Developing Applications
with NEM Blockchain

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Introduction

First Part 12:00 - 13:00

- Developing blockchain applications
- NEM Approach
- NEM Features
- **NEM Tools**
  - **Setup environment**

Second Part 14:00 - 14:30

- **Use Case Presentation**
  - **NEM Development Process**
  - **Hands-on**

Conclusions

Blockchain **properties**

Distributed

Immutable

How much application logic do we really need on the Blockchain ?

"A **smart contract** is a computer protocol intended to facilitate, verify, or enforce the negotiation or performance of a contract."

Nick Szabo (1996)

Blockchain properties can also be **drawbacks**

Distributed

Slowness

Immutable

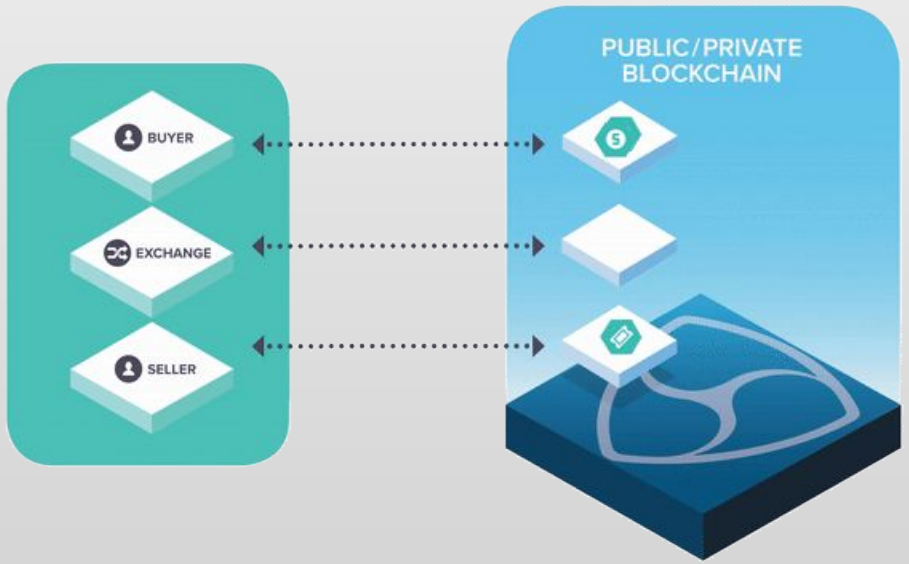
Defining long-term applications

Maintenance

NEM Approach

Without application logic on the Blockchain we can still use it for:

- Transfer and store of value
- Authorisation
- Traceability
- Authentication (identity and data)
- ...



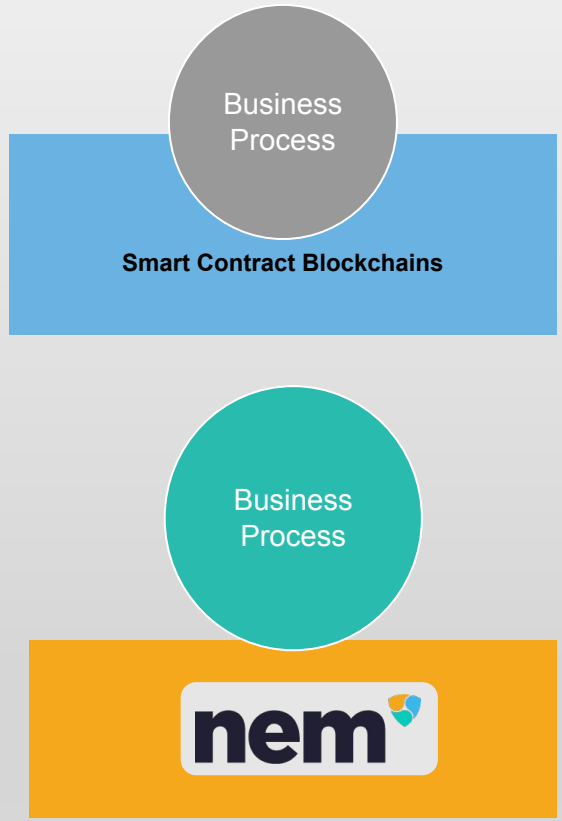
NEM Approach

Others

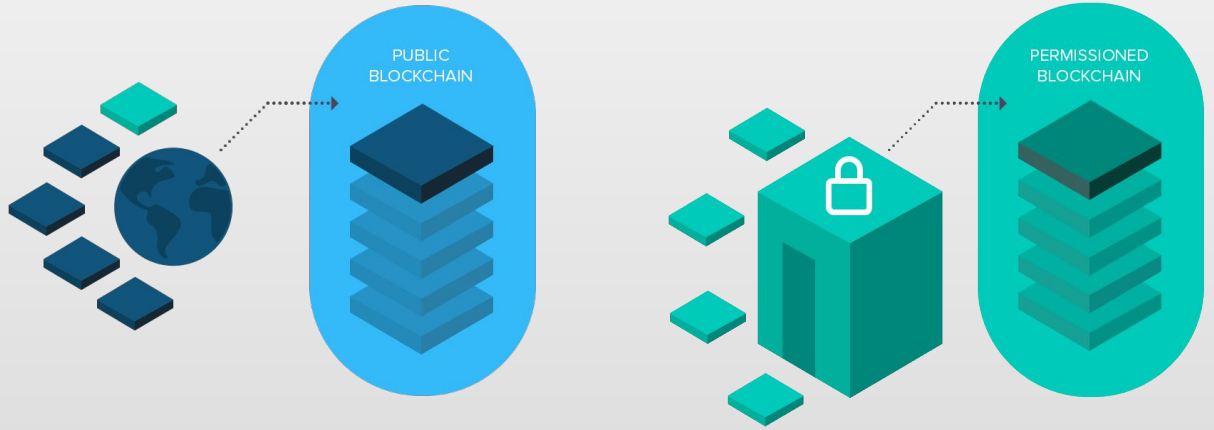
On-Chain Business Logic in a Smart Contract is unmaintainable and difficult to upgrade.

NEM Solution

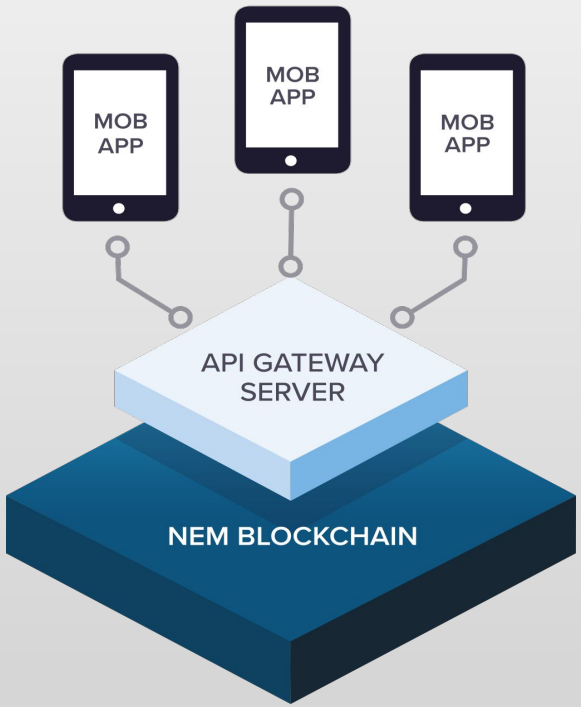
Scalable business logic execution and state management via API.

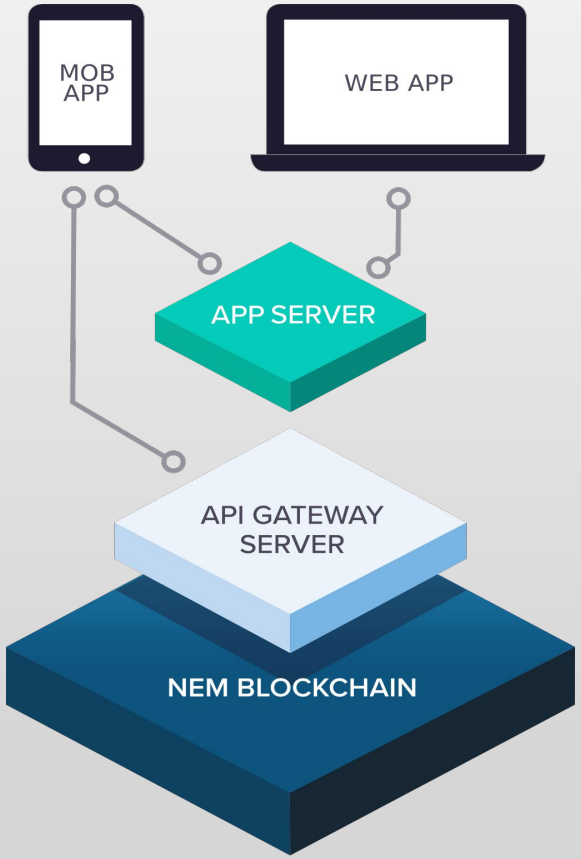


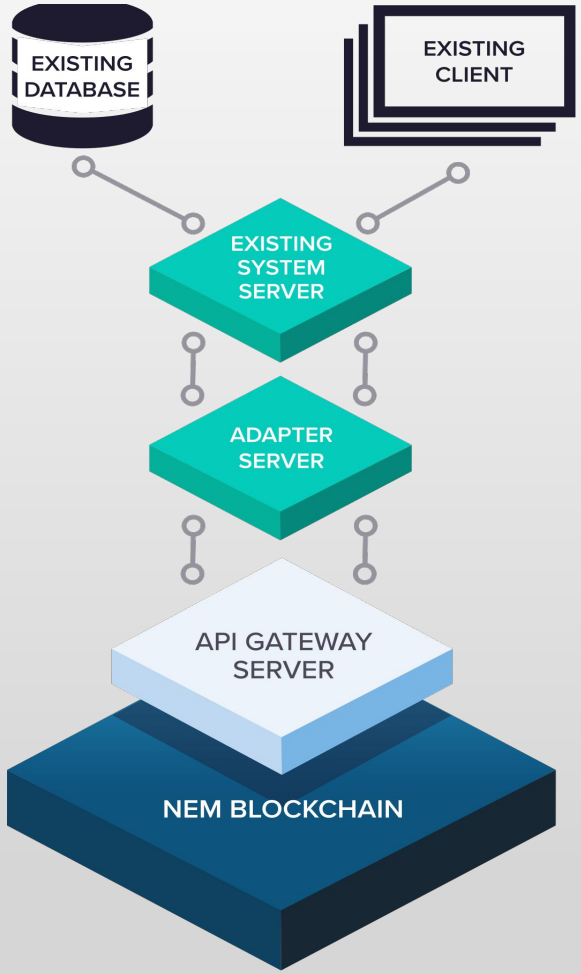
Public vs Permissioned



Throughput	**Low (2 - 100 TPS)**	**High (> 4000 TPS)**
Security/Governance	**Consensus Algorithm**	**Centralized**
Immutable	**Yes**	**?**
Access	**Open**	**Permissioned**


MOB APP
MOB APP
MOB APP
API GATEWAY SERVER
NEM BLOCKCHAIN

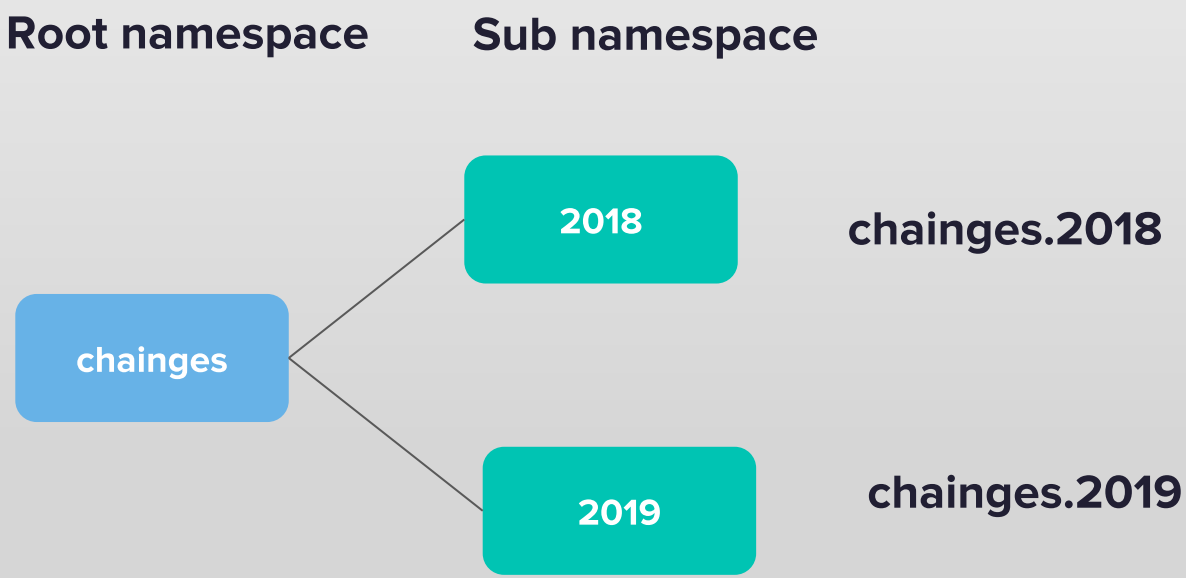

MOB APP
WEB APP
APP SERVER
API GATEWAY SERVER
NEM BLOCKCHAIN


EXISTING DATABASE
EXISTING CLIENT
EXISTING SYSTEM SERVER
ADAPTER SERVER
API GATEWAY SERVER
NEM BLOCKCHAIN

Built-in Features

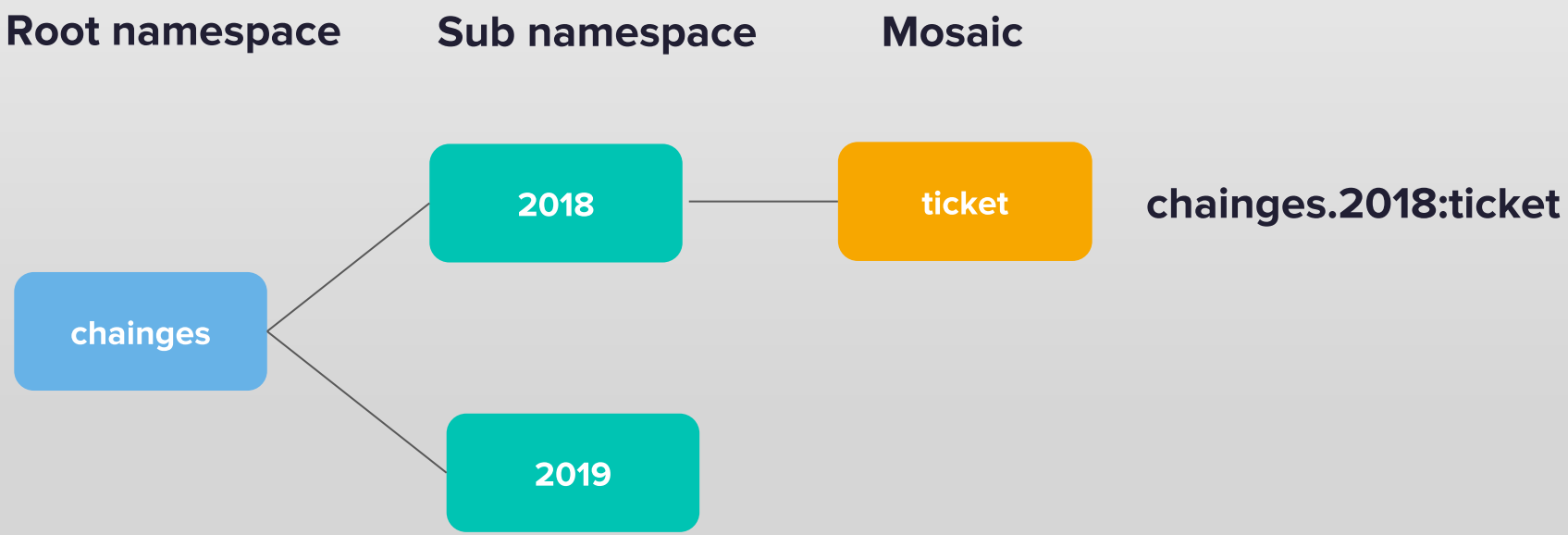
Namespace

Allows organizations to have their unique identifier on the blockchain.

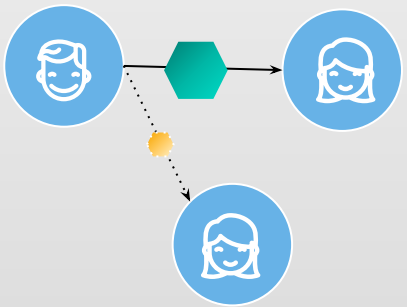


Mosaic

Represents any asset in the blockchain: objects, tickets, coupons, stock share representation, and even your cryptocurrency.

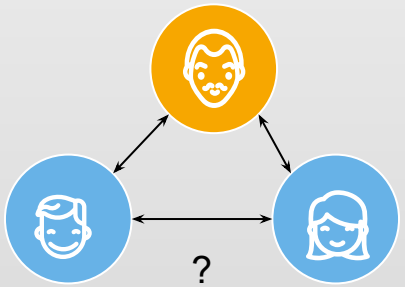


Mosaics are configurable



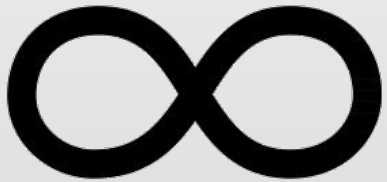
Levy

Does transactions have some extra commission?



Transferability

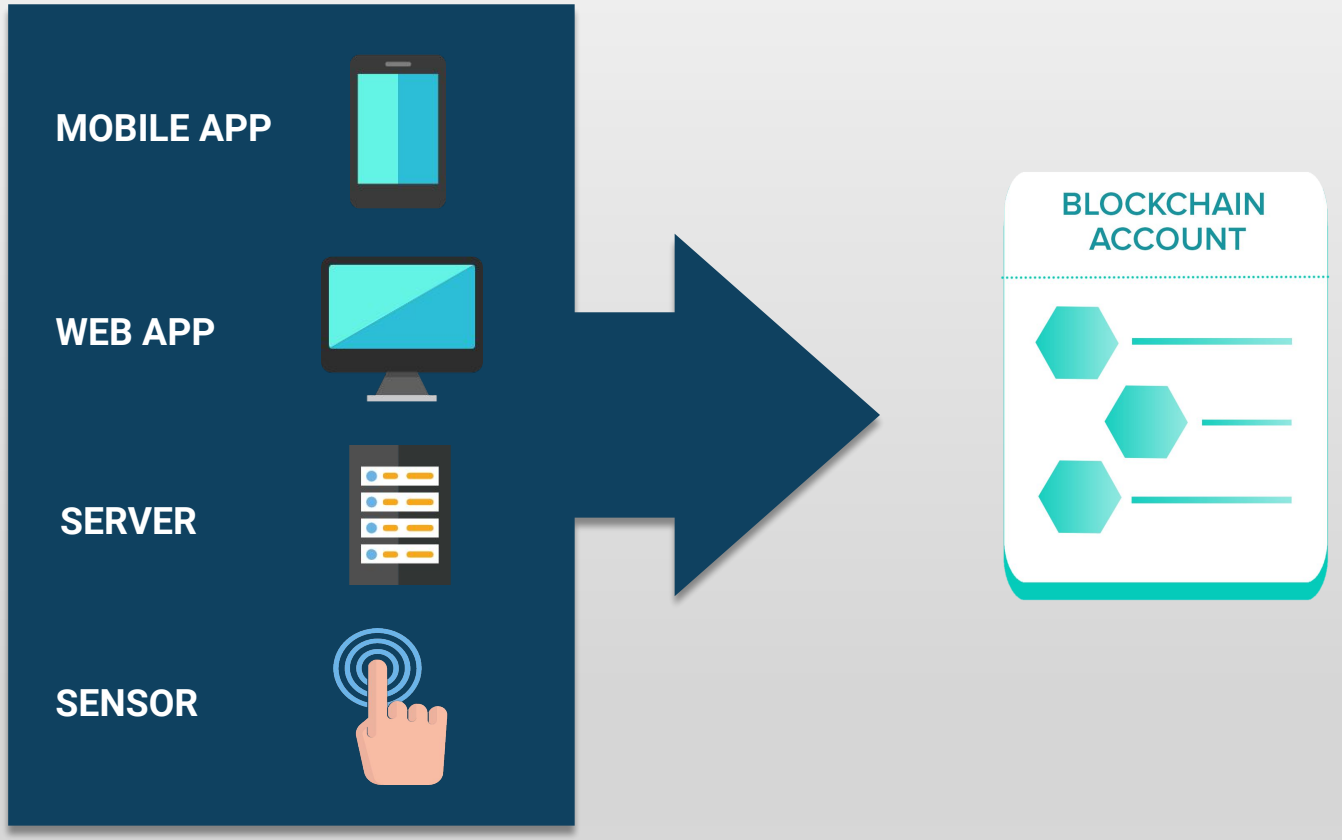
Can assets be transferred freely?



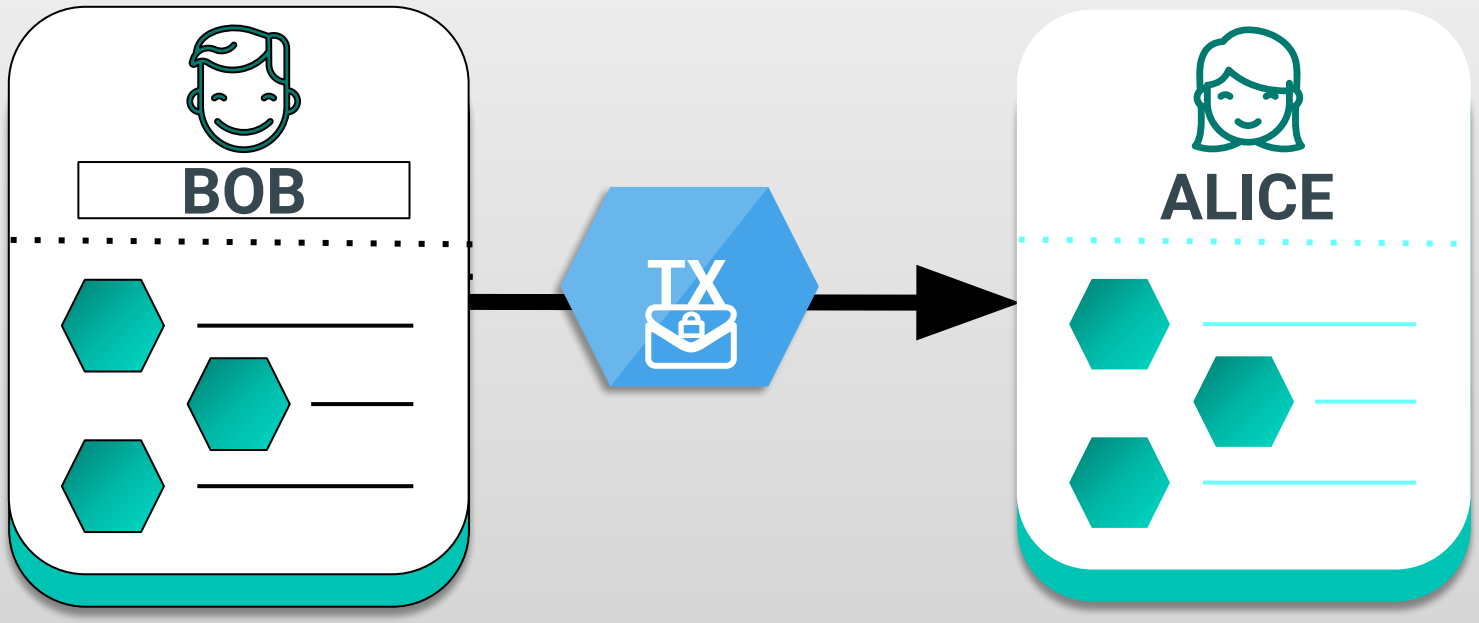
Mutability

It is the initial supply alterable?

Accounts



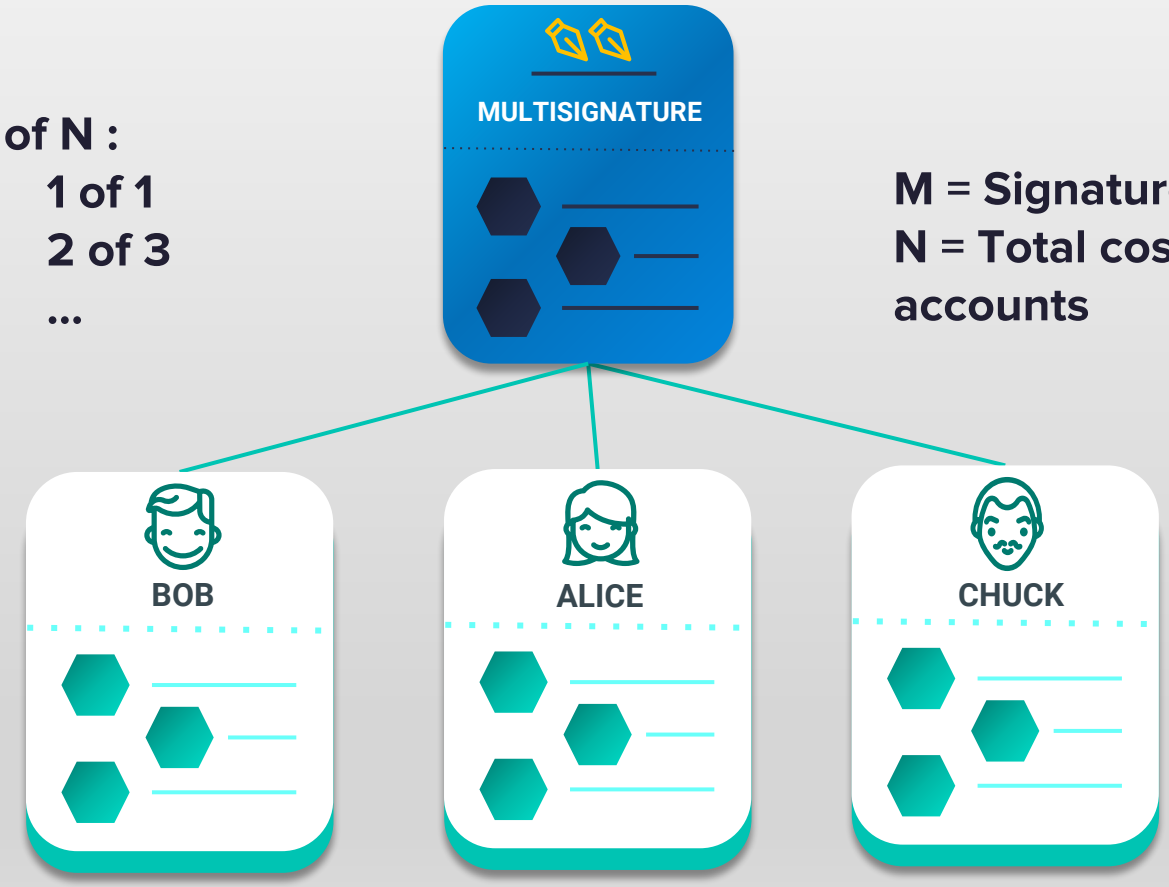
Transfer transaction



Multisignature account

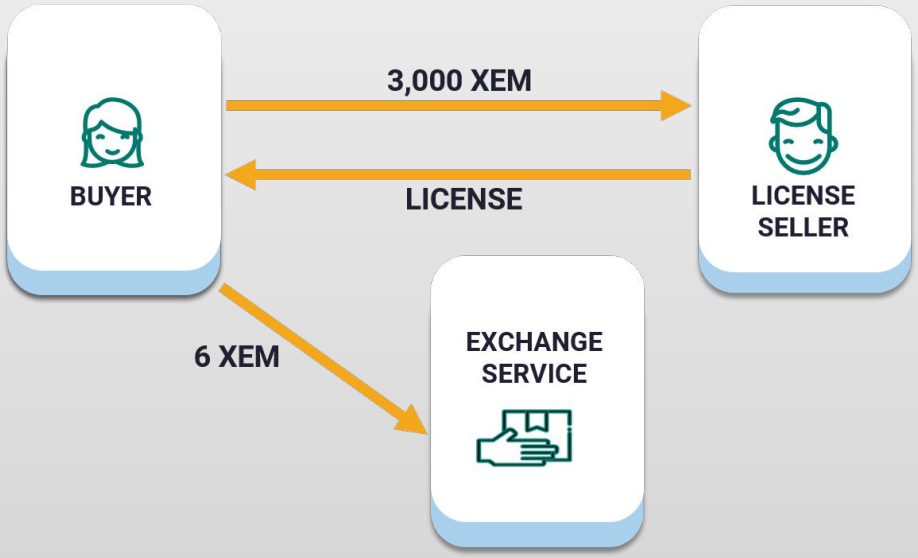
M of N :

- **1 of 1**
- **2 of 3**
- **...**



M = Signatures required
N = Total cosignatory accounts

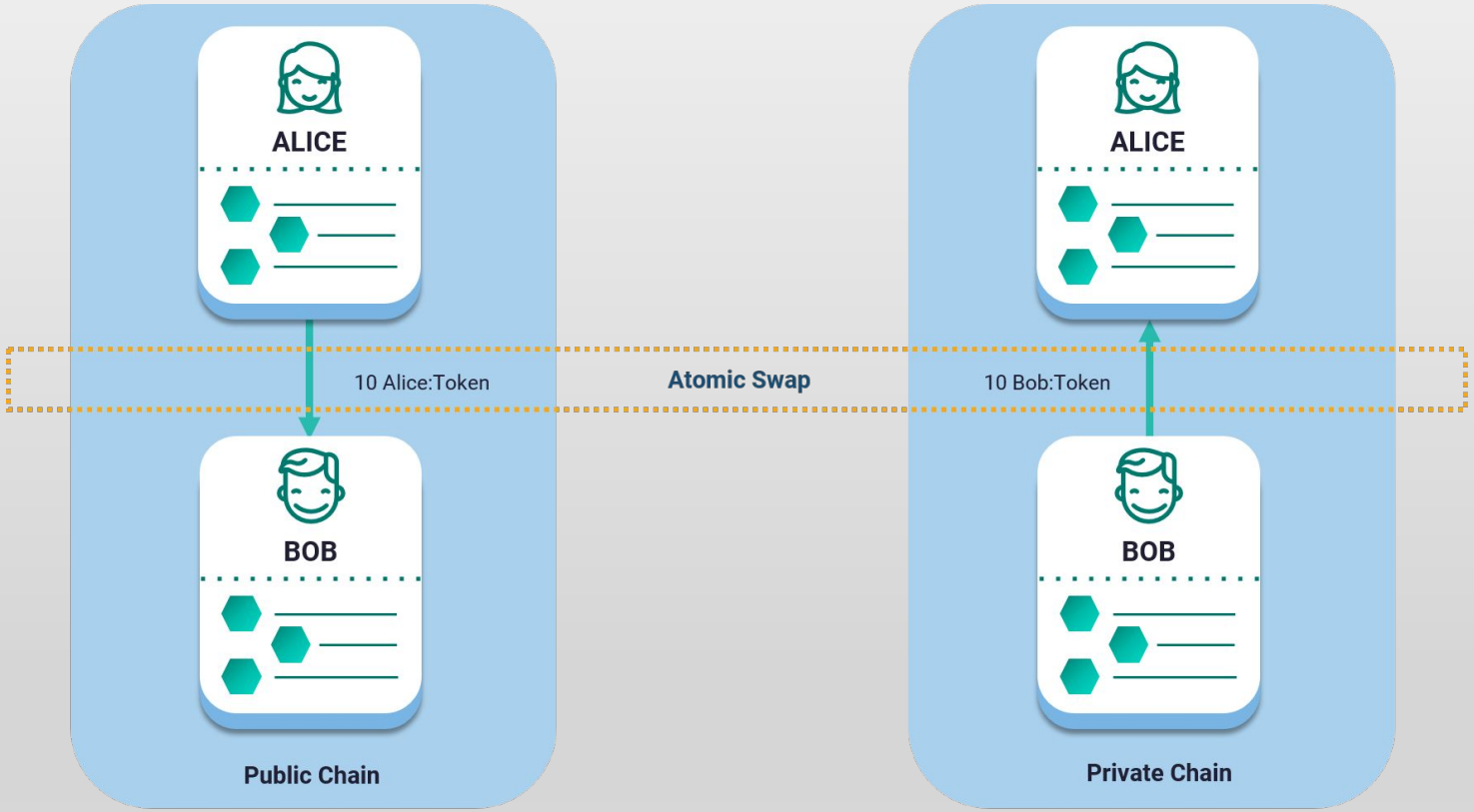
Aggregate transaction



Aggregate transactions contain **multiple transactions** that can be initiated by different accounts.

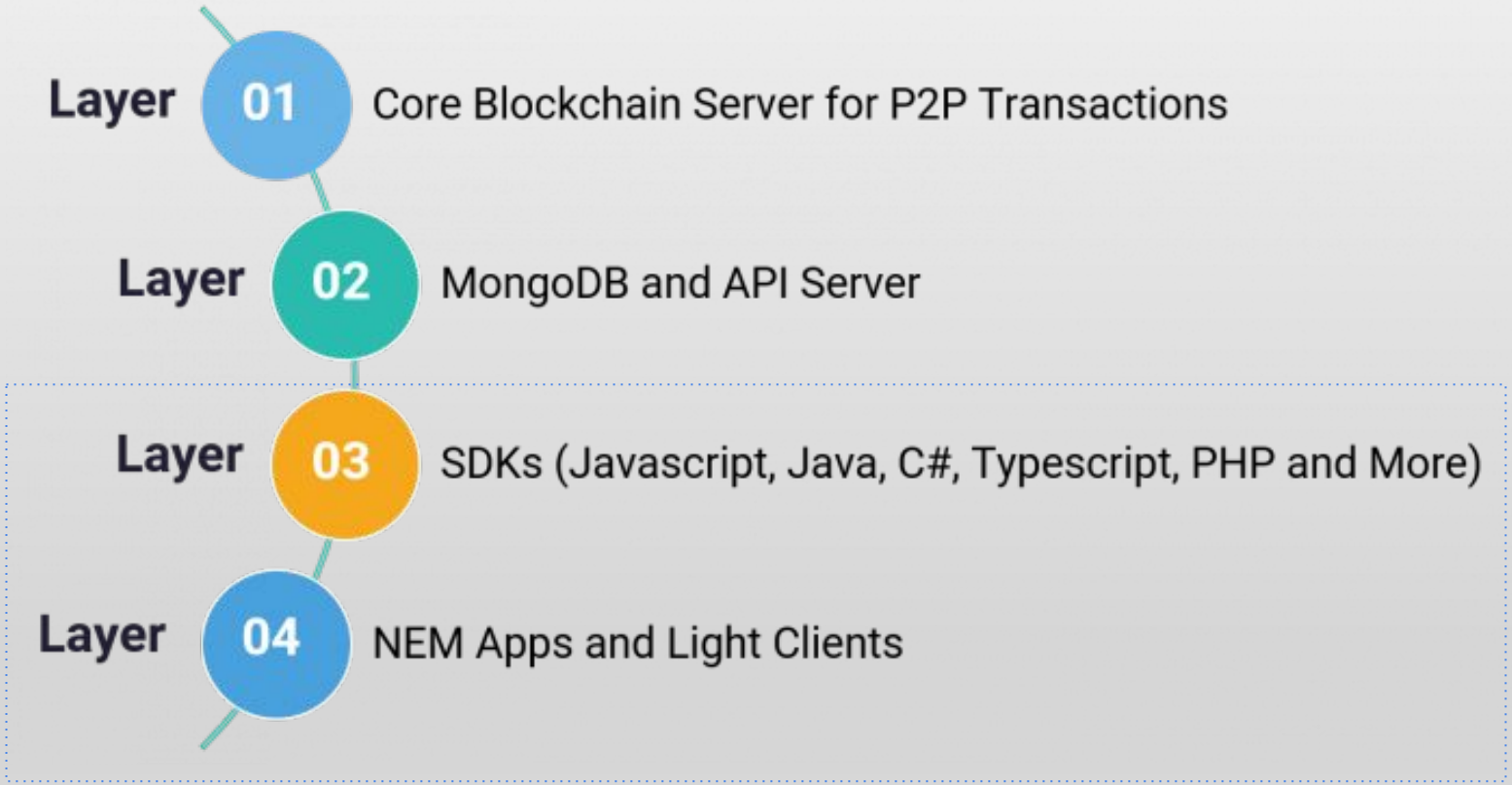
All inner transactions will be included in a block **or none** of them.

Atomic Cross-Chain Transactions



NEM Tools

4 layered architecture



Layer 03 SDKs (Javascript, Java, C#, Typescript, PHP and More)

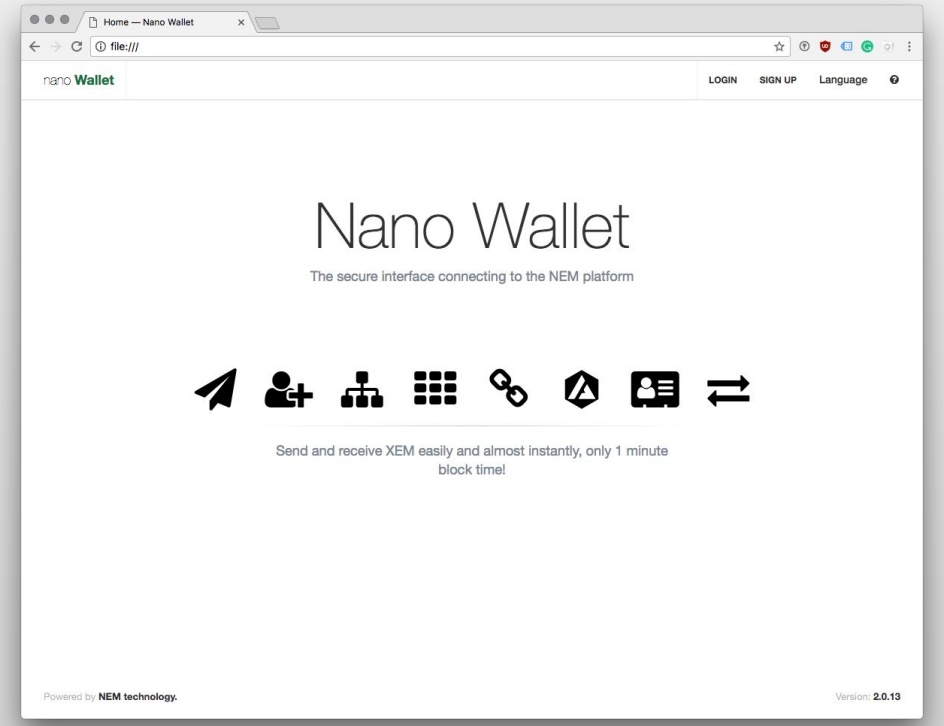
NEM Library

Primary software development tool to create NEM components.

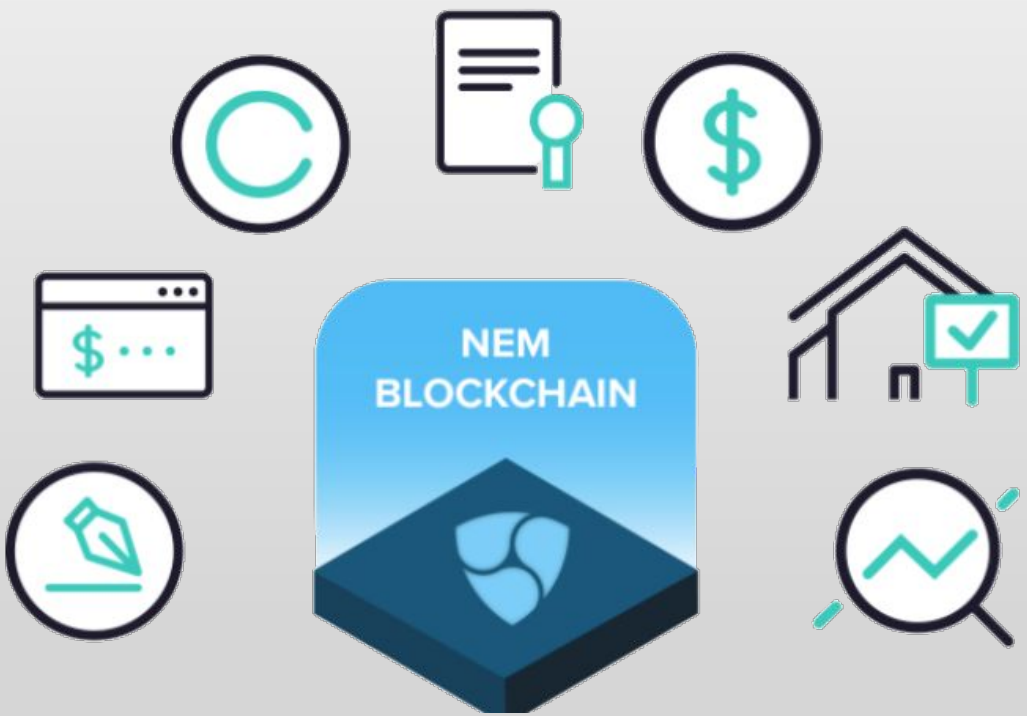
Layer 04 NEM Apps and Light Clients

Nano Wallet

Perform the most common used actions to interact with the blockchain.



Layer 04 NEM Apps and Light Clients



Voting module

NEM Voting Module anyone can create and participate in polls using Blockchain technology.

Apostille

Blockchain Notarizations that are Transferable, Updatable, Branded, and Conjointly Owned.

Setup environment

http://tiny.cc/chainges2018

- **Download Nano Wallet 2.1.2**
- **Create a wallet**
- **Get test XEM**

Creating a new project

mkdir workshop

npm init

npm install -g typescript node-ts

npm install nem-library rxjs --save

touch transferTransaction.ts

Open it with our favorite editor.

Second Part 14:00 - 14:30

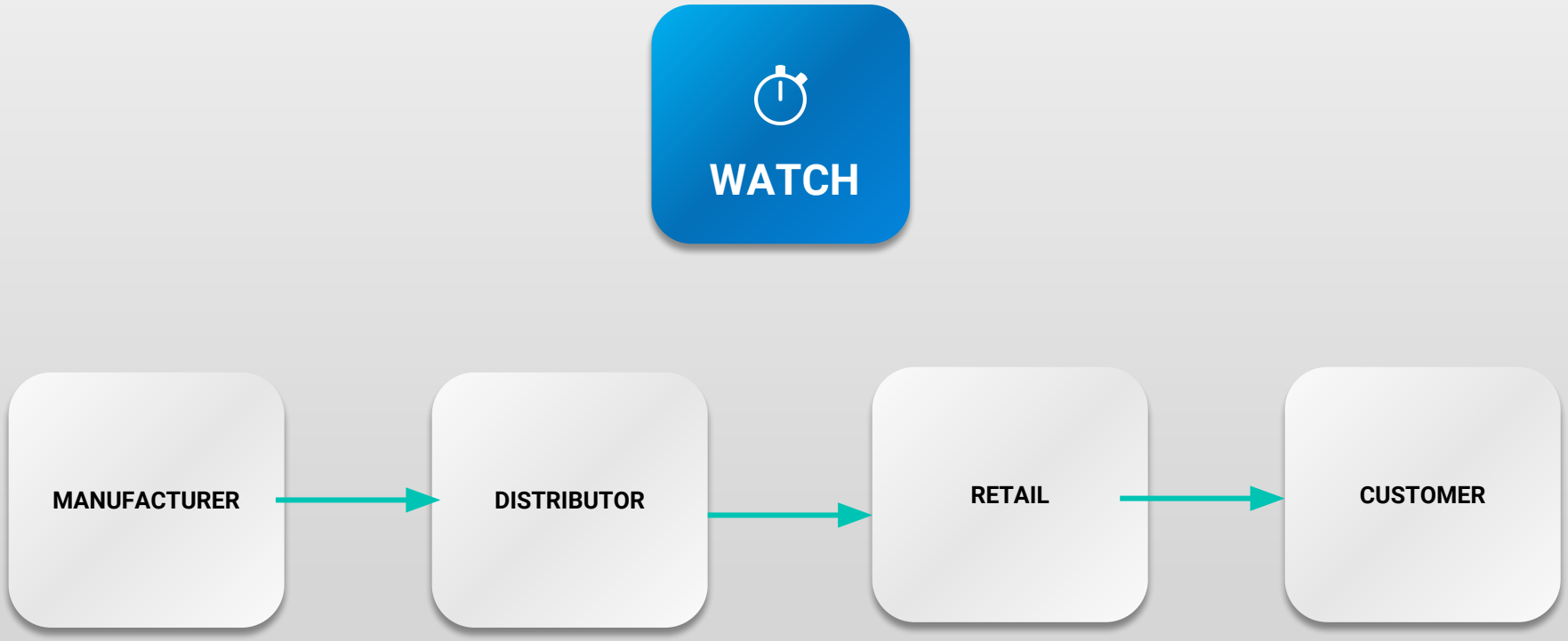
Use Case Presentation

- NEM Development Process
- Hands-on

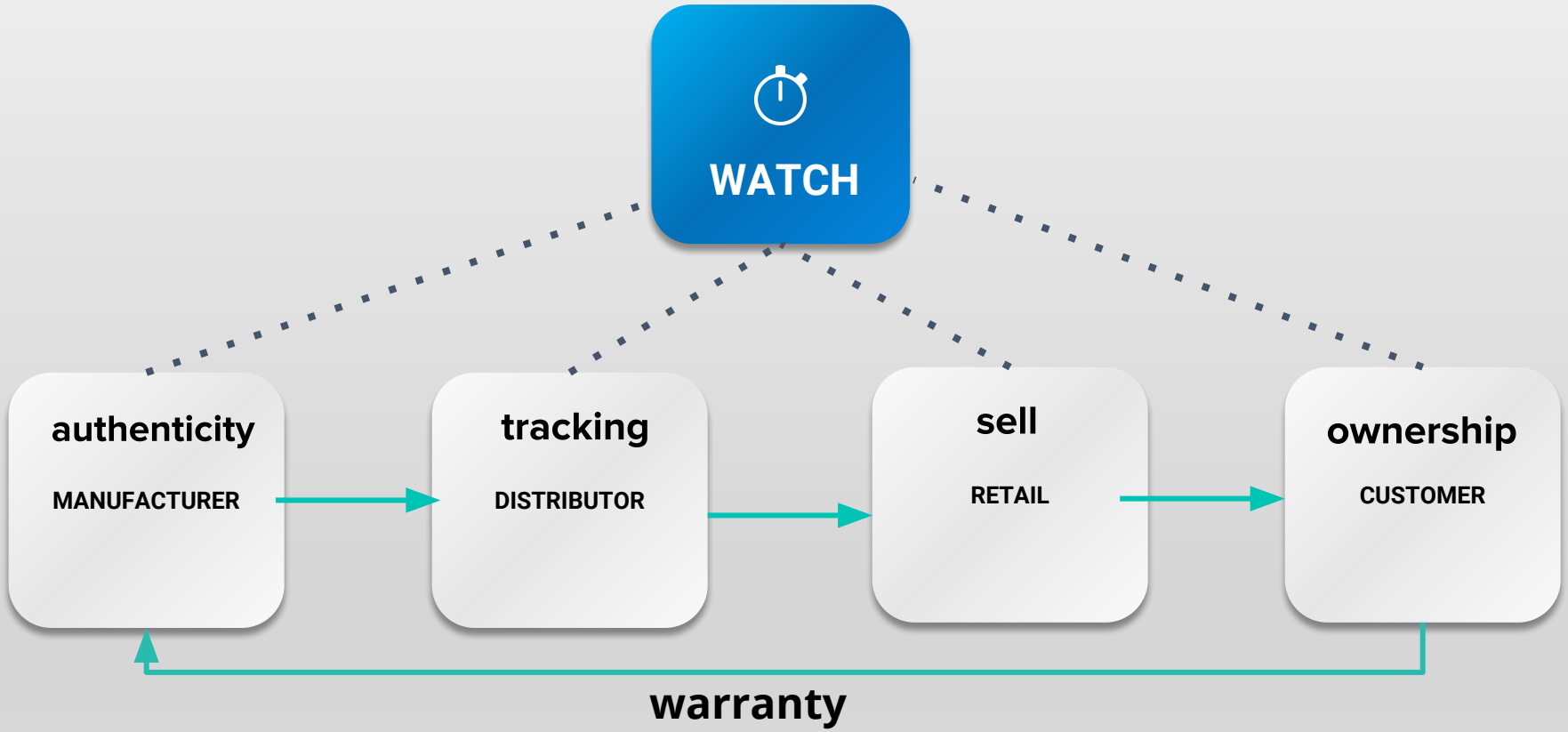
Conclusions

http://tiny.cc/chainges2018

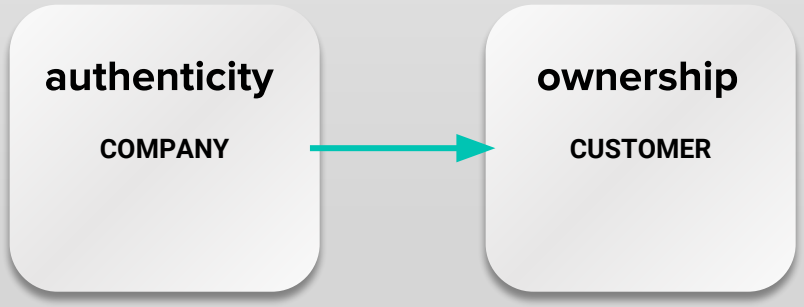
Use Case: Supply Chain



Use Case: Supply Chain



Reducing the scope



WHAT?

- As a company, I want to represent my product on the blockchain and attach to it a quality seal.
- As a company, I want receive money for my products.
- As a customer, I want to own the product.

Reducing the scope

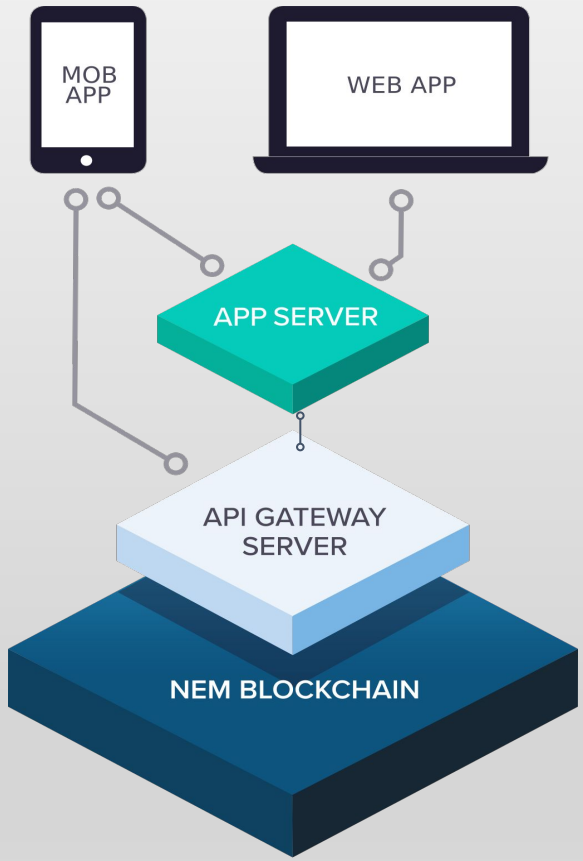
WHO?

CUSTOMER, COMPANY & PRODUCT.

HOW?

1) Company creates the product:
   - Company ➜ App Server ➜ NEM API

2) Customer owns the product:
   - Company ➜ App Server ➜ NEM API
   - Client ➜ NEM API



Which built-in features can we use?

Namespace

Mosaic

Account

Transfer Transaction

Multisig Account (Editable)

Aggregate Transaction

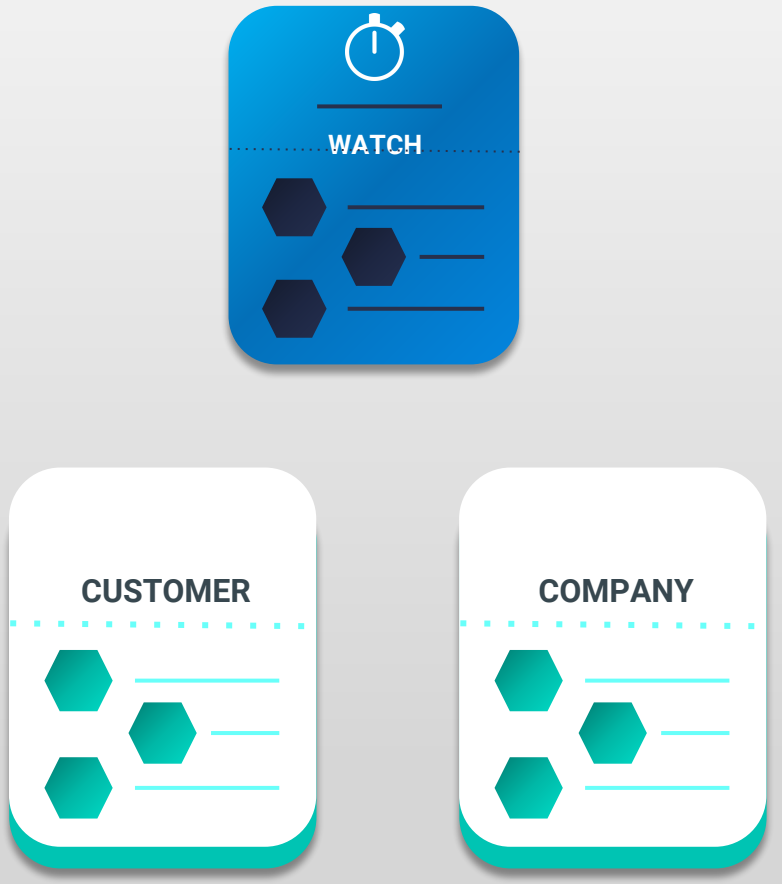
Atomic Cross-Chain Transaction

WHAT?

- As a company, I want to represent my product on the blockchain and attach to it a quality seal.
- As a company, I want receive money for my products.
- As a customer, I want to own the product.

Setup

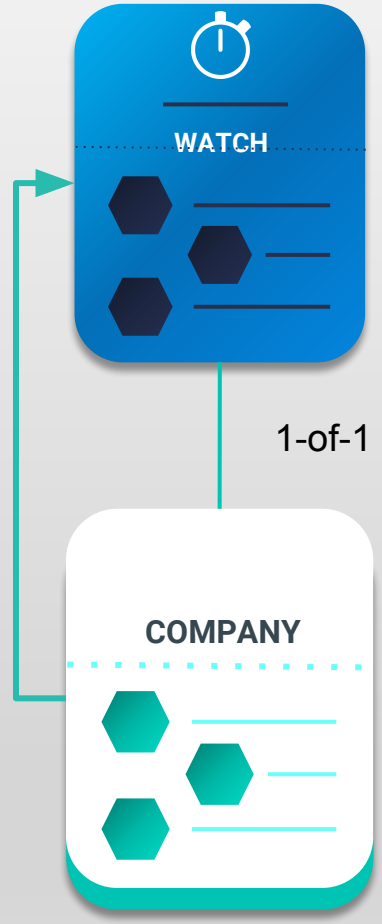
- **Company**: Create company namespace and mosaic company:authenticity mosaic.
- Create two more accounts.
- **Company**: Send 50 XEM to Watch and Customer account.



Company manufactures the product

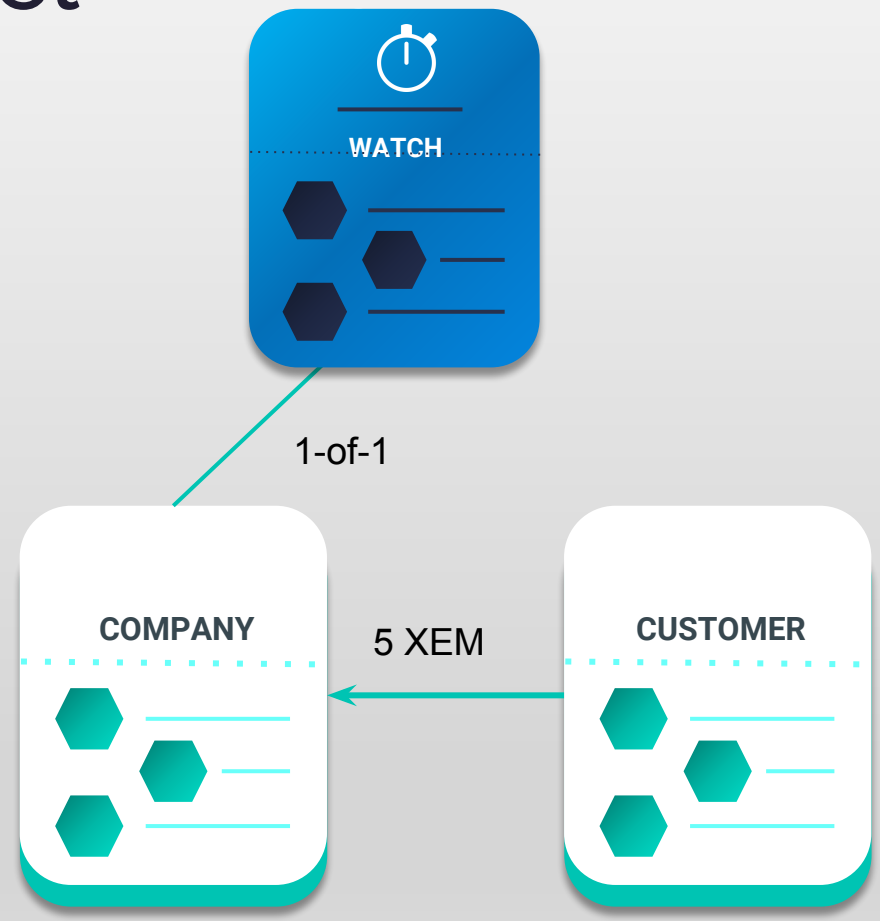
- **Watch**: 1-of-1 multisig with company.
- **Company**: Send authenticity mosaic to watch.

1 company:authenticity



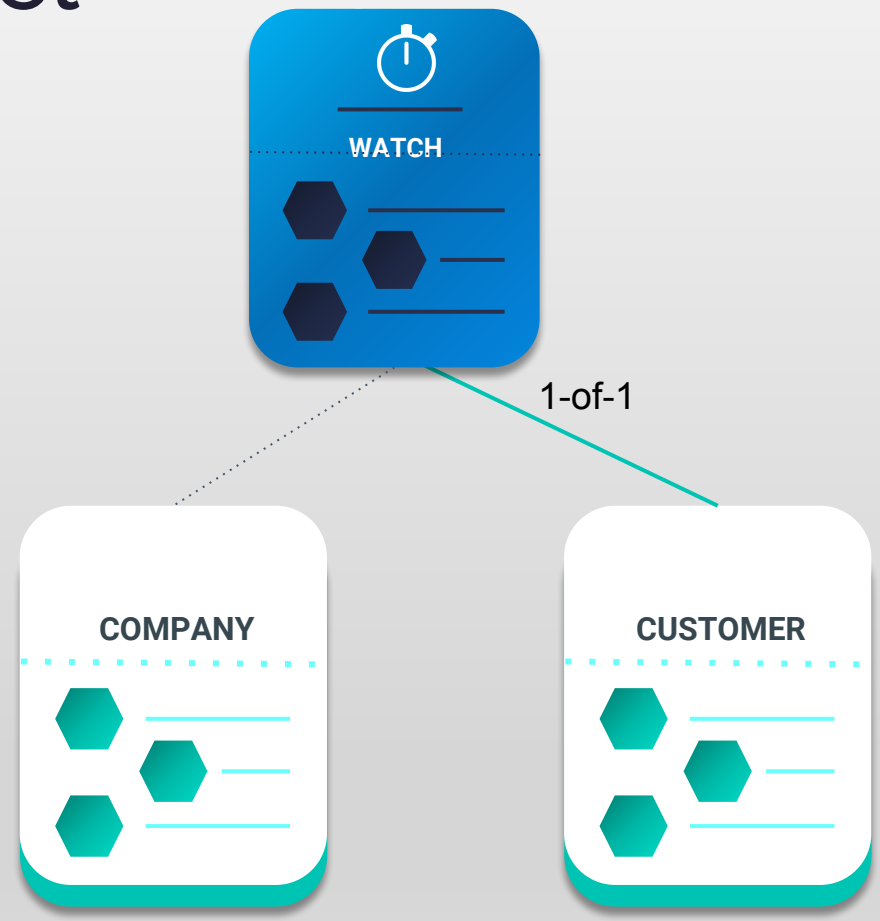
Customer owns the product

- **Customer**: Sends 5 xem to company.

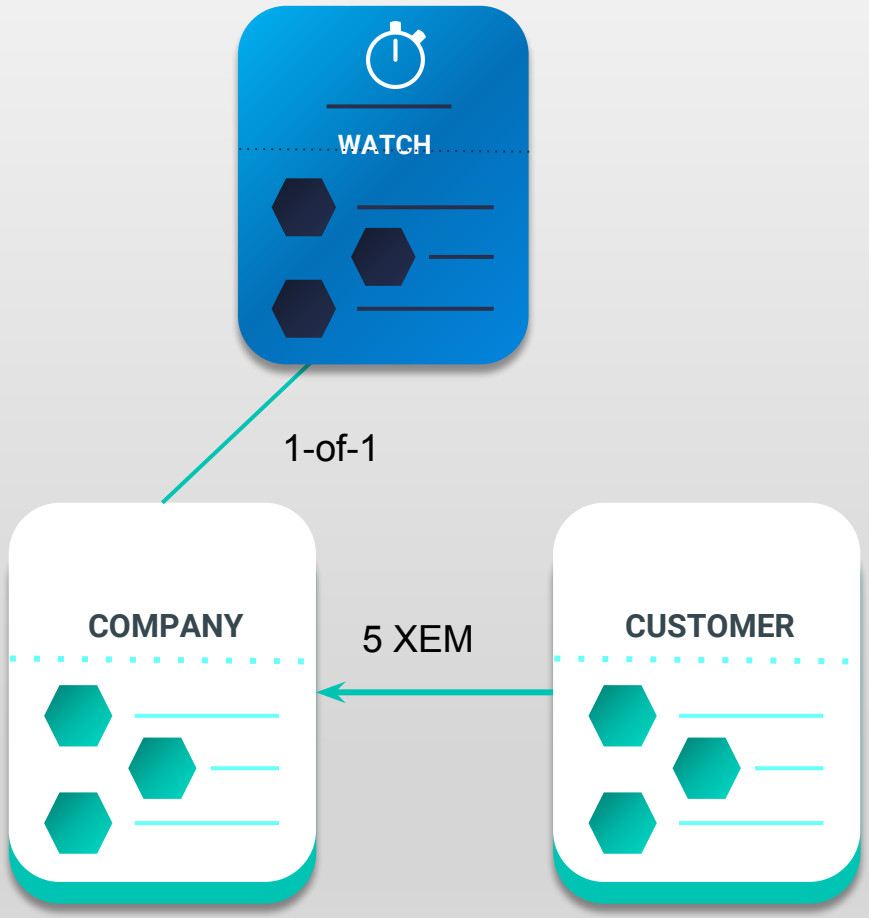


Customer owns the product

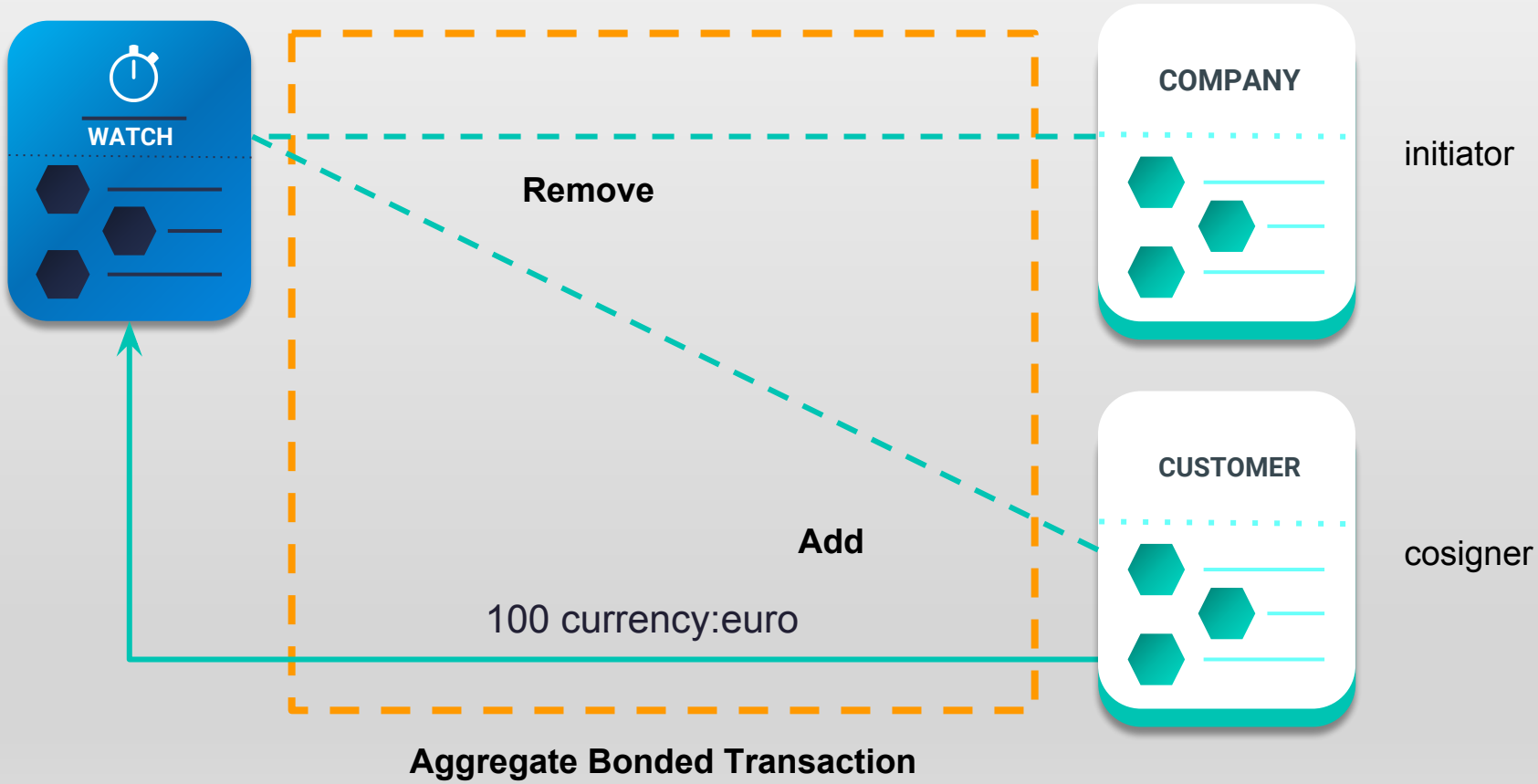
- **Company**: Adds customer and removes itself.



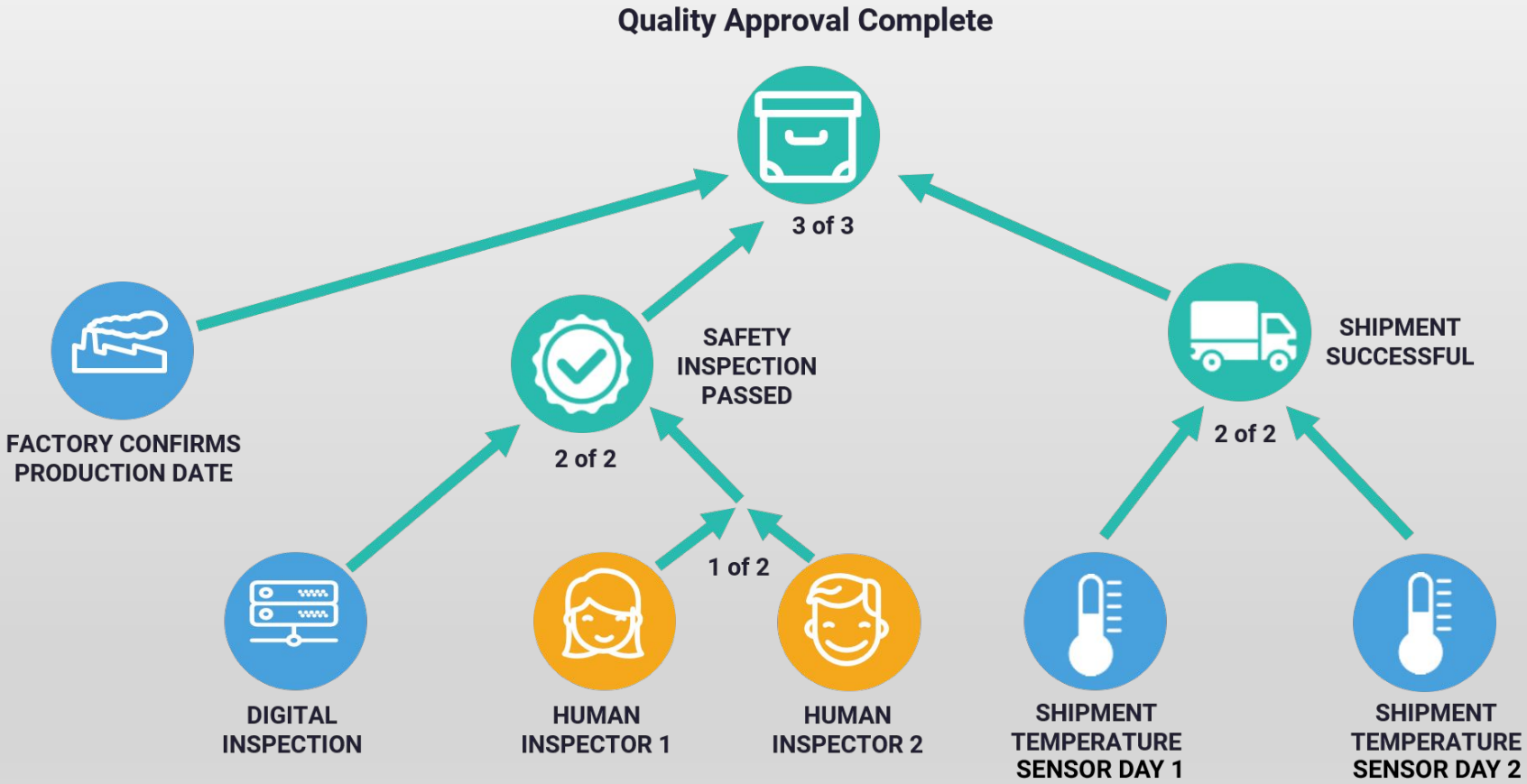
The company could receive the funds and not remove itself as a cosigner of the watch account.



Aggregate Transactions



Multi-level Multisig Account



Conclusion

The simplicity of NEM's smart assets:

- Forces you to answer questions in the early stage of development
- Still allows to leverage on the potential of blockchain
- Makes developing Blockchain applications:
  - More secure
  - Easier
  - Faster

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