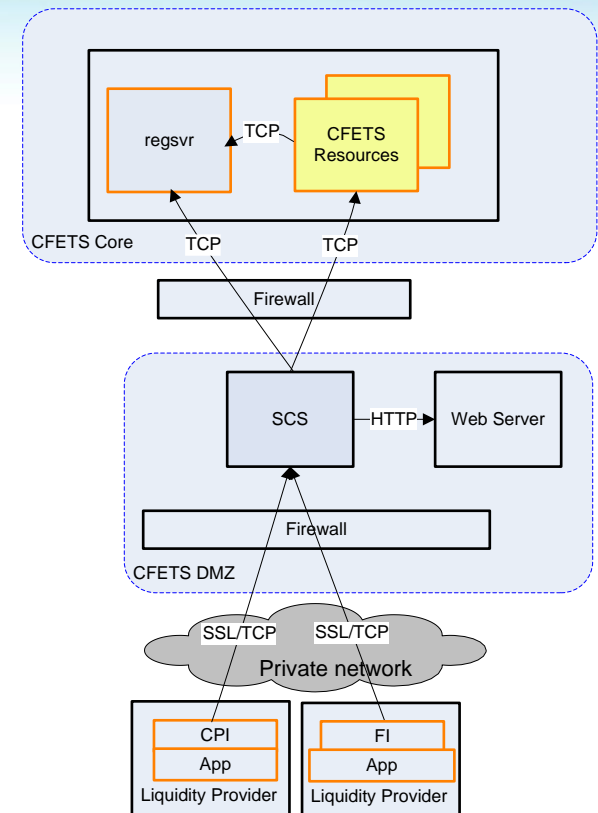


Resilience model	Live/Live
Peer Connection	Yes
Remote Access	CPI, Trader

POMS (Bilateral Trading)



- ❑ This is the dealing engine for bilateral trading.
- ❑ It manages transaction flow
- ❑ Member bank clients login to P/LOMS to:
 - ❑ submit deal requests
 - ❑ RFQs
 - ❑ CRFQ, MRFQs
- ❑ LP CPI applications login to POMS to:
 - ❑ Receive orders against their contributed indicative rates

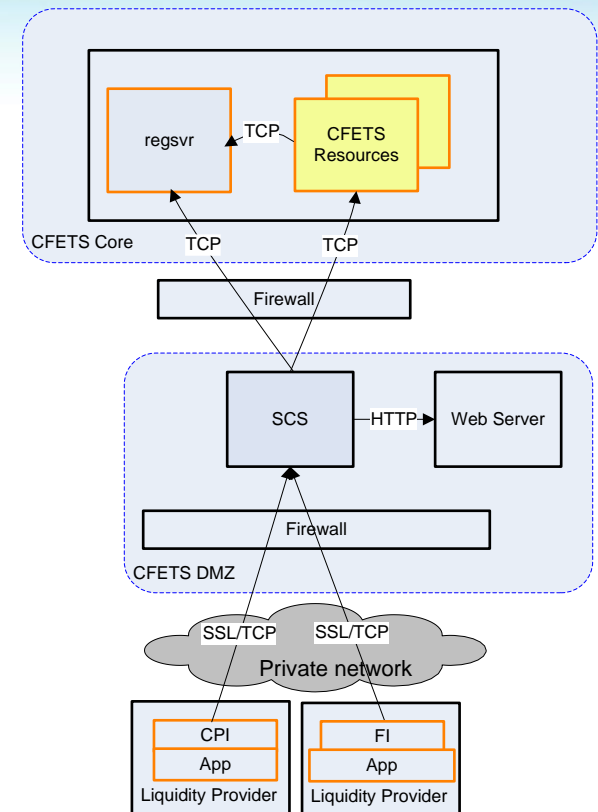


Resilience model	Live/Live
Peer Connection	Yes
Remote Access	CPI, Trader

GID.orders (Bilateral Trading)



- ❑ Provides trading service for bilateral model
- ❑ It allows bank Traders to login and pickup RFQs submitted that are not handled by an automated CPI.
 - ❑ This can be a backup for when CPI is down
 - ❑ Have different asset class coverage to a CPI

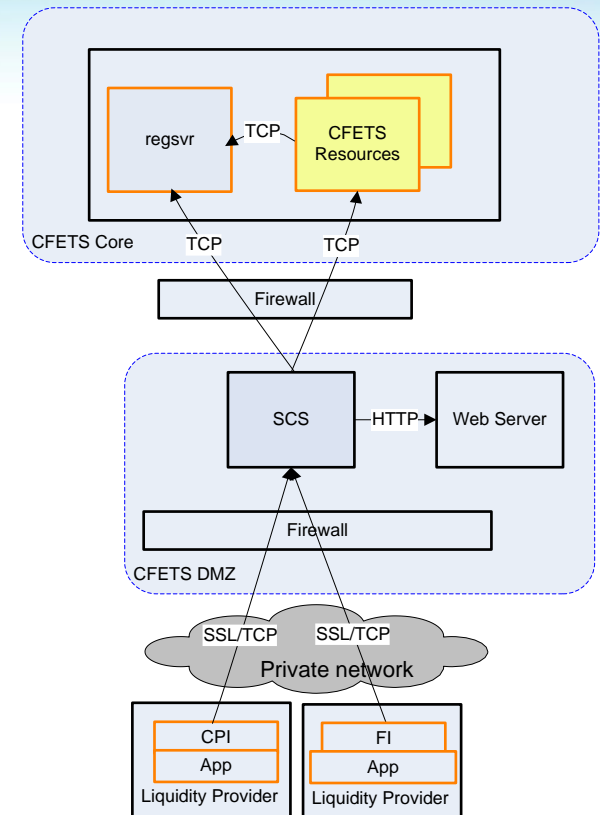


Resilience model	Live/Live
Peer Connection	Yes
Remote Access	Maker/Taker

GID.logs



- ☐ Allows Blotter search on done trades
- ☐ Bank Traders can login to this resource and drive trade reports based on filter criteria



Resilience model	Live/Live
Peer Connection	Yes
Remote Access	Maker/Taker/ LBN