



**HYPERLEDGER** PROJECT

Altoros Hyperledger Demo

Distributed Clearing Platform for Derivatives



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# Introducing Hyperledger

A **collaborative** effort created to **advance blockchain** technology by identifying and addressing important features for a **cross-industry open standard** for distributed ledgers that can transform the way **business transactions** are conducted globally.



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# Introducing Altoros

Altoros is a 250+ people consultancy helping banks and insurance companies digitize revenue streams.

For blockchain applications we integrate solutions offered by the Hyperledger ecosystem.





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Hyperledger provides distributed ledger and smart contract technology



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Synswap is building a Distributed Clearing Platform



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Altoros is making it happen



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# Hyperledger Technology

## Smart Contracts

Code executed by members of a peer-to-peer network implements workflows of a Clearing House.

## Ledger

Immutable ledger of financial agreements is maintained by all members.

## Confidentiality

Financial agreements recorded on the blockchain are open only to the parties involved.



# OTC Derivative swap

Bilateral agreement to exchange cash flows at specified intervals (payment dates) during the agreed life of the transactions (maturity)

ISDA



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ISDA

A credit default swap is a credit derivative contract in which one party (*protection buyer*) pays a periodic fee to another party (*protection seller*) in return for compensation for default (or similar *credit event*) by a *reference entity*.

ISDA



# Risk Management

In order to mitigate counterparty risk when trading a CDS, important **post trade** workflows are executed:

Netting of cash flows

Margining (collateral management)

Compression (netting of offsetting trades)

Default Management

However, “some firms and infrastructures still rely on fax for some of their business communication and instruction”.



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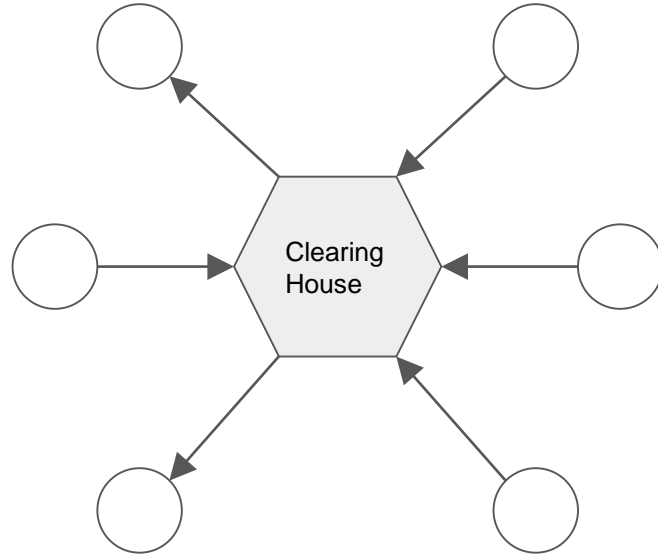


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*ISDA Whitepaper: The Future of Derivatives Processing and Market Infrastructure, September 2016*



# Clearing House



These risk management workflows are typically run by a Clearing House, but...



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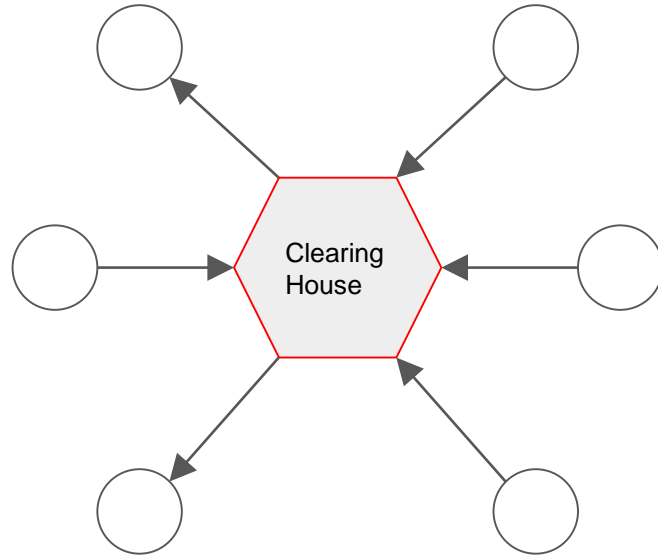


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# Clearing House



Central Clearing House:

- Expensive



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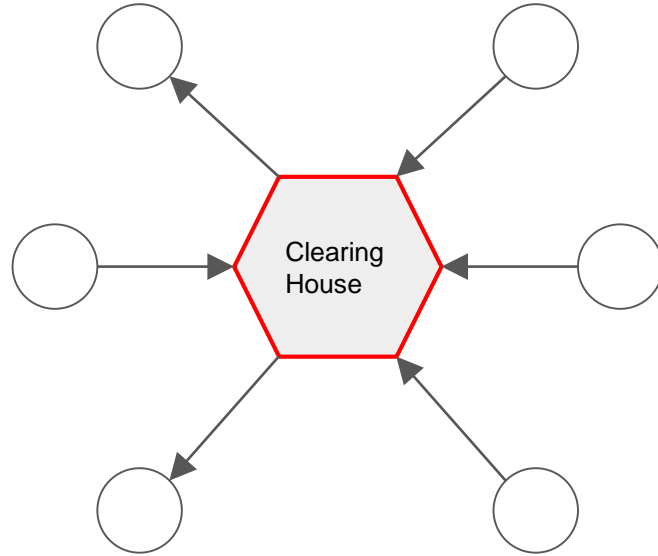


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# Clearing House



Central Clearing House:

- Expensive
- Counterparty Risk



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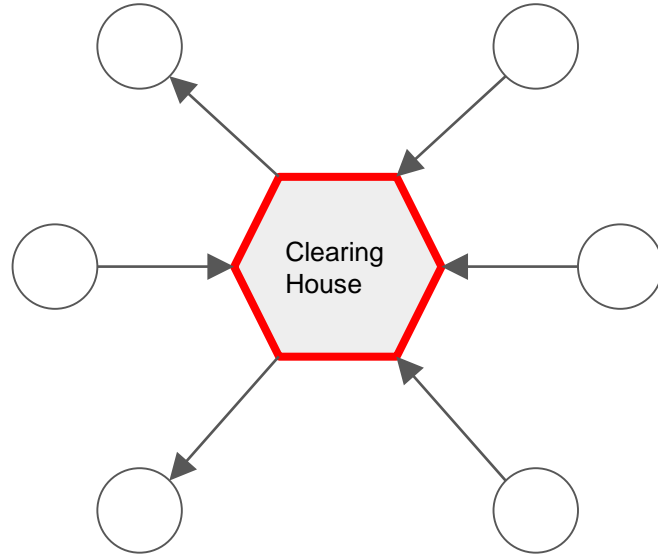


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# Clearing House



- Central Clearing House:
- Expensive
  - Counterparty Risk
  - Concentration Risk



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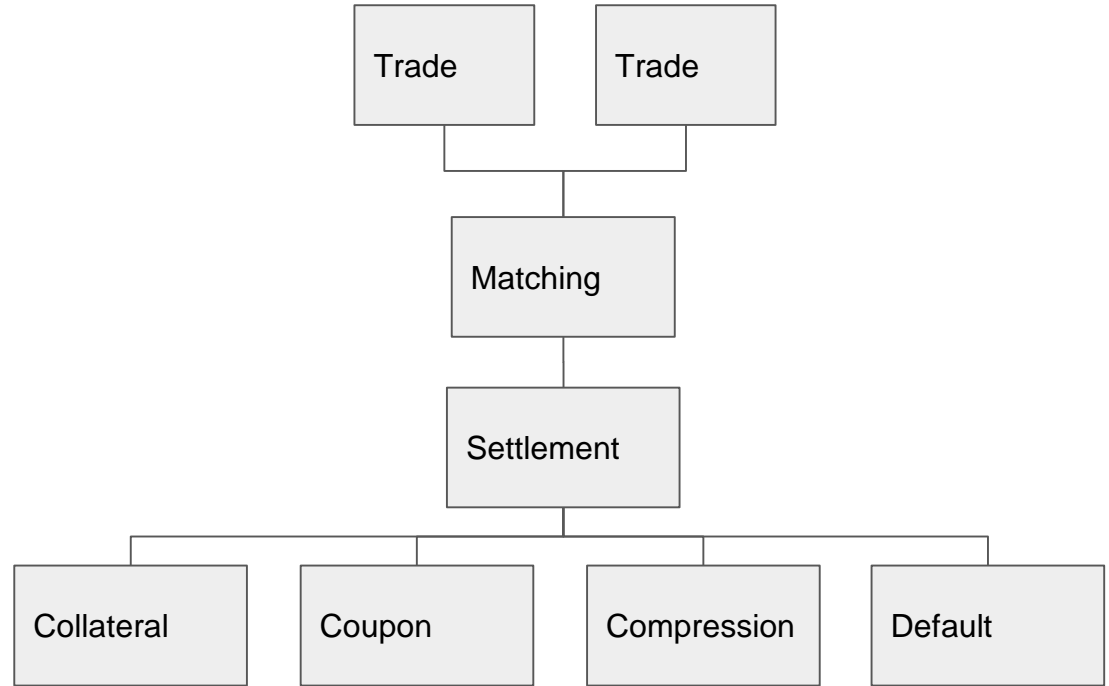
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# Post Trade by Smart Contracts

Smart contracts run by trading members on a peer-to-peer network can fully automate post trade workflows



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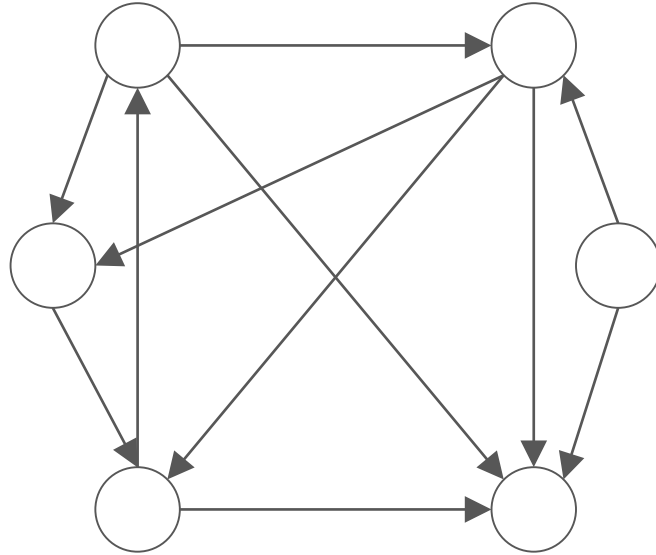


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# Clearing House: Distributed



Workflows of a Clearing House are run by all members in a peer-to-peer network



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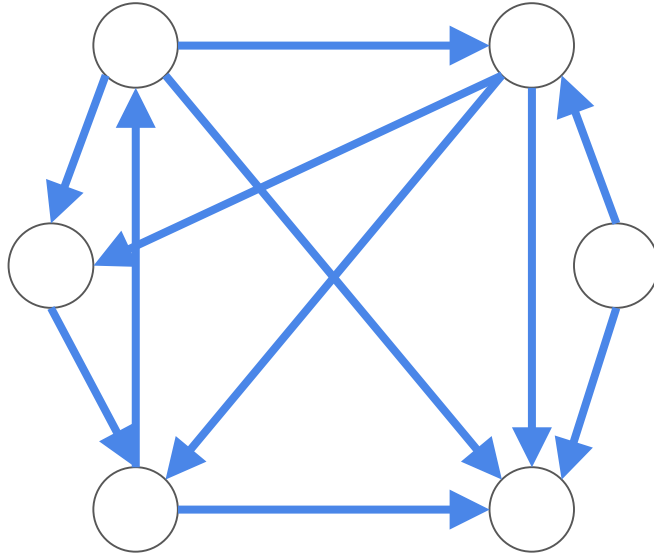


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# Trades are Smart Contracts



Financial agreements between counterparties are represented by smart contracts.

They are isolated ledgers *and* executable code.



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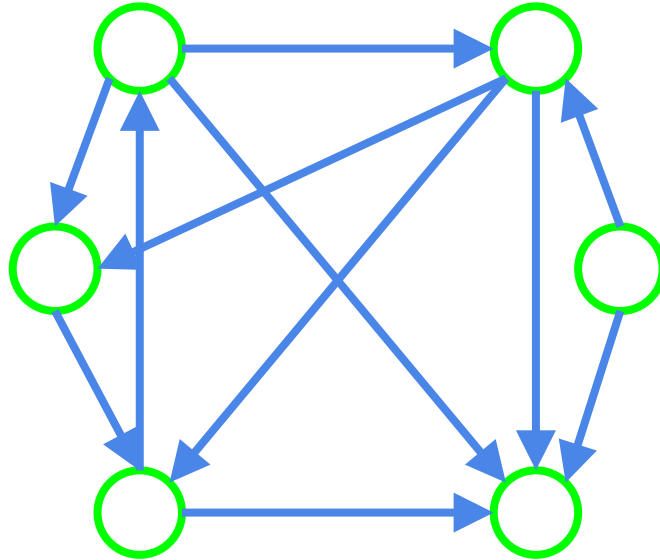


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# Counterparties are Members



Counterparties enroll in a network as equal members, supporting and executing workflows.



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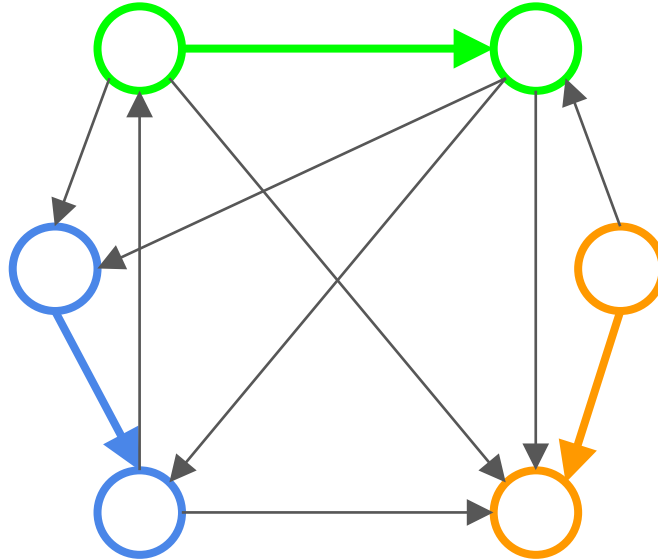
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# Trades are Confidential



Financial agreements can be decrypted and executed only by its counterparties.

Other members support order and persistence but cannot see confidential data.



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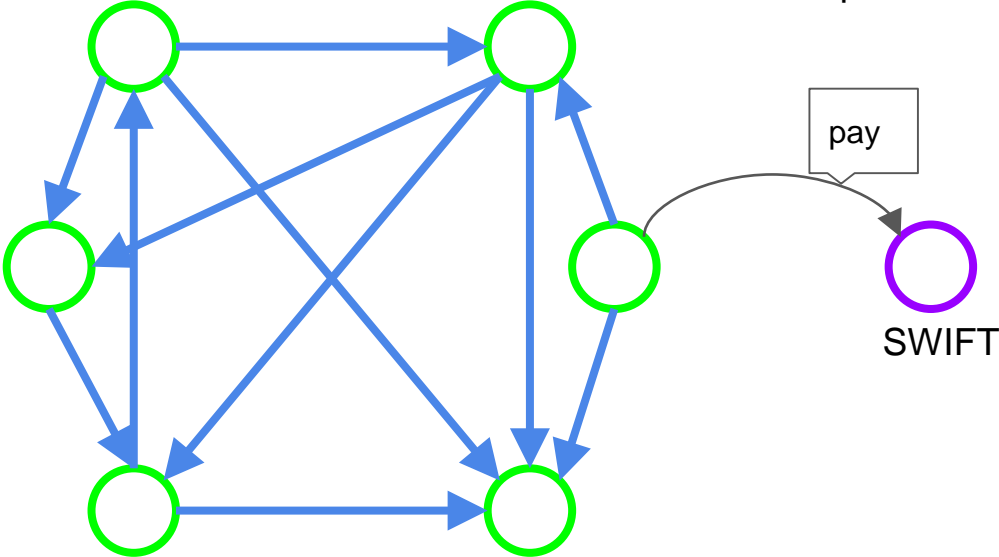
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# Payment by Adapters

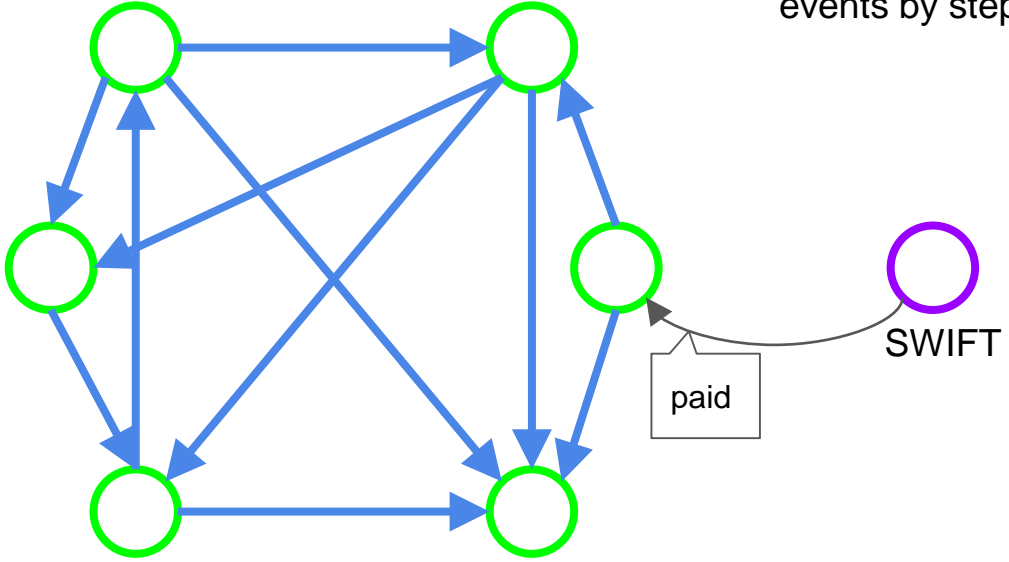
Smart contracts *orchestrate* payments by issuing instructions to the payment system outside of the platform.



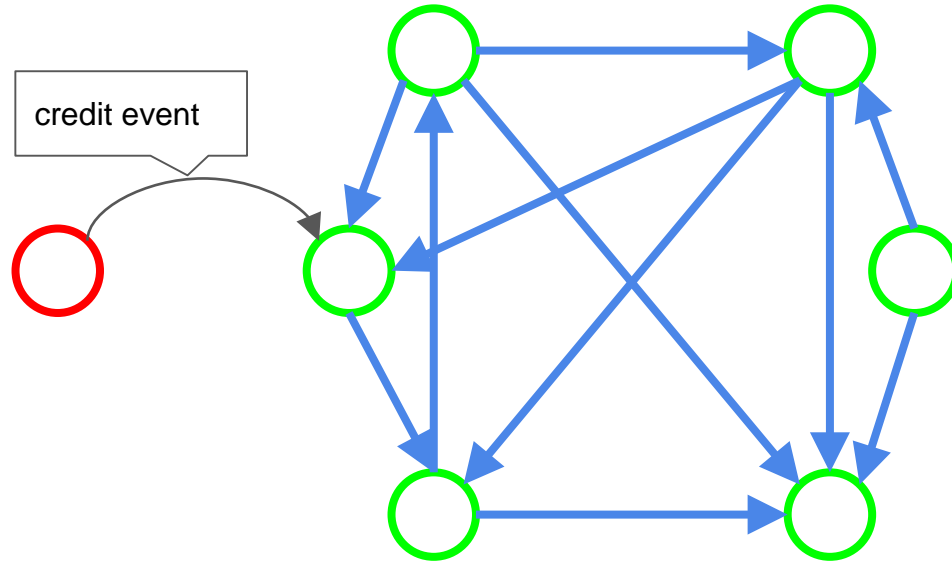
# Payment by Adapters

Payment system notifies the platform of successful transfers.

Smart contracts *react* to these events by steps in their workflows.



# Credit Events by Oracles



Smart contracts *react* to events delivered to the platform by trusted *oracles*.



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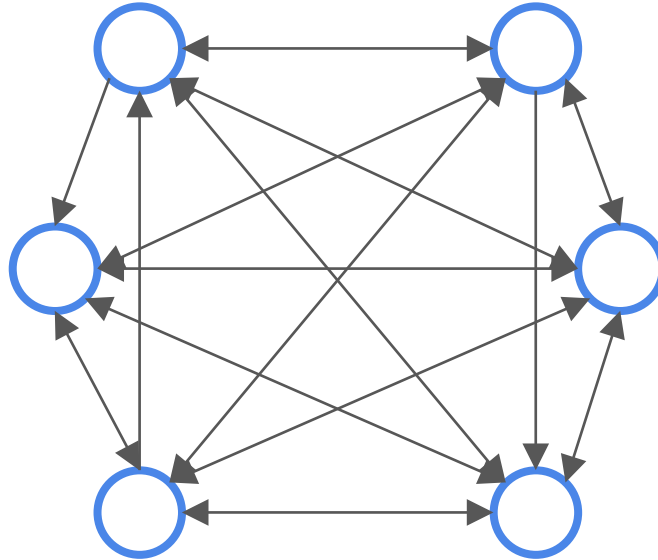


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# Pricing by Consensus



Prices for collateral management are calculated by a smart contract run by each member.

Members reach consensus on the CDS price.



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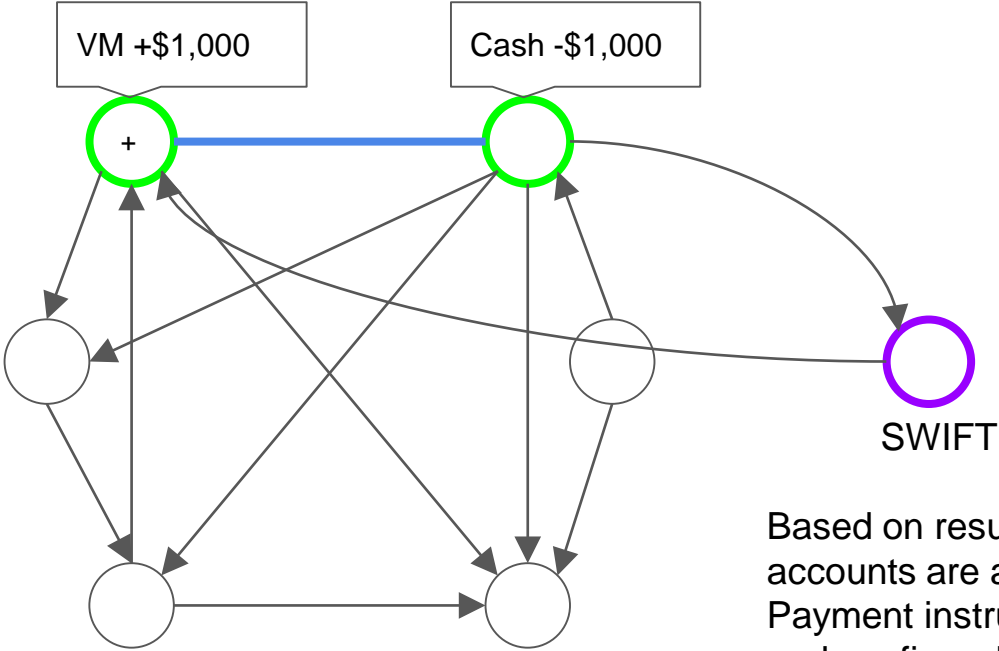


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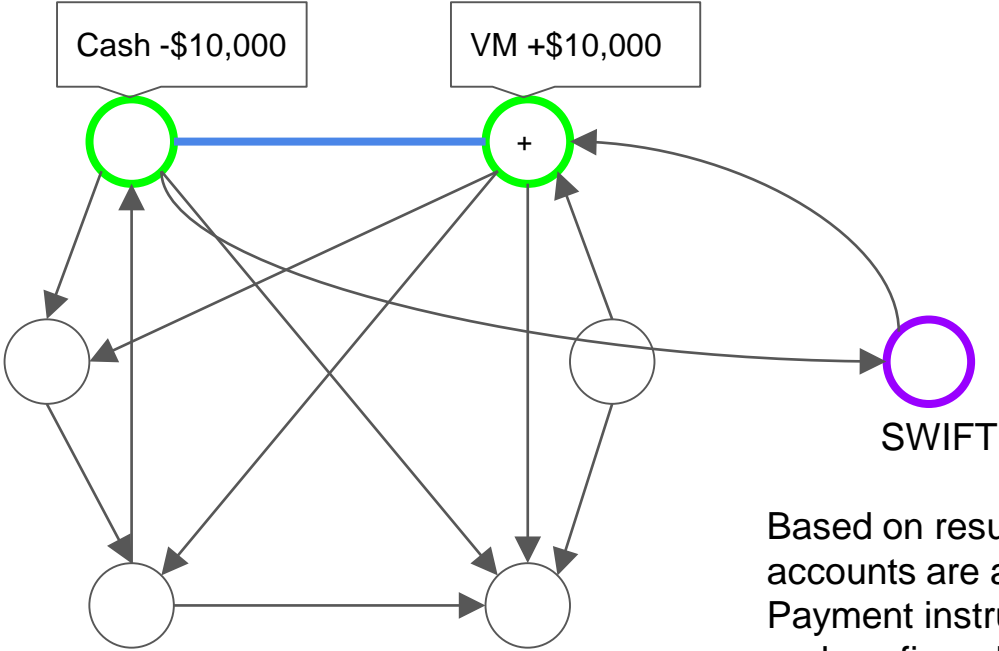
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# Collateral Management



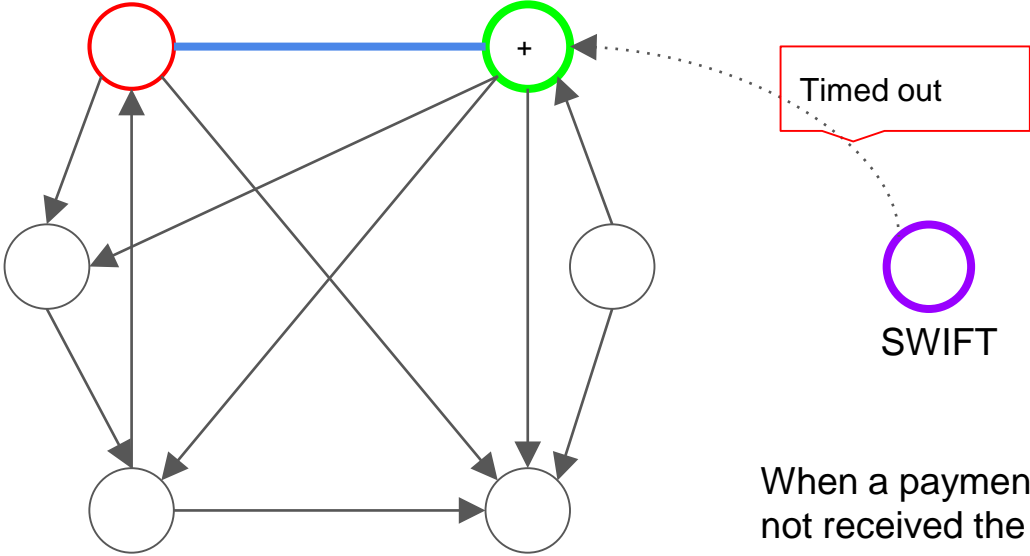
Based on results of Pricing margin accounts are adjusted daily. Payment instructions are issued and confirmed.

# Collateral Management



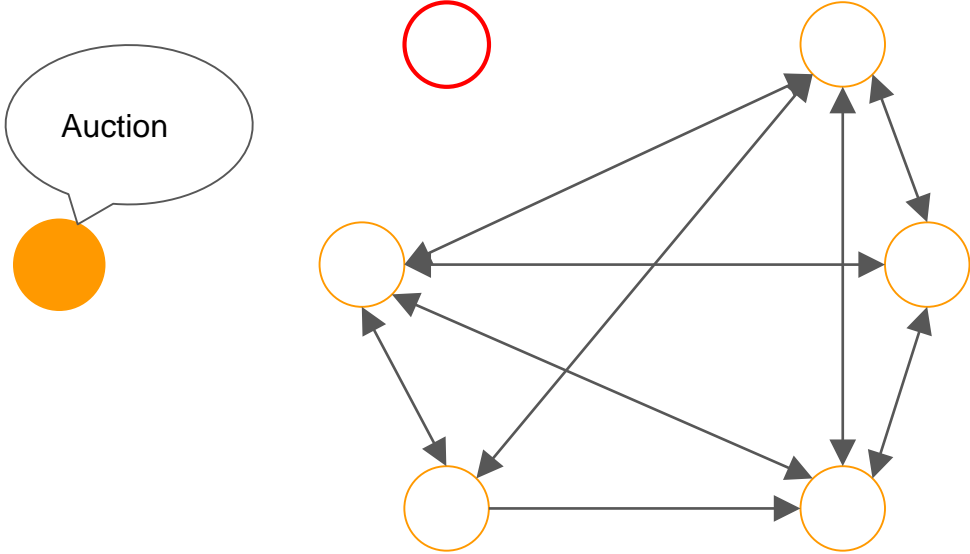
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# Collateral Management



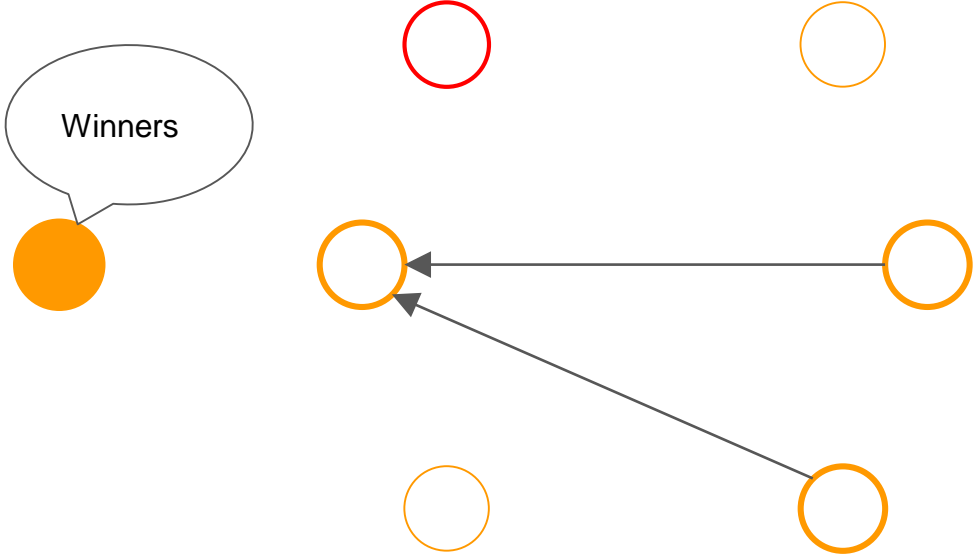


# Member Default



When a member defaults, a smart contract calls to auction out the defaulted member's portfolio among remaining members.

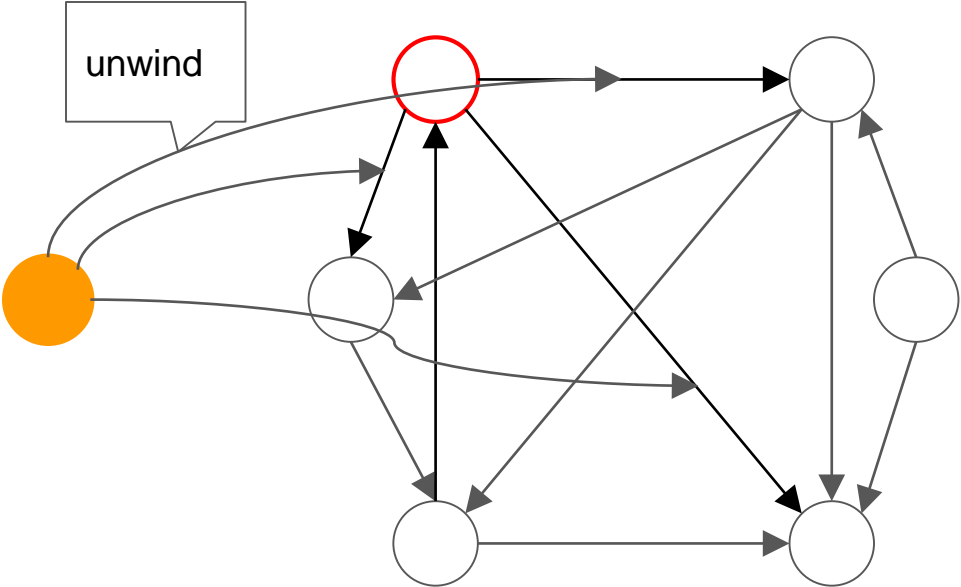
# Member Default



A smart contract determines the winners of the auction process.

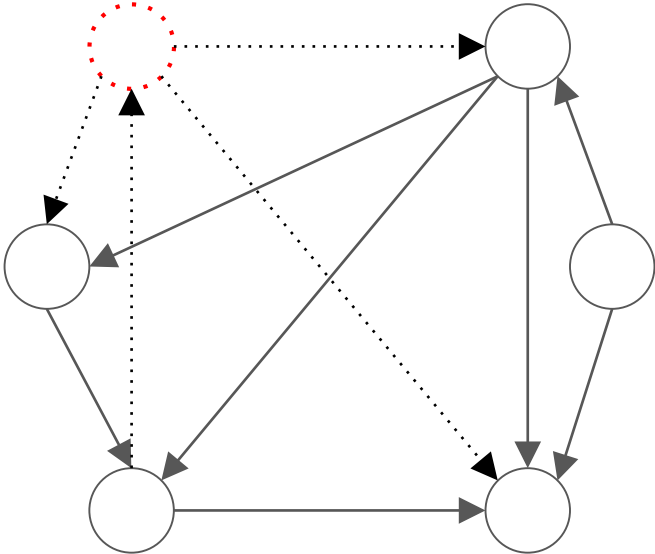
Members who win the trades of the defaulted member become new counterparties of the trades.

# Member Default



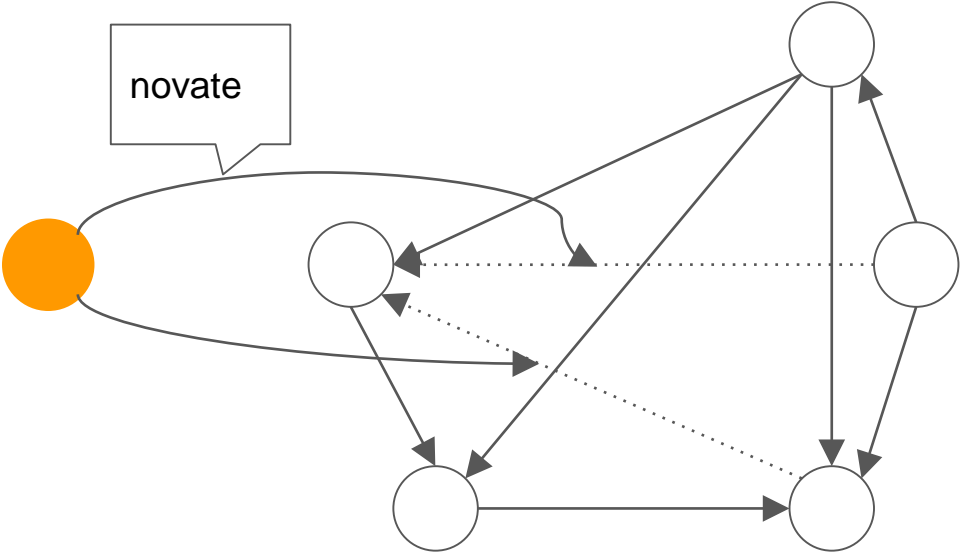
Smart contract unwinds trades of the defaulted member...

# Member Default



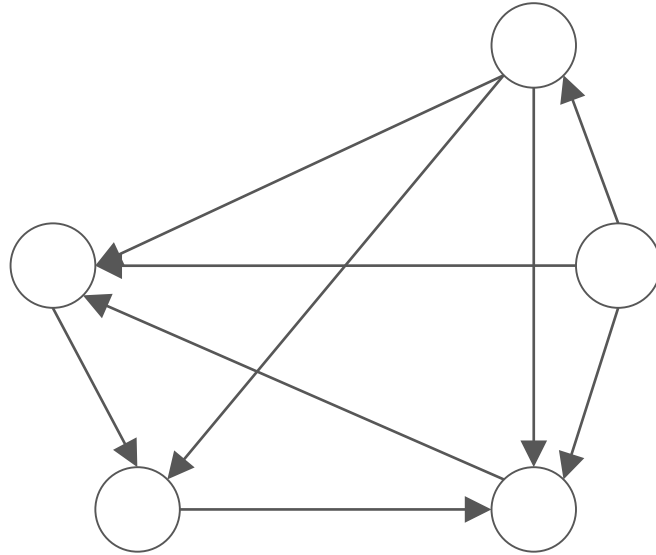
... and redistributes them among the winners of the auction.

# Member Default



New trades are created automatically.

# Member Default



Members collectively covered for the defaulted member.



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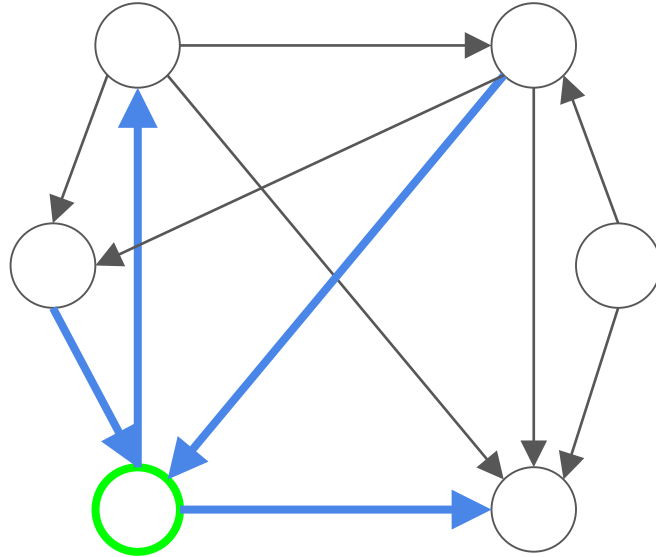


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# Trade Compression



Each member submits his portfolio anonymously to a smart contract.



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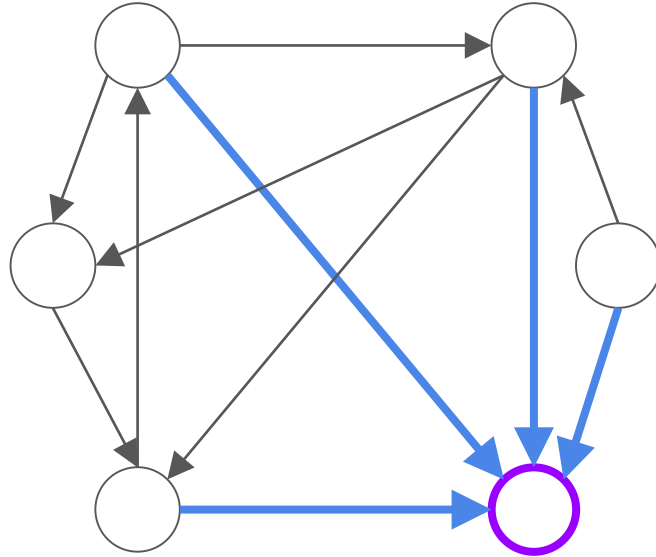


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# Trade Compression



No member nor the smart contract can see trade details...



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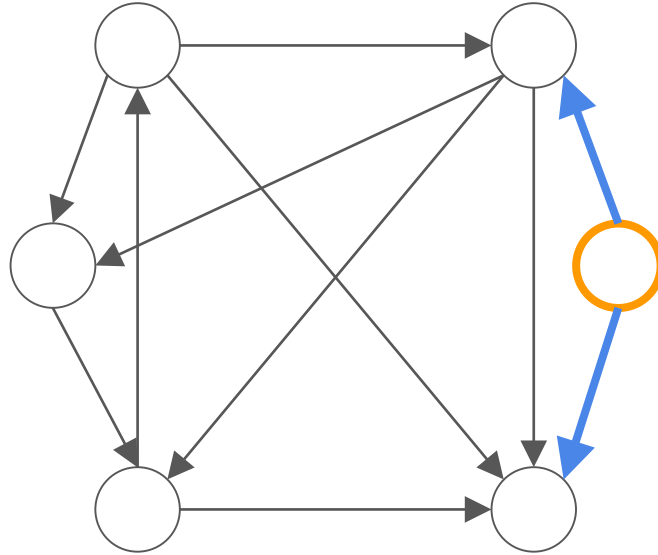
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# Trade Compression



... or deduce parties to trade.



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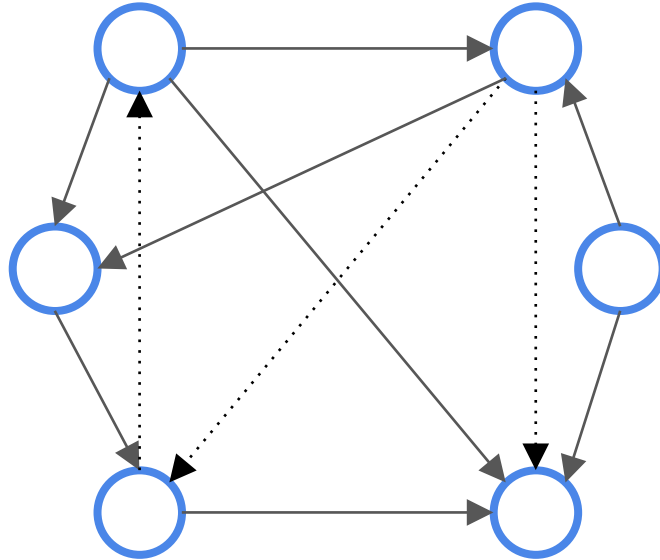


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# Trade Compression



The smart contract runs a compression algorithm on anonymized inputs.



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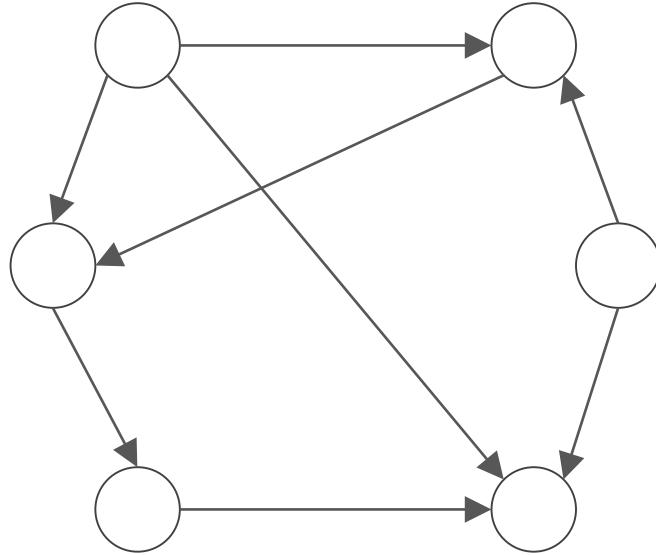


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# Trade Compression



Number of trades is reduced and so are the risk and capital requirements.



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# Decentralized Clearing on Hyperledger

Hyperledger technology provides confidentiality of financial agreements committed to a common ledger.

Smart contracts run by trading parties on Hyperledger blockchain allow to collectively execute post trade workflows in a more secure and less expensive decentralized model.

