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NASDAQ OMX[®] NOMX CLEARING – MARGINING SYSTEM

GENIUM INET CLEARING

FUNCTIONAL MODULES

Instrument coverage

Exchange traded and OTC

Instruments: Futures, Forwards, Put /Call Options (am/eu), FRA, Swaps, Repos, TM (flex), CFD, Binaries, cascading futures and more

Asset classes: Equity, ETF, Index, FI, FX, Commodity, Electricity

Cash settled and physical delivery

Stock lending

Pre-trade
Functions

Trading venues, trade reporting

Pre-trade risk

FIX, FPML, Native

Clearing platform

Risk Management

Post-trade
Functions

Trade & Position management

Contract management

Fees, commission & billing

Margining

Collateral management

Settlement

Price & curve management

Data mgmt, & reporting

Limit monitoring, event checking

Dashboards, analysis

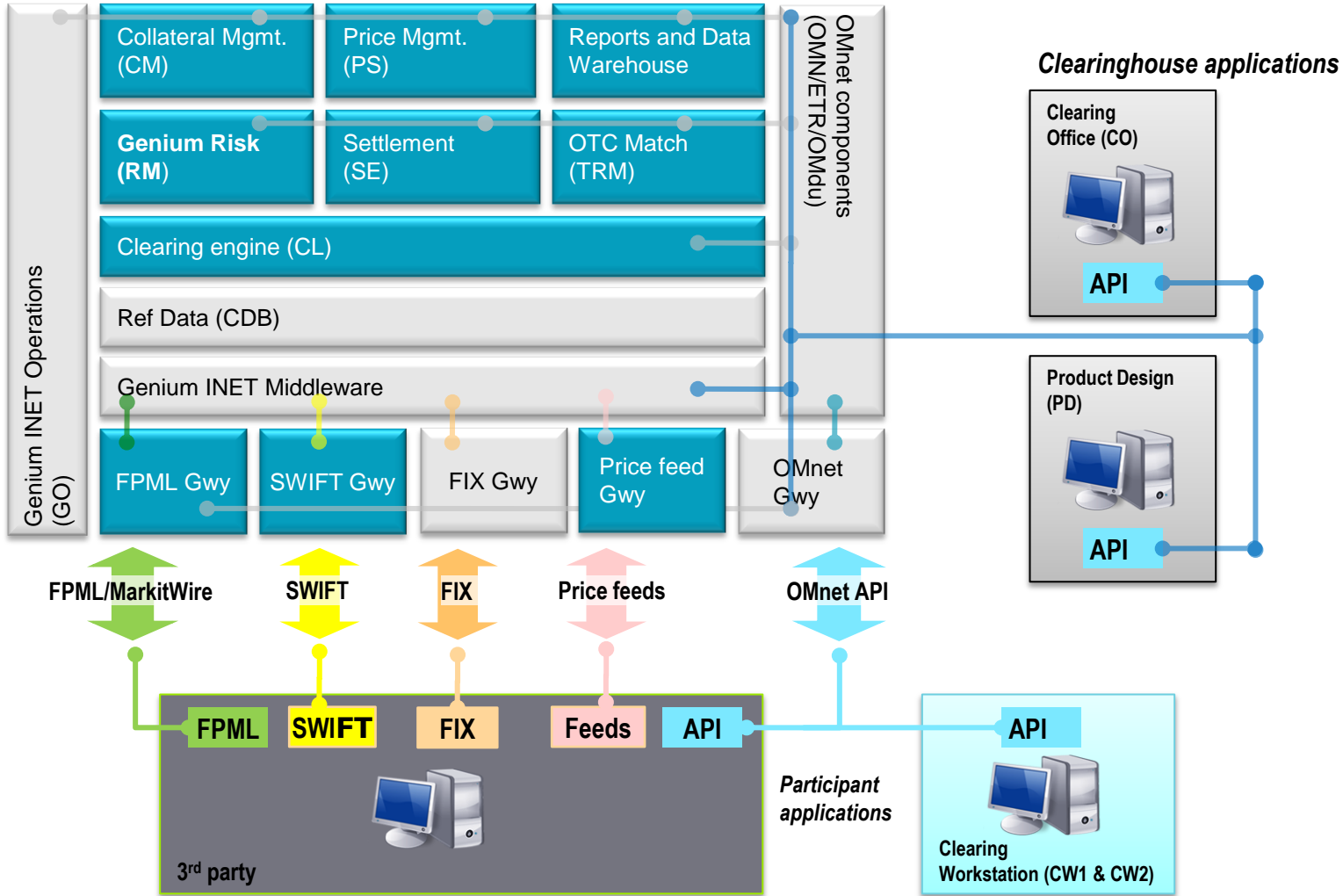
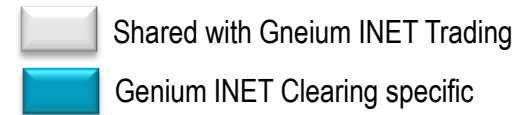
Default handling

OTC

Swift, FIX, FPML, Native

CSD, Banks, Custodians, Warehouses

GENIUM INET CLEARING SYSTEM ARCHITECTURE



NASDAQ OMX[®] GENIUM RISK (RM)

GENIUM RISK

Genium Risk - modern architecture to support

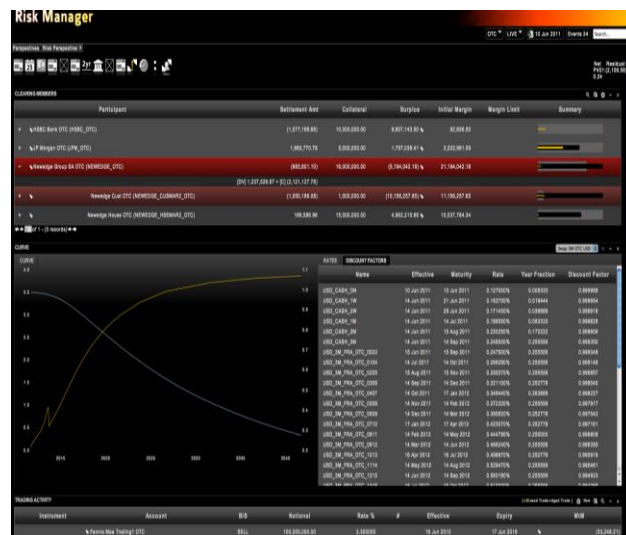
- Efficient coverage of all asset classes
- Gross/net and cross-margining
- Parallel processing and plug in extensions
 - Different margin methodologies: e.g. Delta Hedge, Power Delta Hedge, OMS II, VaR, CFM...
- High flexibility - margin method configurable per participant & instrument
- Twin testing framework (verify new release against the current)

High performance

- Fast full margin runs and flexible intra day margin scheduling
- Real-time risk management

Advanced functionality

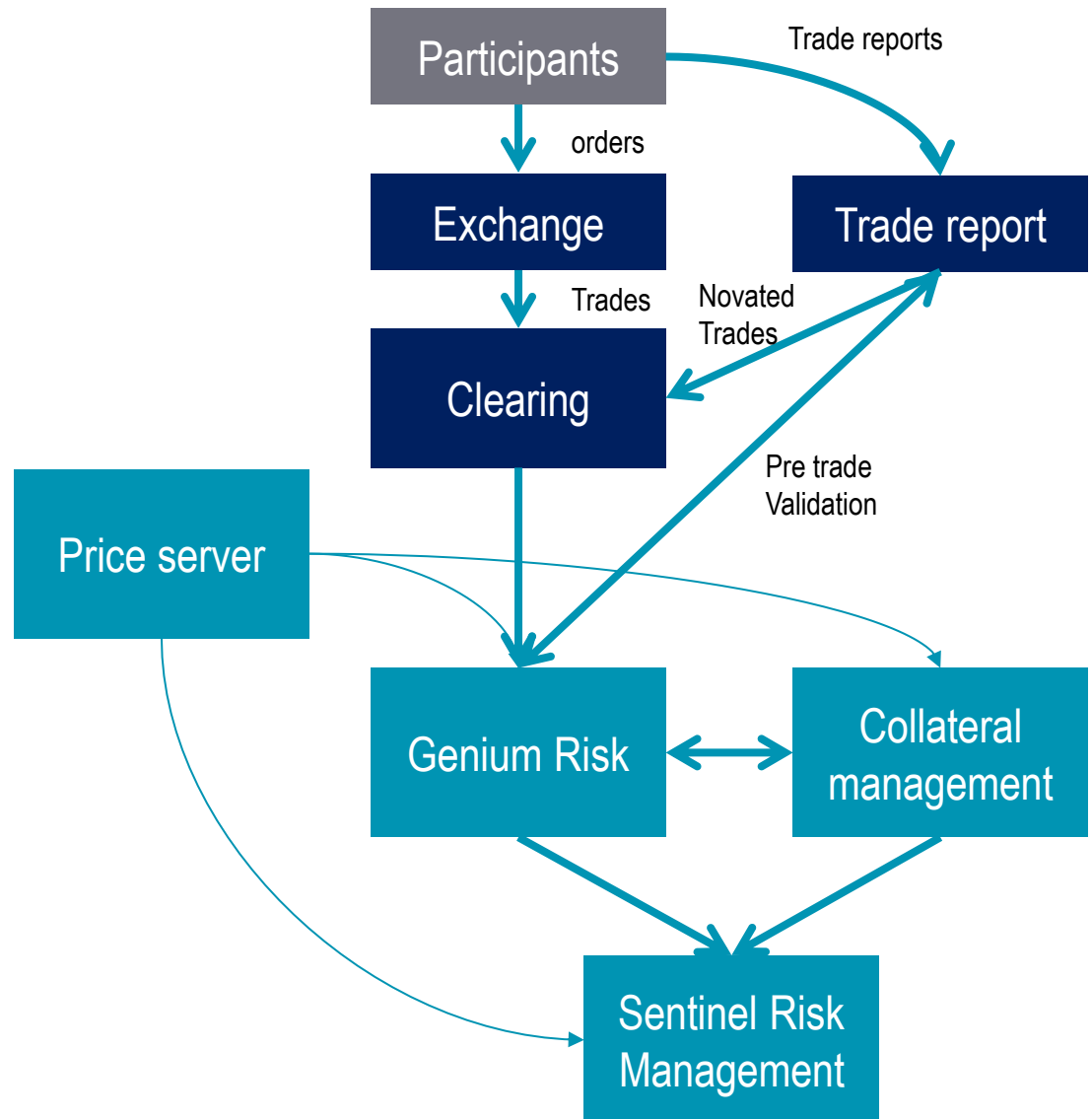
- Efficient but prudent cross margin capabilities between listed and OTC instruments
- Stress testing (CCaR)
- Daily back testing
- Risk aggregation
- Integration with Sentinel Risk Manager for incident handling, including limit and alarms
- Sophisticated Price server



GENIUM RISK

REAL TIME RISK FLOW

- Margin simulation
- Intraday margin
 - Scheduled on time
 - Manual request
 - Triggered by event
- End of day margin
- Pre-Validations (margin vs collateral)
- Limit and alarms
- Stress testing
- Back testing



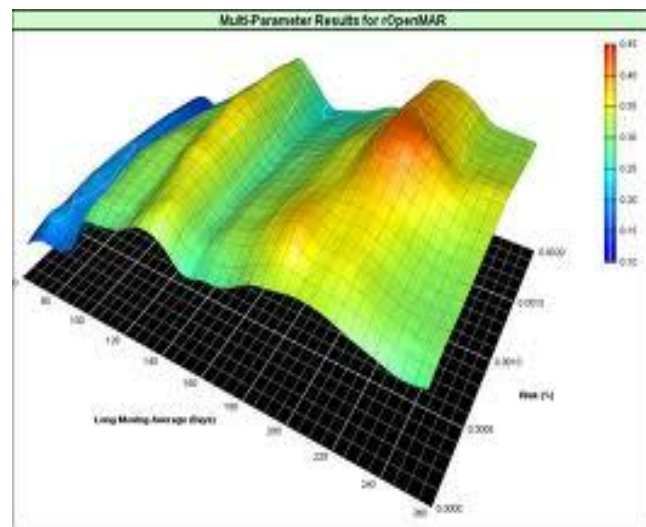
PRICE SERVER INPUT TO MARGINING AND COLLATERAL

Functionality

- Prices for margin and collateral valuation
- Filter and determine prices for margin calculation (intraday and end of day)
- Sophisticated exception handling to determine good prices
- Yield curves
- Volatility surface
- Greeks
- Parameter based calculations allows for customer specific models
- Volatility surfaces for better pricing of illiquid out-of-the money options
- Integrated with external price feed, e.g. from Reuters
- Publish prices to members and internal modules (API)

Theoretical price models:

- Black Scholes
- Black 76
- Binomial
- Exotic (binary)
- Discounted underlying price
- Roll method



NASDAQ OMX[®] COLLATERAL MANAGEMENT (CM)

GENIUM INET CLEARING SETTLEMENT & COLLATERAL MGMT

Delivery versus payment and cash transfer to CSDs and settlement banks via Genium INET SWIFT Gateway (GSG)



Settlement instruction handling

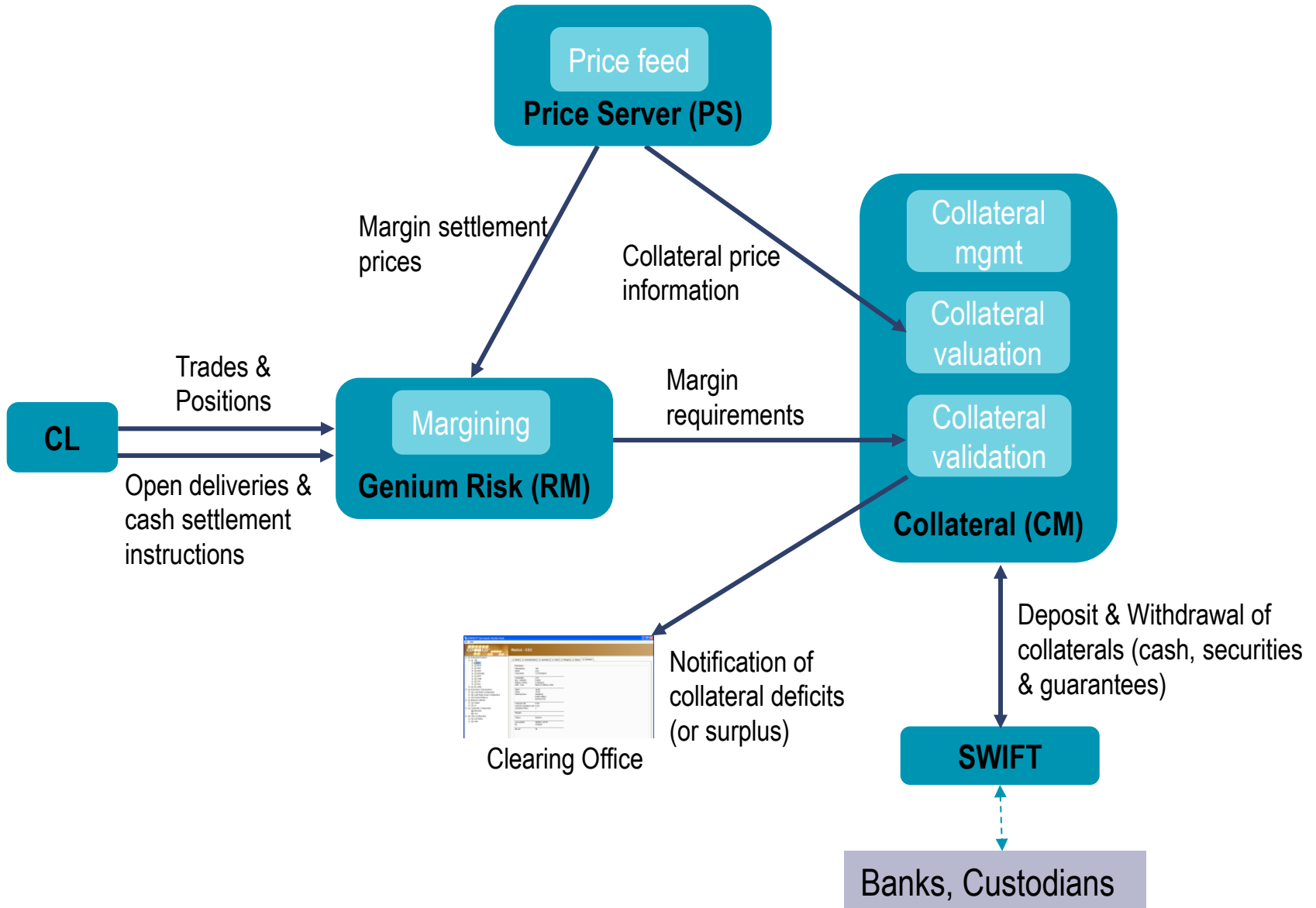
- Real time & batch settlement instruction generation and distribution
- Aggregate settlement requirements into CSD/bank instructions
- Multi level netting: Full net, Aggregated buy & sell or trade-by-trade
- Real-time settlement monitoring
- Multi currency
- Prepares data for general ledger

Collateral Management

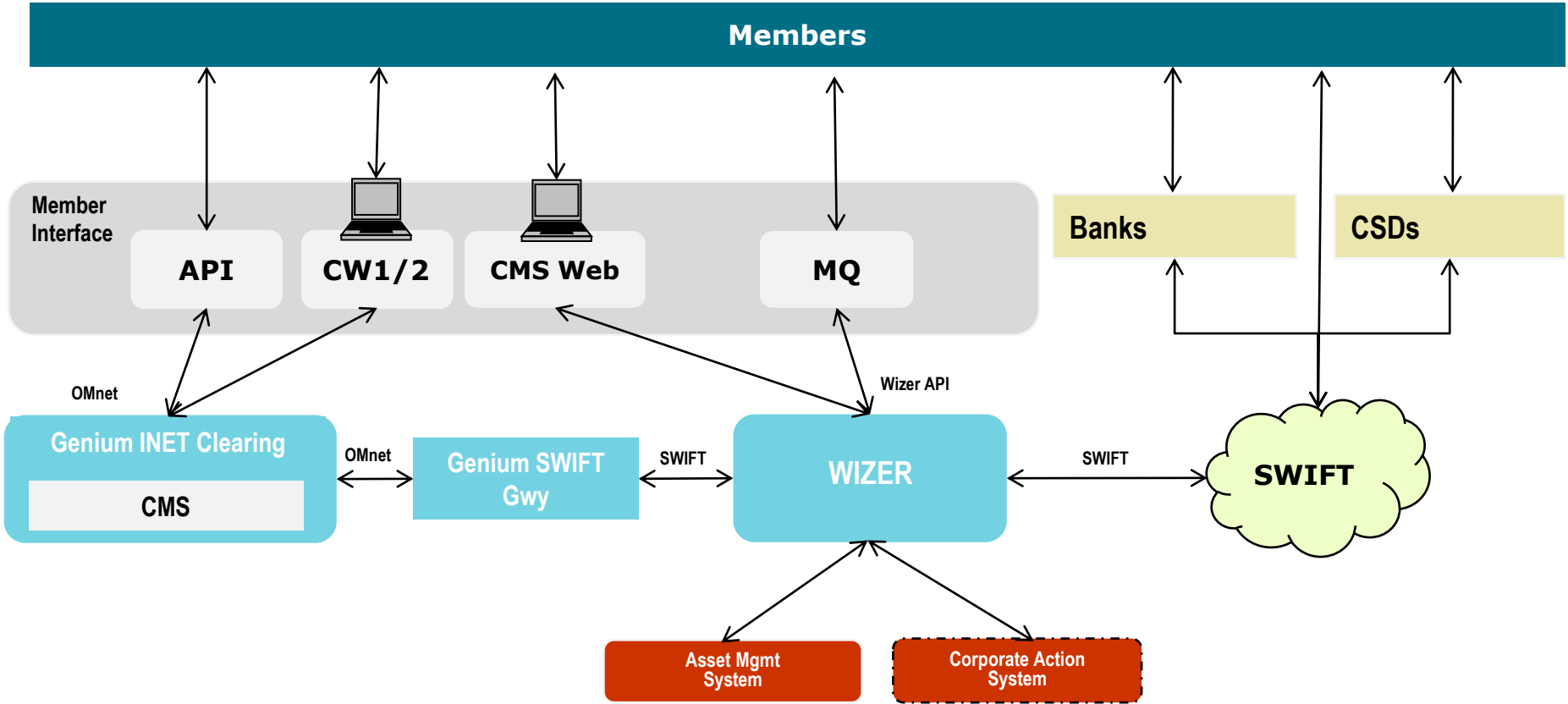
- EMIR compliant collateral management service – supports segregation and portability of client collateral
- Handles deposit and withdrawal of collateral (cash and securities) in real time from CSD or custody system
- Performs valuation of securities collateral based on available price information
- Validates total collateral (i.e. cash and securities) against margin and settlement requirements to determine deficits or surplus
- Notification sent to Clearing Operations when collateral deficits are discovered

COLLATERAL MANAGEMENT

REAL TIME COLLATERAL FLOW



COLLATERAL MANAGEMENT SYSTEM INTRASTRUCTURE



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