



# BLOCKCHAIN DIE DATA PLATTFORM PERSPEKTIVE

Christoph Seck | KI Group

INTRODUCING KI group



# KI group



EVERYTHING IS ABOUT DATA

**KI** performance **KI** analytics



BUSINESS MODELLS ARE CHANGING

**KI** capital **KI** mobility **KI** finance **KI** retail



YOU CAN'T INNOVATE ALONE

**KI** capital



SOFTWARE EATS THE WORLD

**KI** performance **KI** labs **KI** decentralized

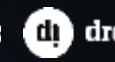
MobiLab



CONTENT IS CRUCIAL



dreaminc



dreaminc



LEARNING NEVER STOPS

**KI** academy



HUMAN RESOURCES ARE THE LARGEST CAPITAL

**KI** professionals **KI** academy **KI** connect

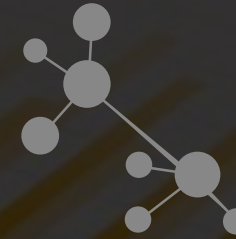
# KI group Facts & Figures

>125



Employees

approx. 200



Projects



7

Segments

4

Locations

Cologne

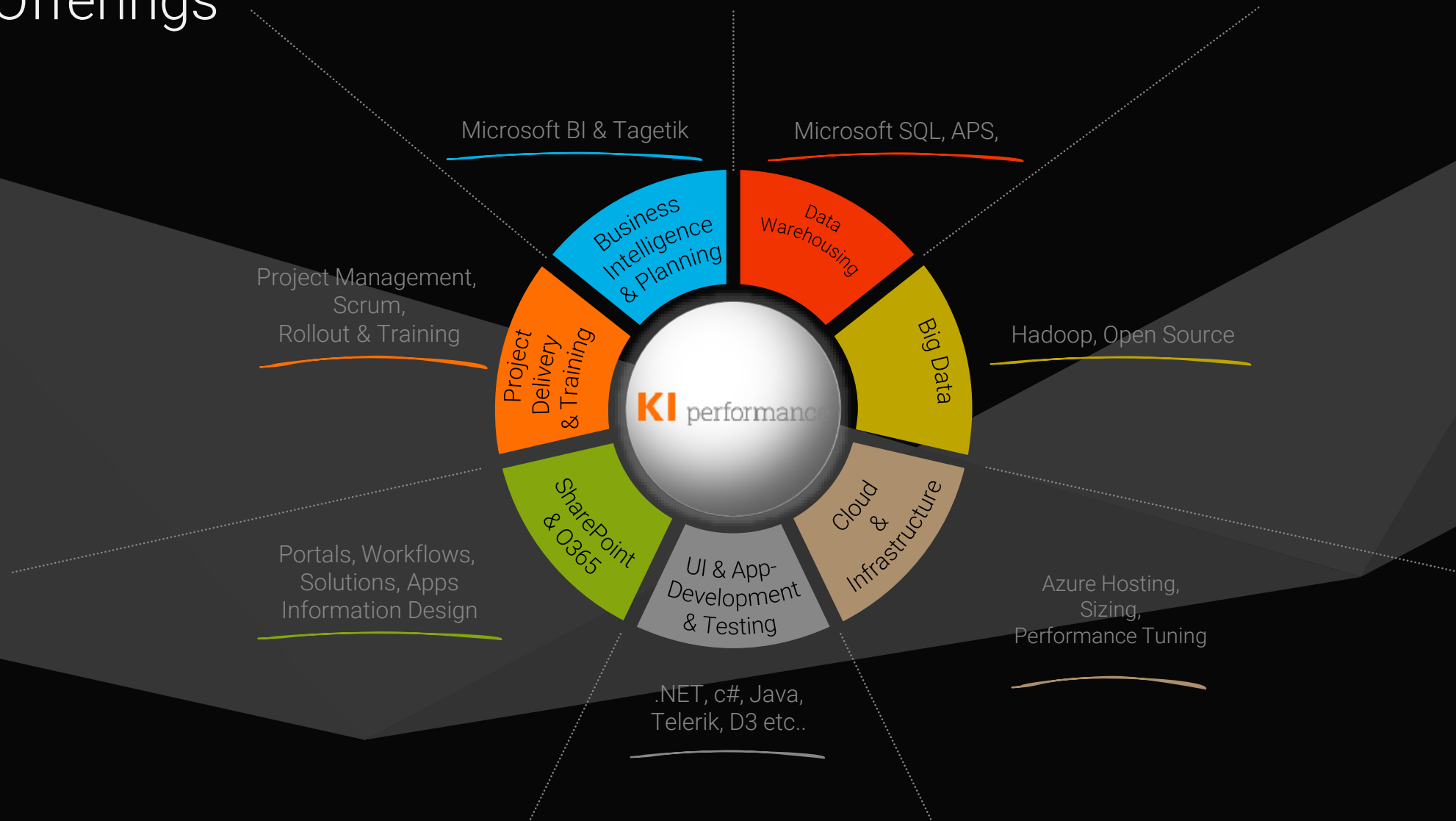
Stuttgart

Berlin

Munich



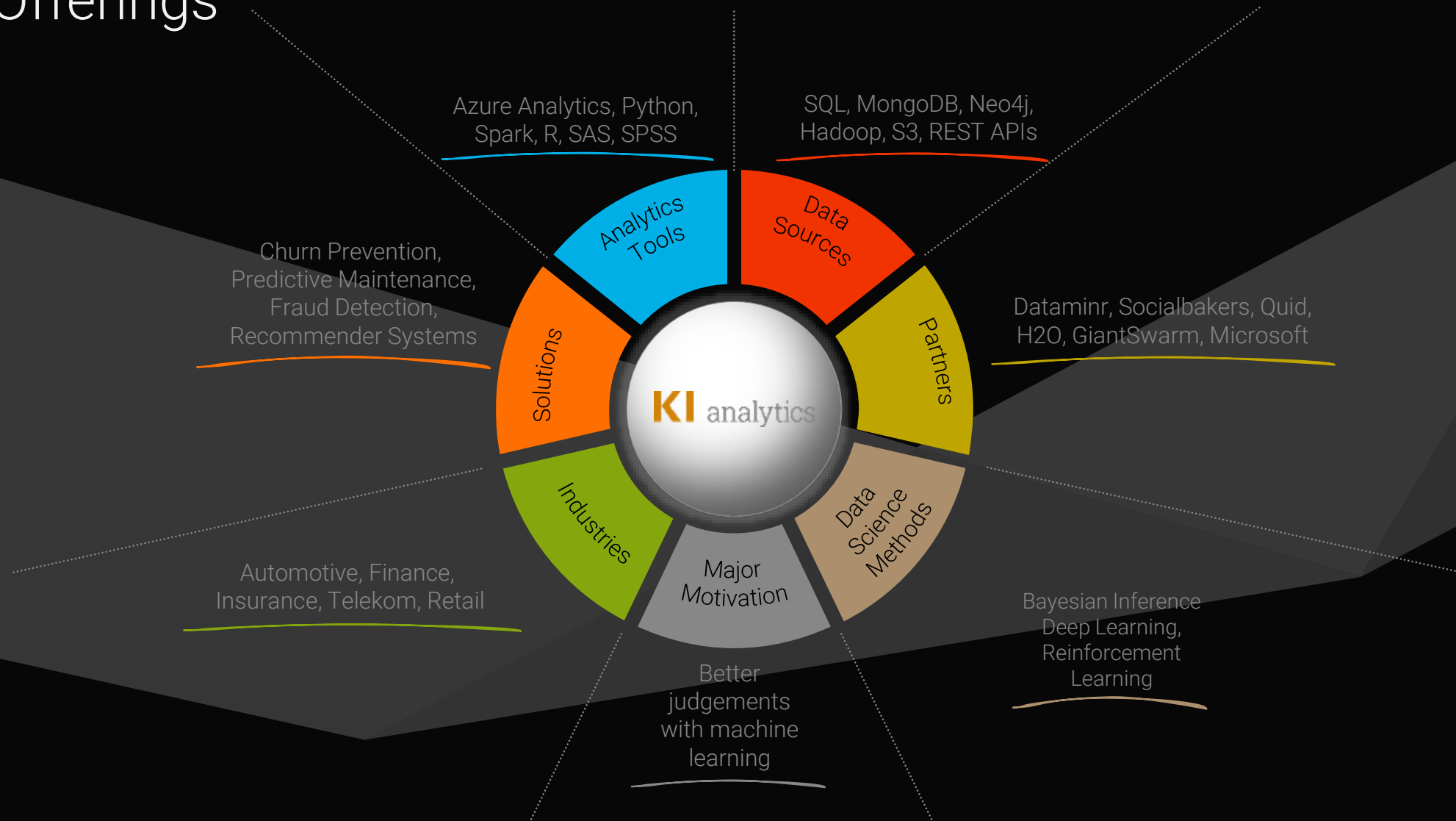
# KI performance Core Offerings





# KI analytics

## Core Offerings



# KI group Partners (Extract)

Microsoft  
Partner

Gold Data Analytics  
Silver Collaboration and Content  
Silver Application Development

Analytics, Data  
Collaboration,  
Cloud



Crossbeat –  
Digital Agency NYC



socialbakers

Social Media  
Analytics



SAP Linkage



Data Mining,  
Dashboards



Prism

Camera Analytics,  
Heat maps products



Workflows in  
SharePoint,  
Outlook  
SharePoint



Planning,  
Consolidation



On Shelf Availability



Containerization,  
Microservices as  
solutions for the  
scale-out



Algorithms  
Skalierung



real-time information  
Discovery

AI NexusLab

Intensive four-month  
program for young AI  
companies in New  
York



Frontend



Qualitative Data  
Analytics &  
Visualization

GitHub

Collaborative Coding,  
Largest open source  
platform worldwide



# KI group References (Extract)





# KI group Investments

 **Dataminr**

talents  
+connect  
Wir lieben Bewerbungen.

RightIndem 

*Food  
Experts  
Group*

**ALOHA**

 **JUMPTUIT**



 **dreaminc**  
 **dreaminc**  
VEDA

**rize**

**auxmoney**

 **ETEPETEIE**

**MobiLab**

**nigo**

**sfara**



## Agenda



**Introduction**



**Block Chain Basics**



**Anonym versus Pseudonym**



**Getting Data: The one and the many**



**Getting Data: Doing the Power BI**



## Agenda



### **Introduction**



### Block Chain Basics




### Anonym versus Pseudonym



### Getting Data: The one and the many



### Getting Data: Doing the Power BI

The background is a close-up, macro shot of water droplets on a dark, reflective surface. A bright, circular light source is positioned in the upper-middle section, creating a strong lens flare and illuminating the surrounding droplets. The droplets vary in size, with some being large and prominent, while others are small and numerous. The overall color palette is dark, with deep blues and blacks, contrasted by the bright white and yellow light from the central source.

Eine dezentrale **Datenbank** für  
Transaktionen



The background of the slide features two overlapping compact discs (CDs). The discs are positioned diagonally, with the top one slightly offset to the right. They exhibit vibrant, iridescent rainbow colors due to light diffraction, with shades of blue, green, yellow, and red visible. The edges of the discs are dark and reflective. The overall composition is abstract and modern.


Wie auf einer CD können Daten in einer Blockchain nur fortlaufend geschrieben werden. Eine Veränderung bestehender Einträge ist nicht möglich.





**Bitcoin - der Ursprung**  
10 Millionen Bitcoin-Wallets  
200.000 Transaktionen



A black and white photograph of five children of indigenous descent, likely from Papua New Guinea, smiling and posing for the camera. They are all making peace signs with their hands. The child in the center foreground is a girl with a wide, joyful smile. Behind her are two more girls, one to the left and one to the right, also smiling. To the right of the central girl is a boy, and in the bottom right corner is another boy, both smiling. The background is slightly out of focus, showing what appears to be a simple building or structure. The overall mood is happy and positive.

**Banking the Unbanked**  
Ein Handy -> ein Konto


## **Banken-Infrastruktur**

Ausschalten von Zwischen Instanzen

BANK  
OF  
IRELAND

WAY IN





## **Blockchain 2.0 – „Smart Contracts“**

State Machines - Der digitale Vertrag in der Blockchain

# Insurance Policy

Versicherungen

Age

Date of Birth

Gender

Middle



**Internet of Things**





# Blockchain simplified

## Unzählige weitere Use Cases vorstellbar

### I. Finanzinstrumente, Datensätze und Modelle

- Währung
- Private Equity
- Public Equity
- Anleihen
- Derivate (Futures, Forwards, Swaps, Optionen und komplexere Varianten)
- Stimmrechte
- Rohstoffen
- Verwendung der Haushaltsmitte
- Handelsaufzeichnungen
- Hypotheken- / Darlehensaufzeichnungen
- Wartungsaufzeichnungen
- Crowdfunding
- Micro-Finance
- Micro-Charity

### II. Öffentliche Aufzeichnungen

- Landrechte
- Fahrzeugregister
- Geschäftslizenz
- Geschäftsaufnahme/ -auflösung
- Geschäftseigentümerverzeichnisse
- Regulatorische Aufzeichnungen
- Strafregister
- Reisepässe
- Geburtsurkunden
- Sterbeurkunden
- Wähler-ID
- Wahlen
- Gesundheit / Sicherheitsinspektionen
- Baugenehmigung
- Waffenscheine
- forensische Beweise
- Gerichtsakten

- Abstimmungsergebnisse
- Non-Profit-Aufzeichnungen
- Regierungs- / Non-Profit-Buchhaltung

### III. Private Einträge

- Verträge
- Unterschriften
- Testamente
- Stiftungen
- Treuhand
- GPS Spuren (persönlich)

### IV. Andere Halböffentliche Einträge

- Abschluss
- Zertifizierungen
- Lernerfolge
- Noten
- HR Aufzeichnungen (Gehalt, Leistungsbeurteilungen)
- Krankenakten
- Rechnungsunterlagen
- Geschäftsabschlussaufzeichnungen
- Erbgutdaten
- GPS Spuren (institutionelle)
- Zustellungsbestätigung
- Schlichtung

### V. Physische Anlagenschlüssel

- Heim- / Wohnungsschlüssel
- Ferienhaus- / Teilzeitnutzungsschlüssel
- Hotelzimmer Schlüssel
- Autoschlüssel
- Mietauto Schlüssel
- Leasingauto Schlüssel
- Spind Schlüssel
- Safe Schlüssel

- Paketzustellung (Schlüssel für Lieferfirma und Empfänger)
- Wett-Aufzeichnungen
- Fantasy Sports Aufzeichnungen

### VI. Immaterielle Werte

- Gutscheine
- Coupons
- Reservierungen (Restaurants, Hotels, Warteschlangen, etc.)
- Kinokarten
- Patente
- Urheberrechte
- Marken
- Software-Lizenzen
- Videospiel-Lizenzen
- Musik / Film / Buch-Lizenzen
- Domain Namen
- Online-Identitäten
- Urheber- / Stand der Technik Nachweis

### VI. Andere

- Aufzeichnungen (Fotos, Audio, Video)
- Datensätze (Sportergebnisse, Temperatur, etc.)
- Sim-Karten
- GPS-Netzwerkidentität
- Pistolen Entsperrungscodes
- Waffen Entsperrungscodes
- Nuklear Start-Codes
- Spam-Kontrolle (Mikrozahlen für die Buchung)



Data Plattform?





## Distributed Database

- 6000 Replica
- 500 Googles needed
- Financial Value: 39 Mrd \$
- 40.000.000 Petaflops



## Core Transactional System

- International Finance
- Via Smart Contracts:  
The Master Data of our managed Interactions

## Distributed Database

- 6000 Replica
- 500 Googles needed
- Financial Value: 36 Mrd \$
- 40.000.000 Petaflops



## Agenda



Introduction



**Block Chain Basics**



Anonym versus Pseudonym

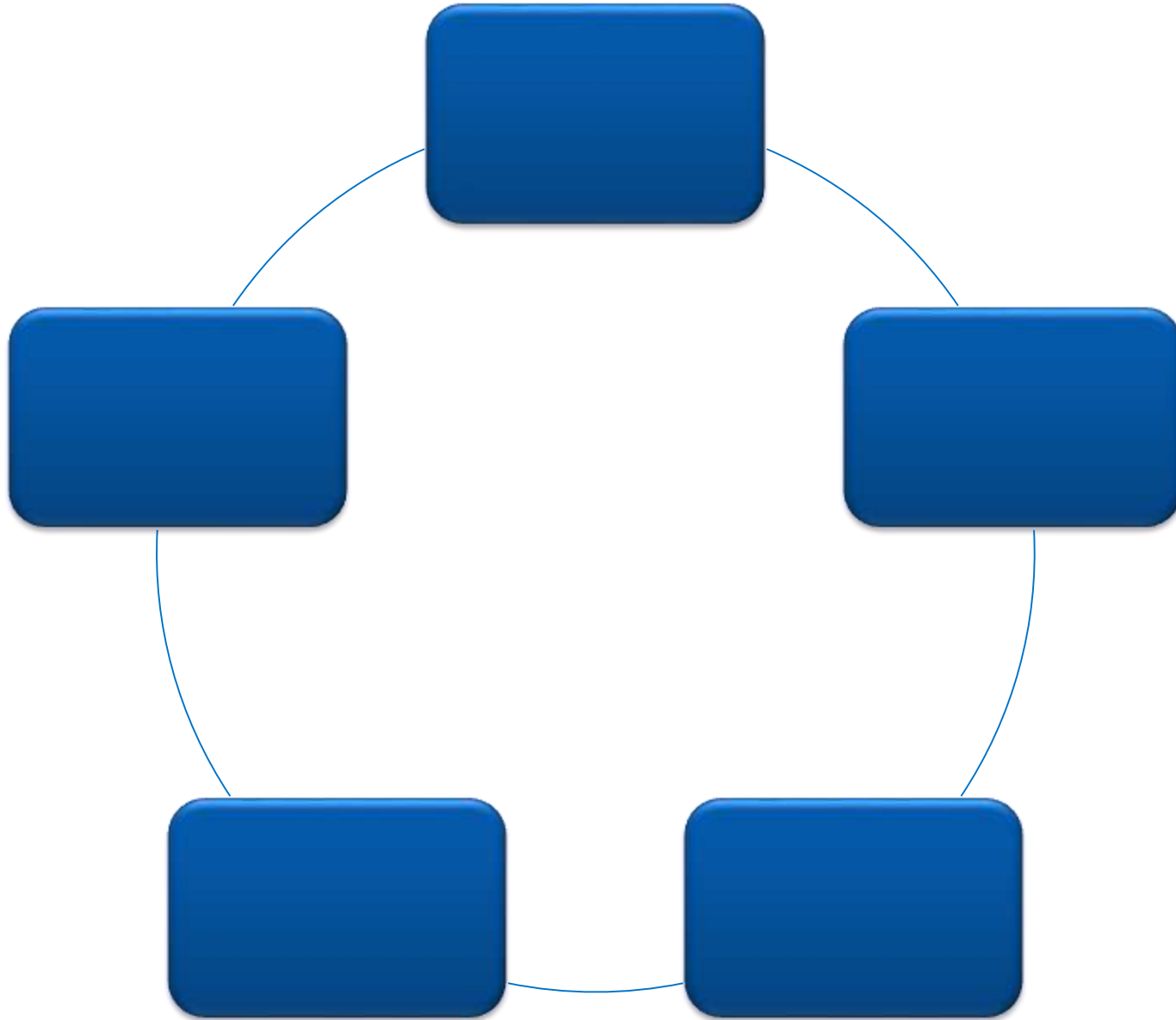


Getting Data: The one and the many

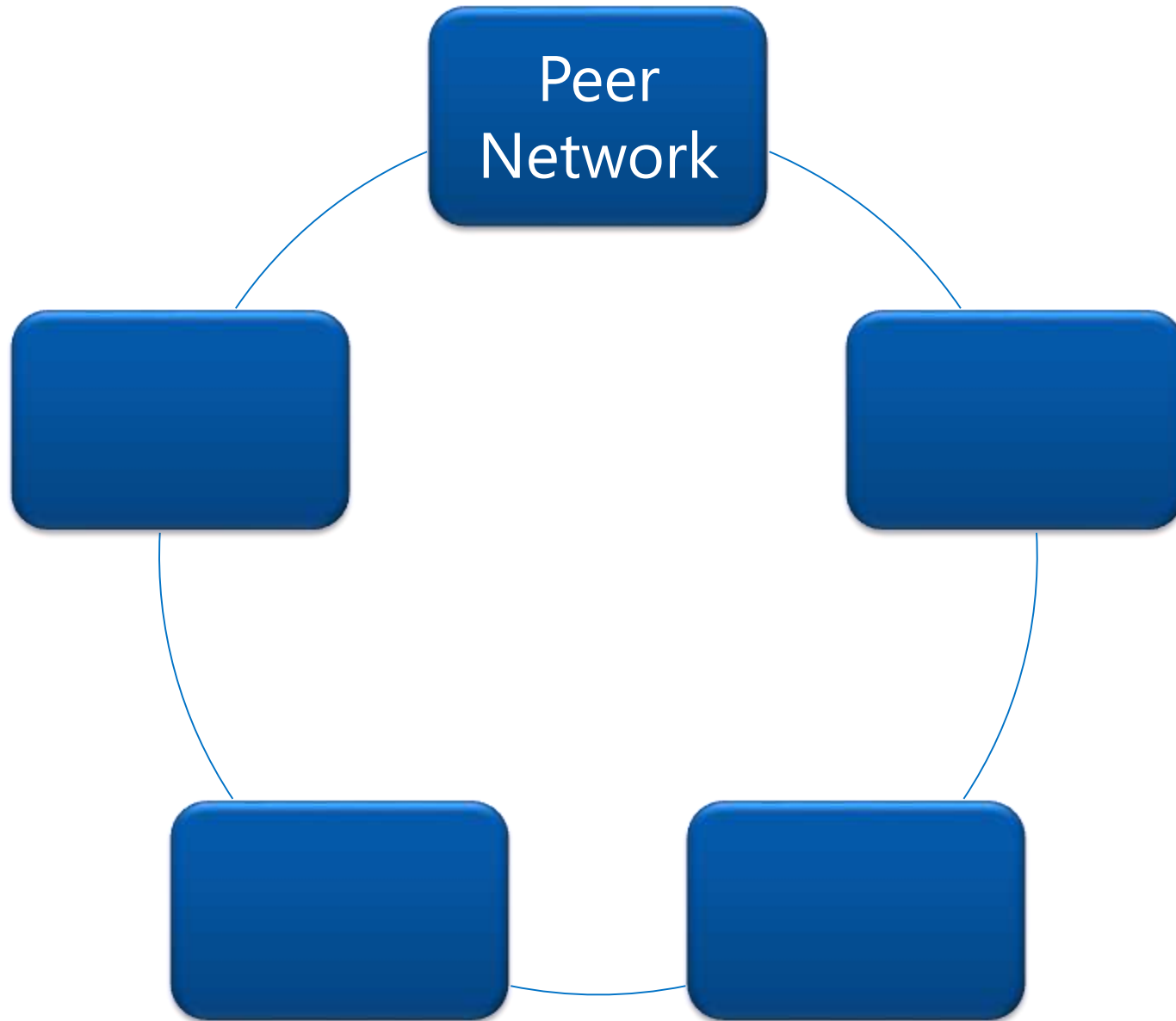


Getting Data: Doing the Power BI

# Components

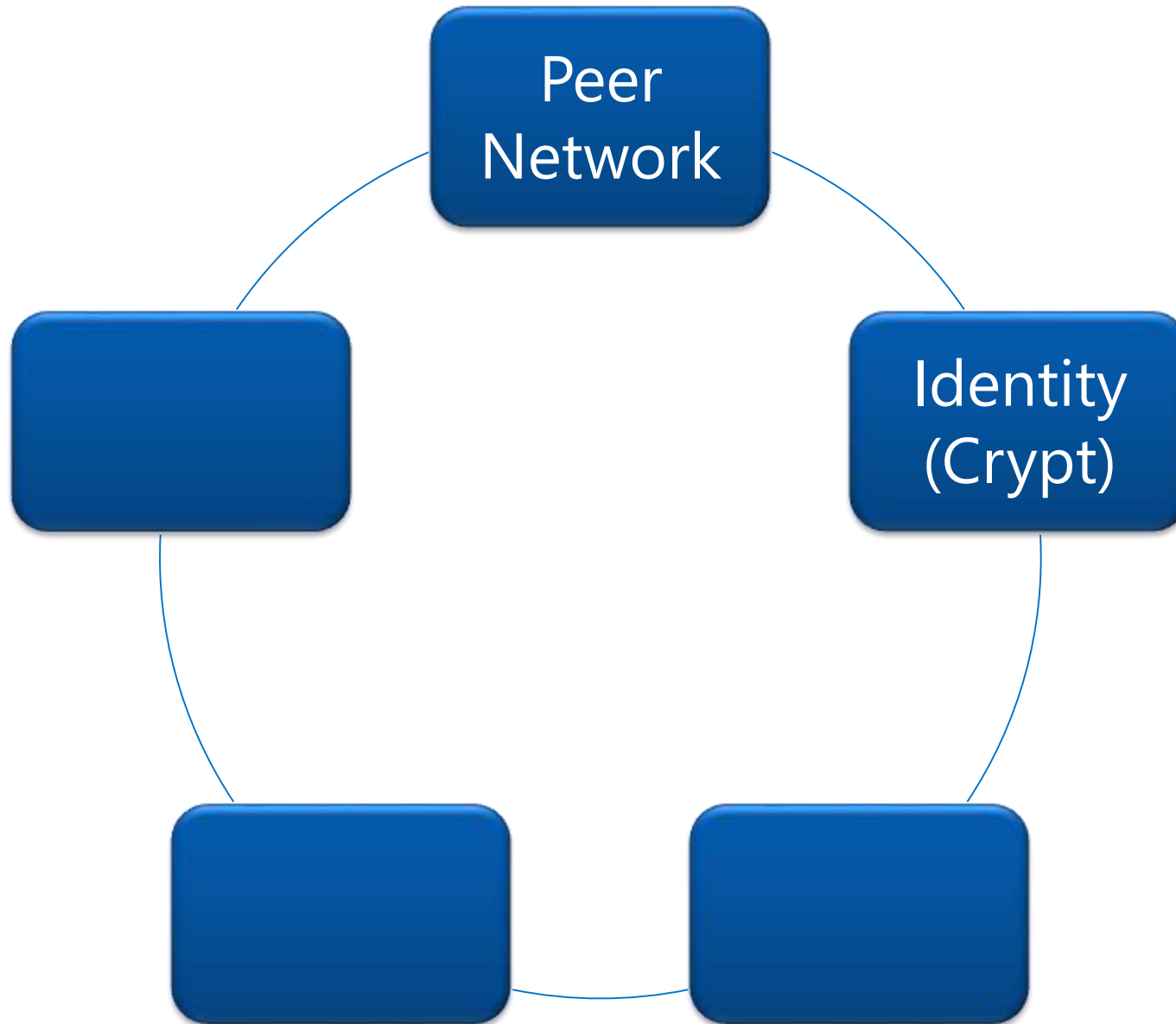


# Components

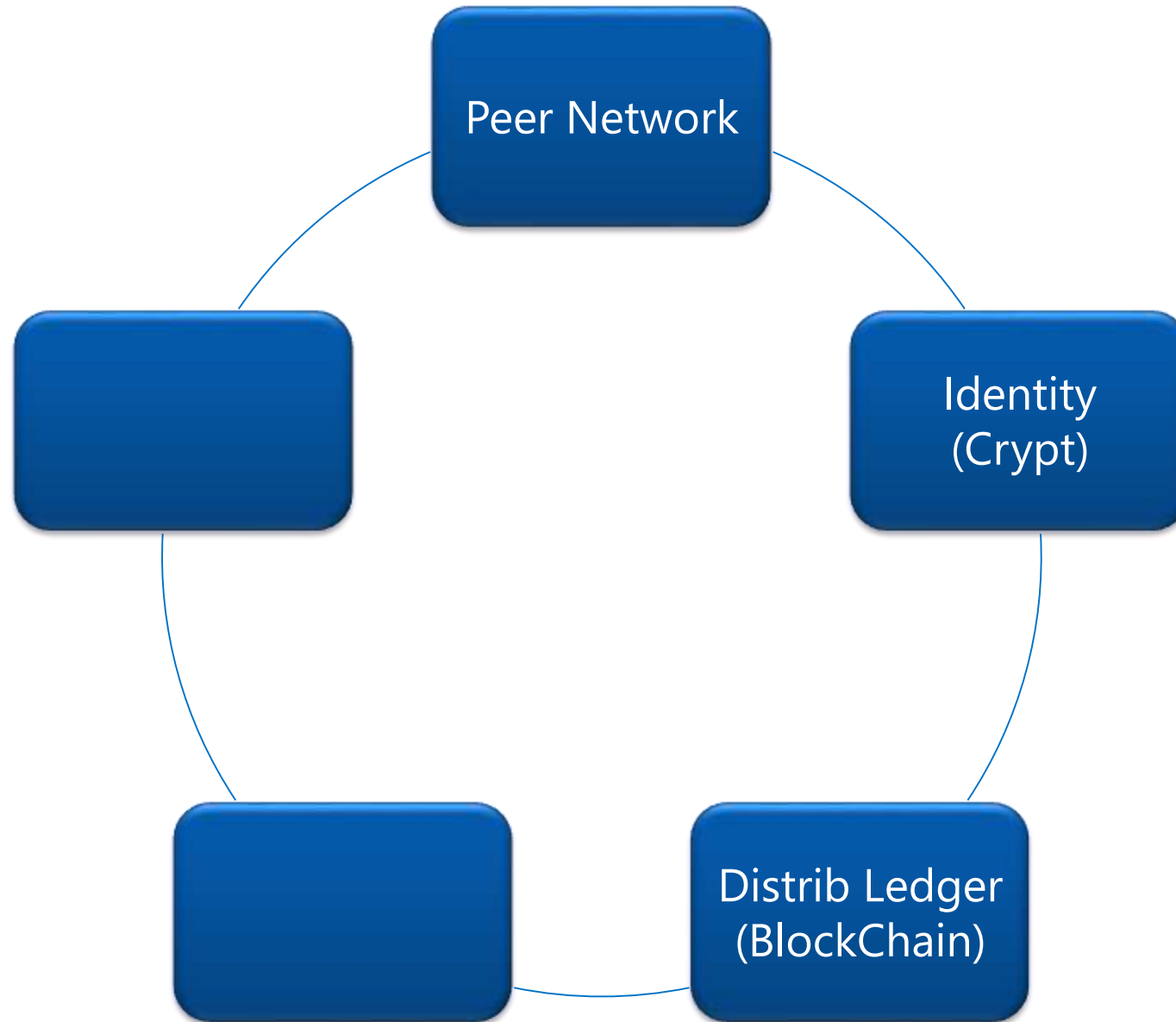




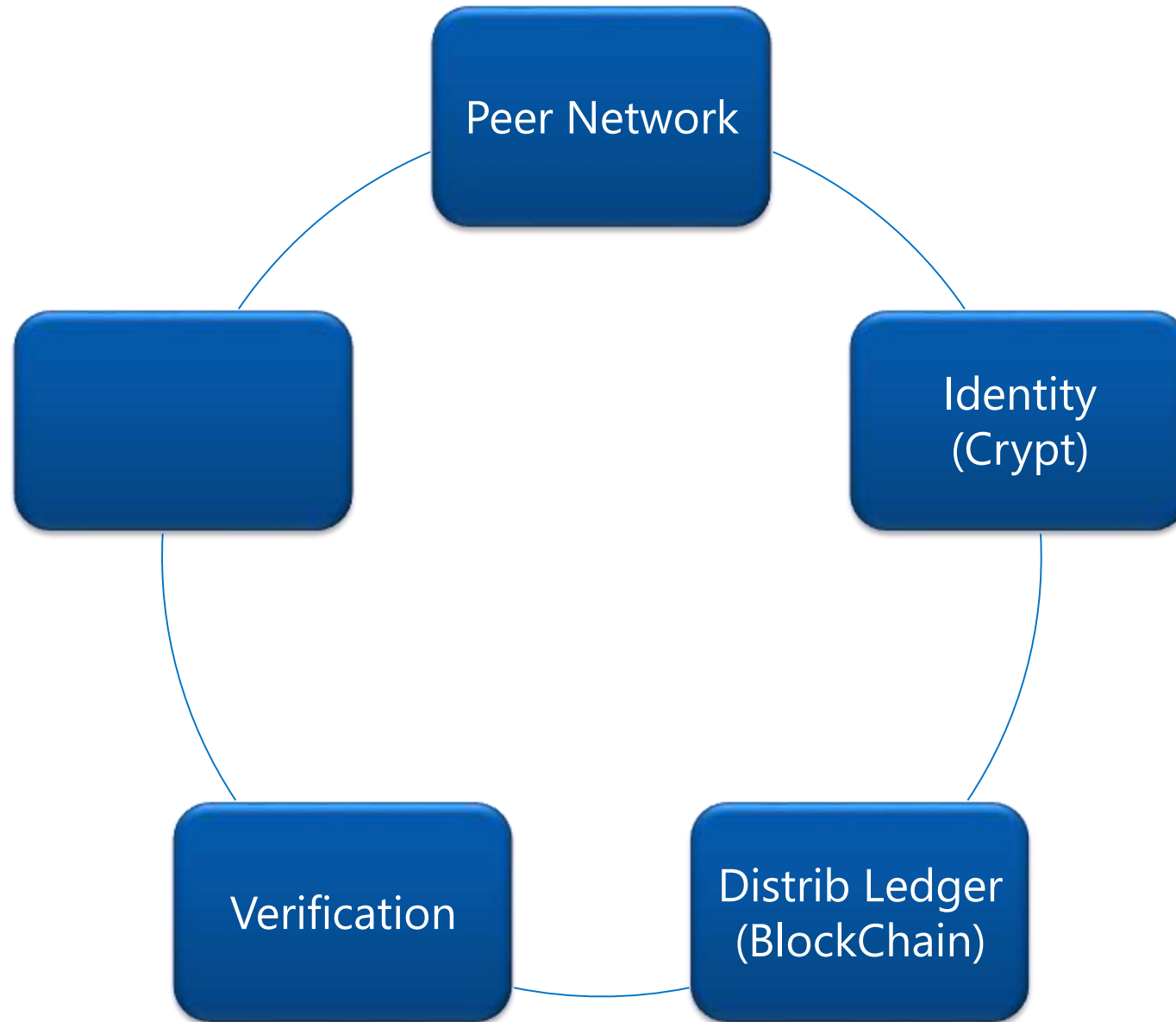
# Components



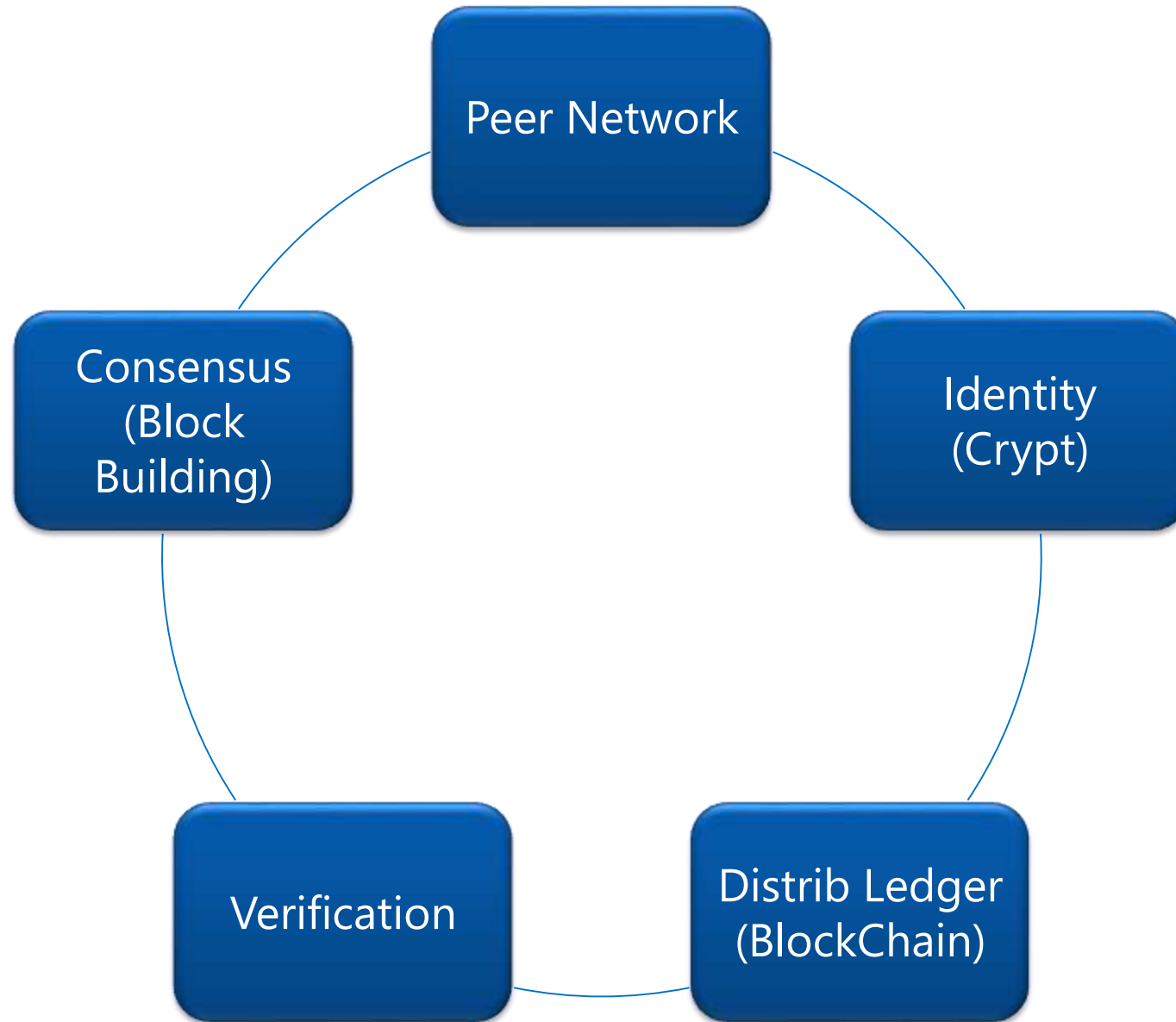
# Components



# Components



# Components



# Money: The two Problems



Counterfeit?

# Money: The two Problems



Counterfeit?



# Money: The two Problems

Double Spend?



Counterfeit?

# Money: The two Problems

Double Spend?



Counterfeit?

# Money: The two Problems



Double Spend?



Counterfeit?



## Four Eyes Principle





## Many Eyes Principle





## Distributed Database



## Distributed Database

All Transactions (Spending)



## Distributed Database

All Transactions (Spending)

*BlockChain*





***Integrity?***

Distributed Database

All Transactions (Spending)

*BlockChain*



***Consensus?***



Distributed Database

All Transactions (Spending)

*BlockChain*



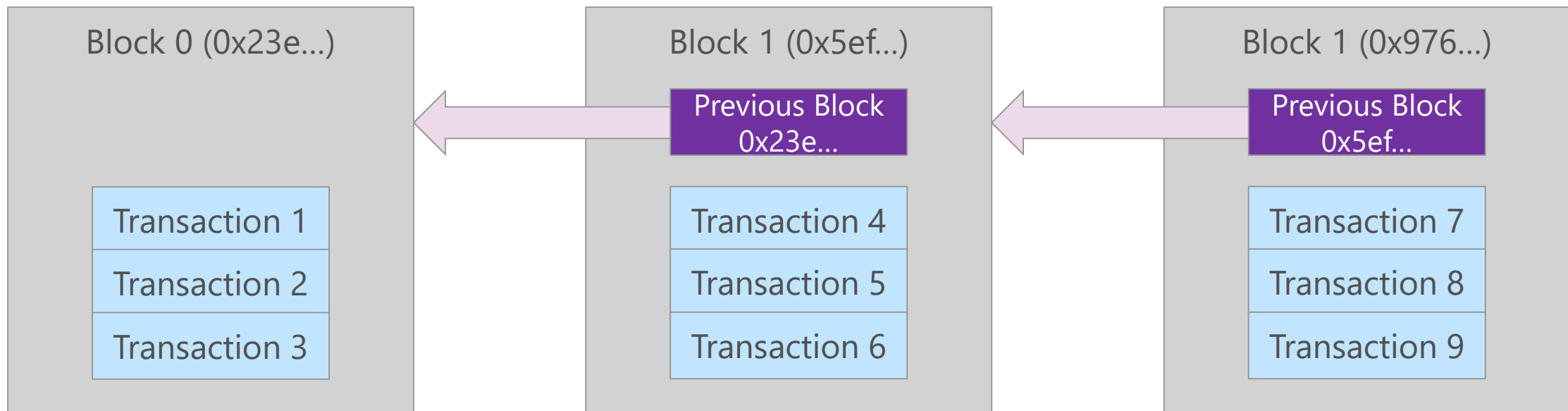
Consensus

Distributed Database

All Transactions (Spending)

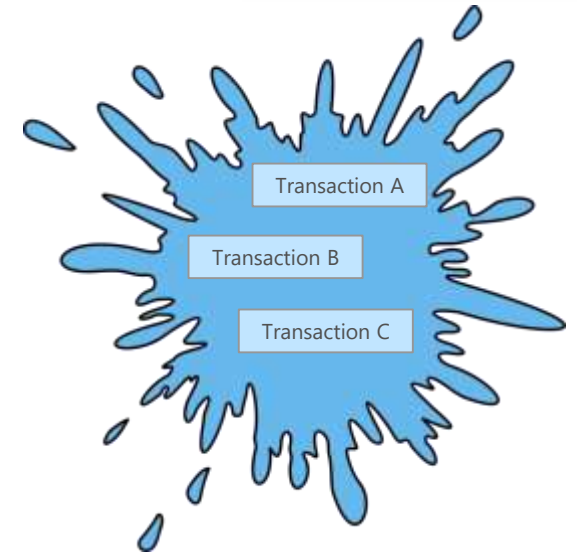
Blockchain

# Transactions and Blocks

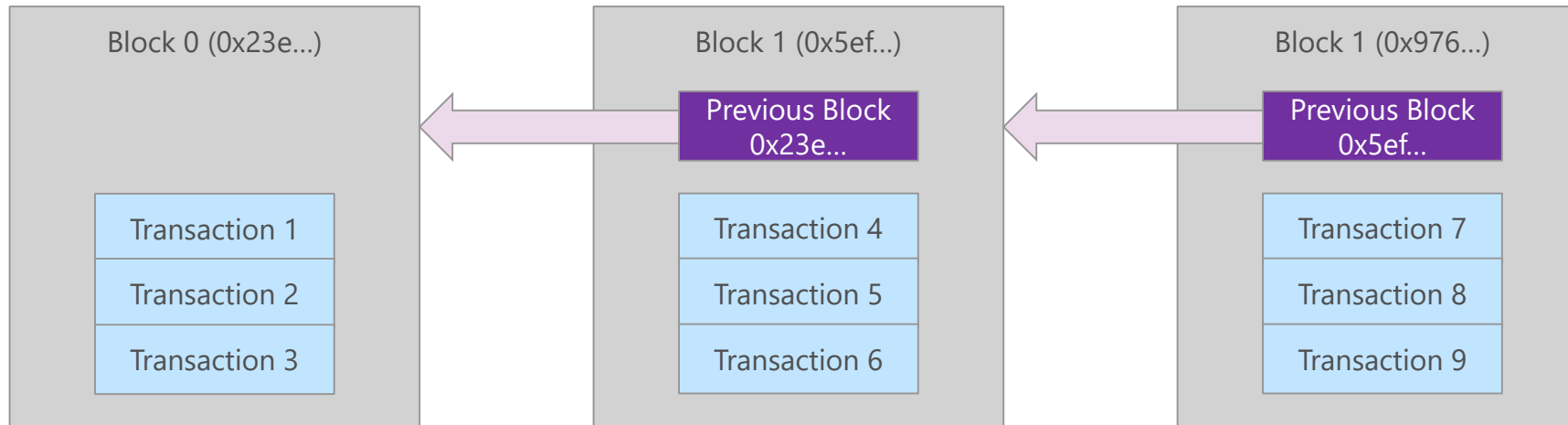


**Confirmed new block**

# Transactions and Blocks



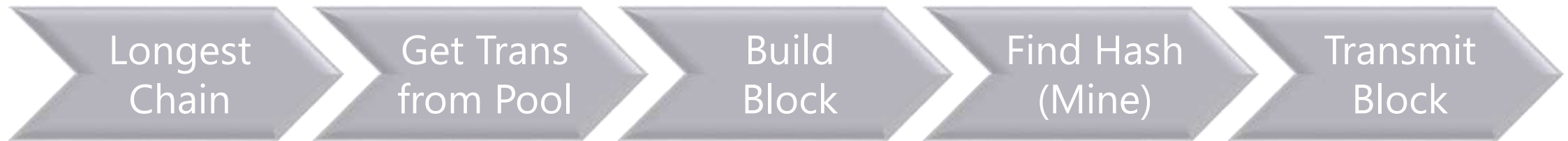
Pool



Confirmed new block

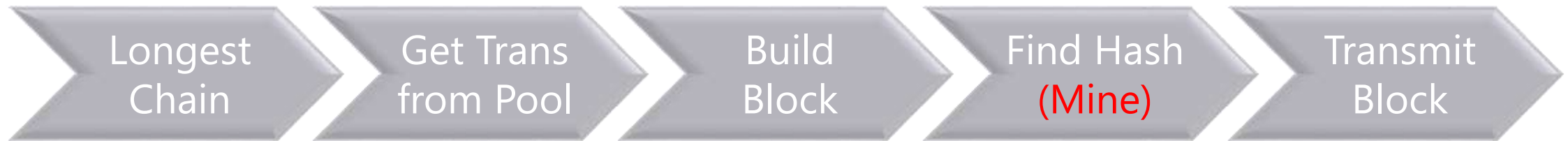
# Block Building

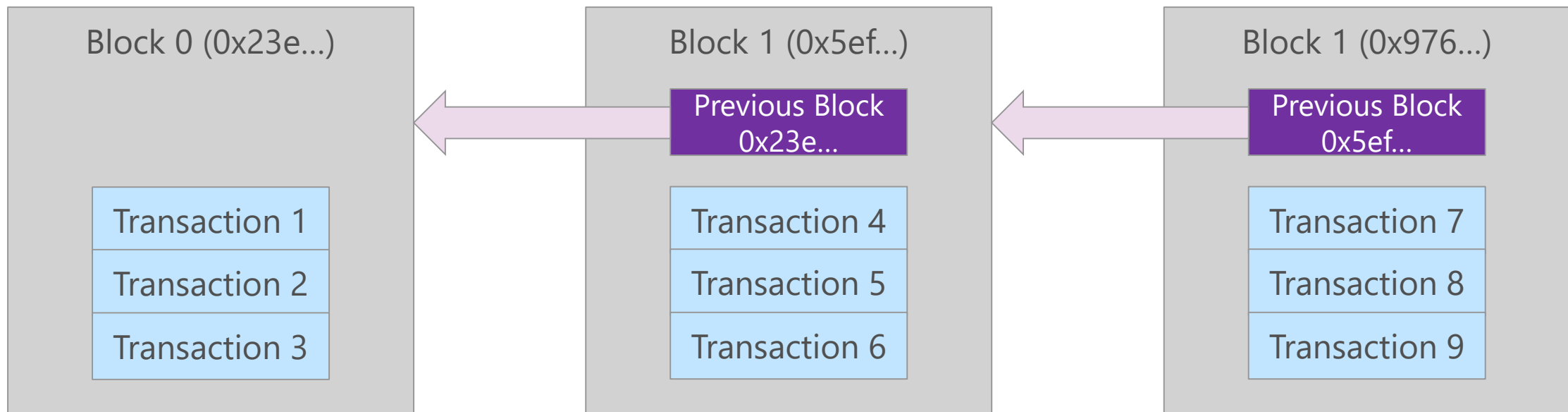
## Mining and Consense



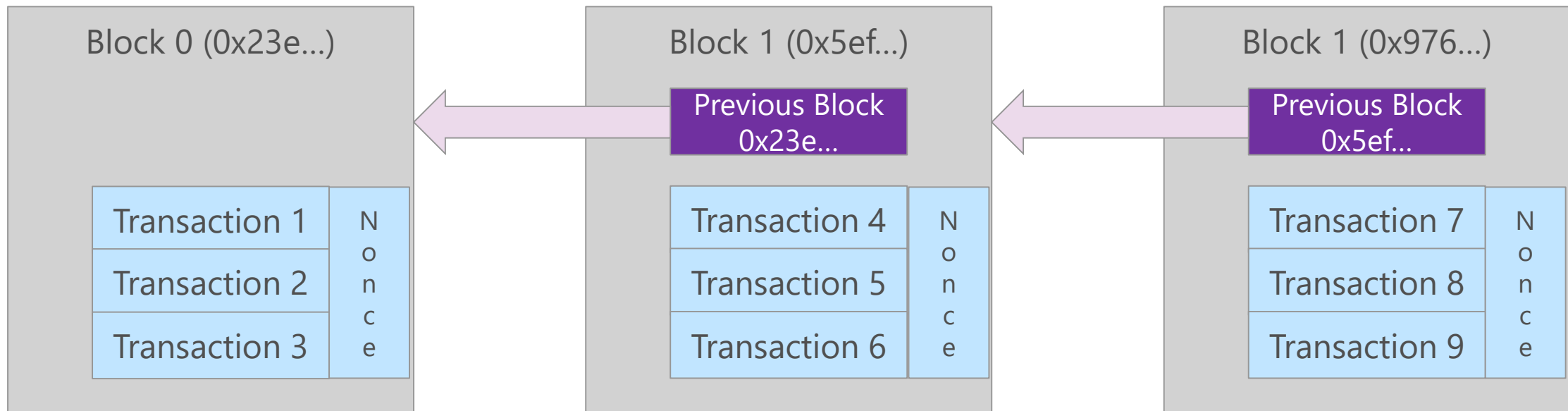
# Block Building

Mining and **Consense**

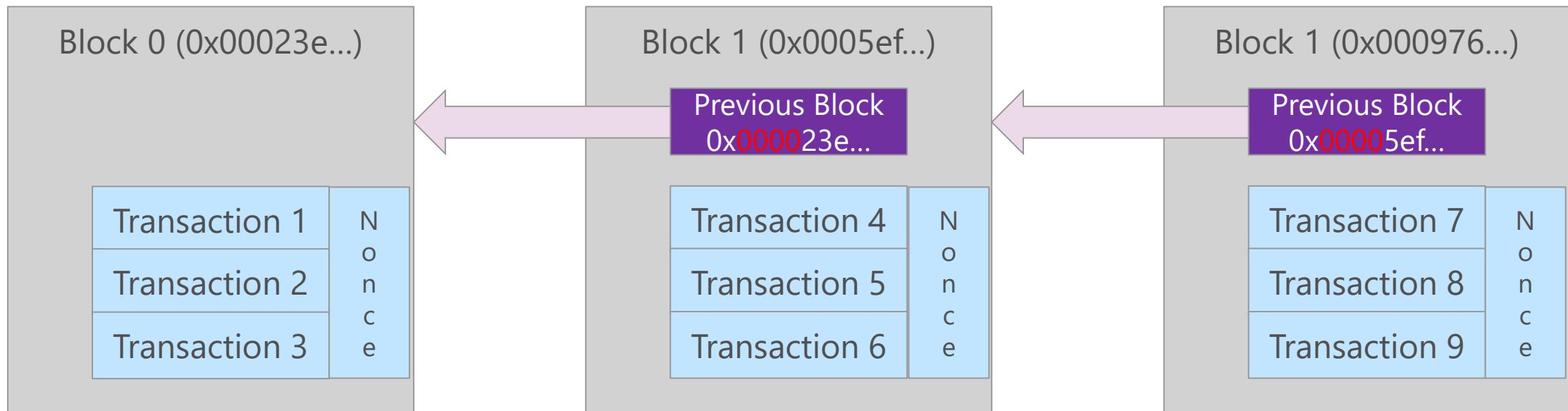




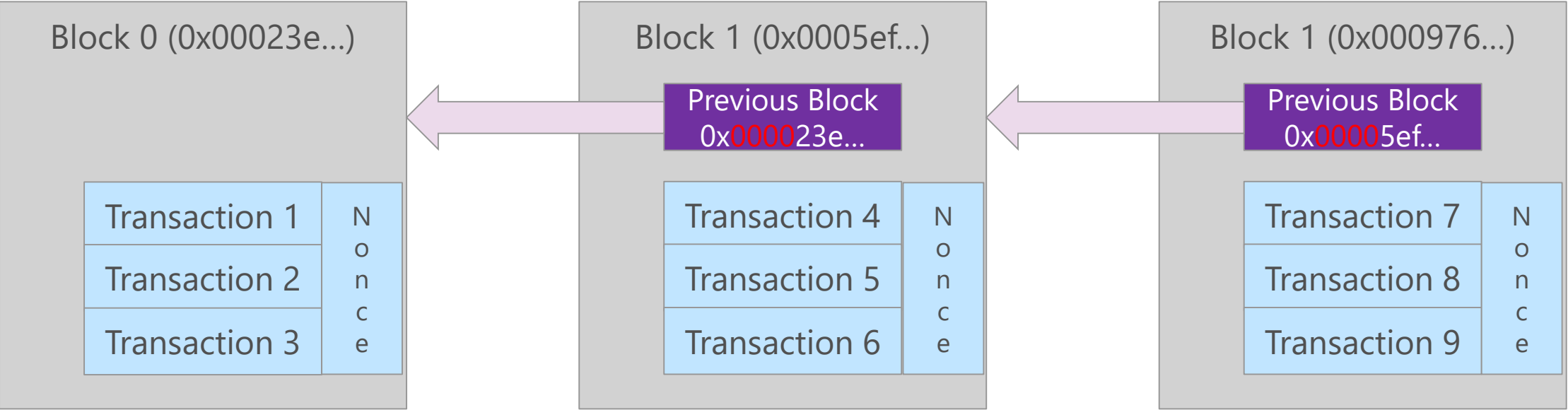




Confirmed new block



# Proof of Work





# Consensus and Proof of Work

- Longest Chain wins (Most Work)
- Incentives
- Changing History is very expensive

# Node Types

Mining Nodes:

Transaction Nodes:

# Node Types

## Mining Nodes:

## Transaction Nodes:

- Look 4 longest Chain
- Watch
- Verify
- Send Transaction

# Node Types

## Mining Nodes:

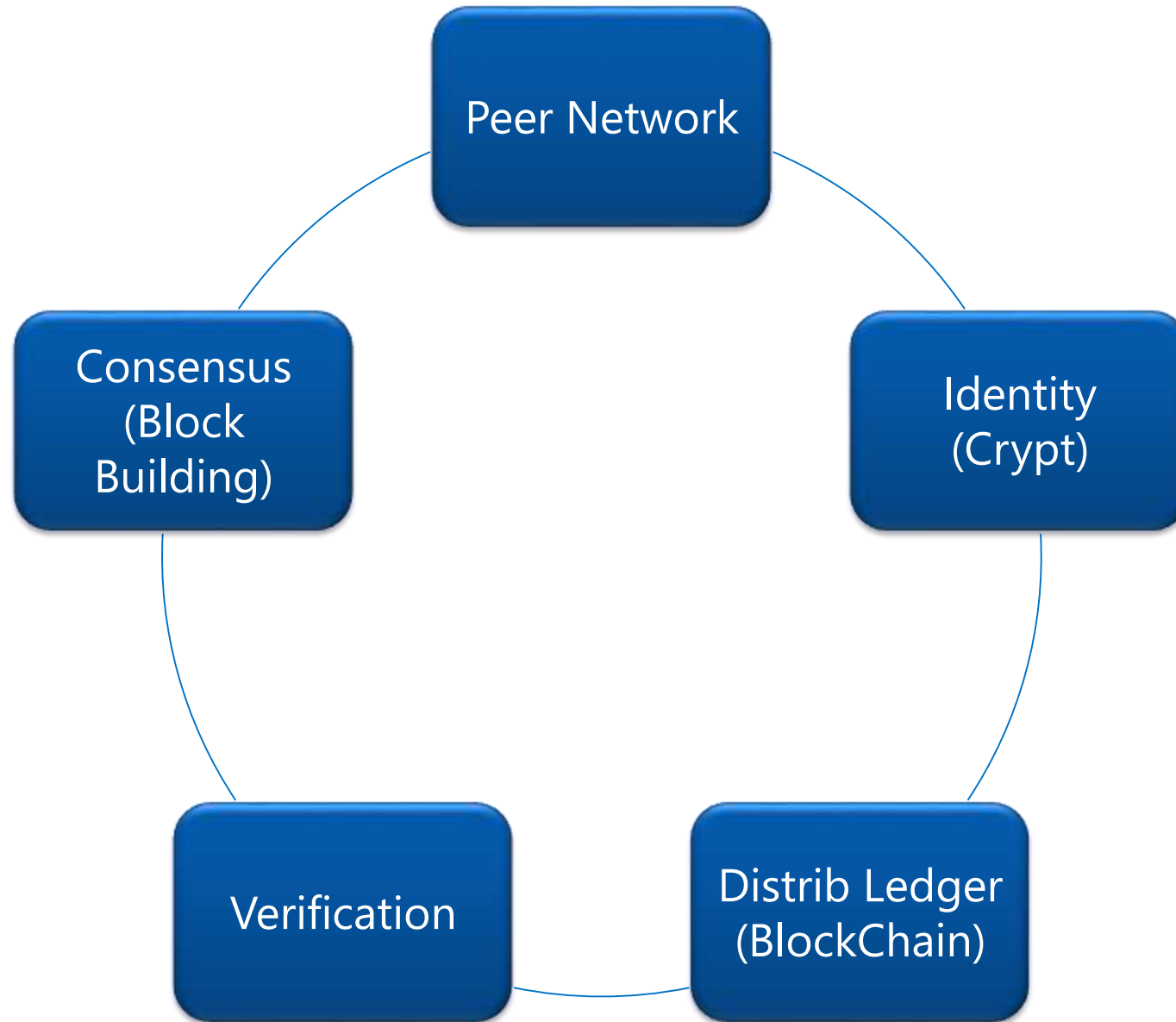
- Look 4 longest Chain, ...
- Create Blocks
- Earn BitCoin

## Transaction Nodes:

- Look 4 longest Chain
- Watch
- Verify
- Send Transaction



# Components





Transition to 2.0



# Blockchain 2.0 & Smart Contracts

## Contract

[illegible]

## Smart Contract Package

# Logic



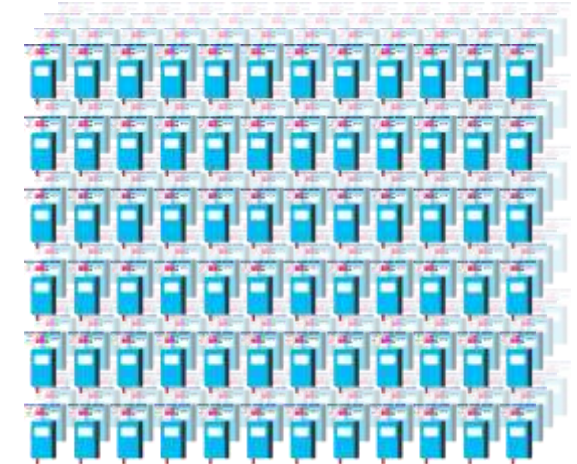
## Properties

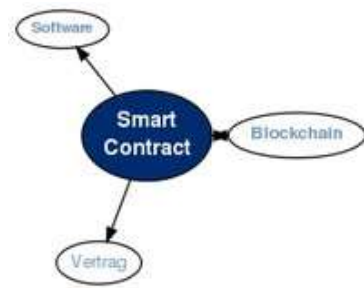


## Ledger

Date	Payment	Late Fee
12/1/2016	\$500.00	\$0
1/1/2017	\$500.00	\$0

## Deployed to Nodes





Code

Schema

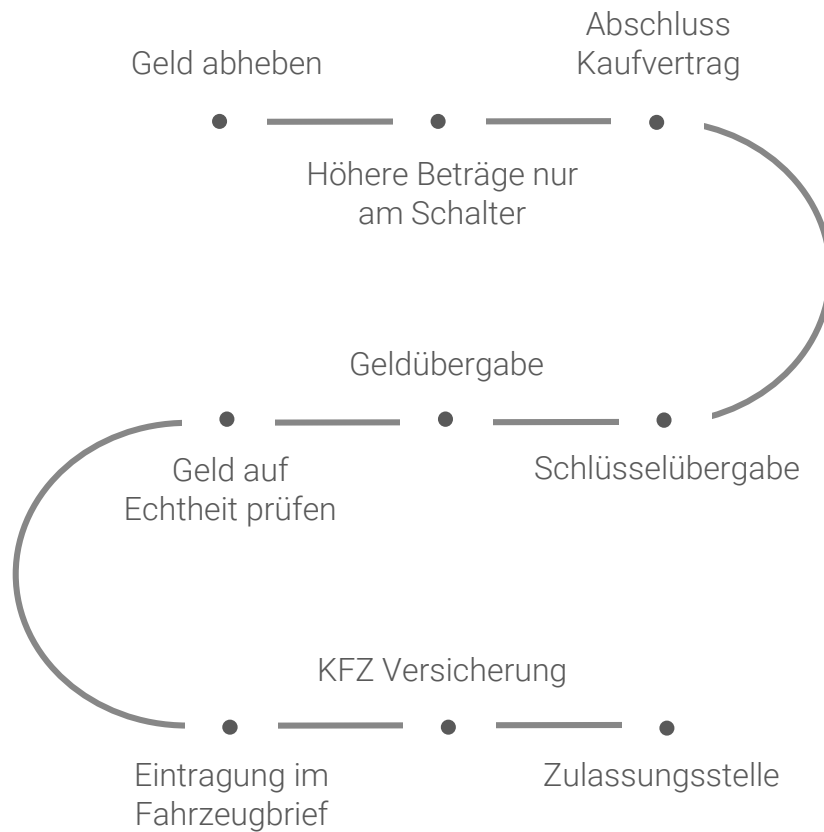
- State

Fixed Entity

- Address

# Beispiel: Privater Gebrauchtwagenkauf

## STATUS QUO



## BLOCKCHAIN

Physische Übergabe  
des Autos

- Abschluss Kaufvertrag als Datenblock, regelt **Geldübergabe, Schlüssel** und **Eigentumsübertragung**
- Physische Übergabe des Autos
- Regelt KFZ Versicherung  
- Kommunikation mit Zulassungsstelle



# A Summary of Blockchain 1.0 to 2.0 Changes

Blockchain 1.0		Blockchain 2.0	BENEFITS
Bitcoin Blockchain	➡	Ethereum, Corda, Hyperledger, many others yet to come	Not locked into one vendor
Simple Transactions	➡	Generic Contracts	Can handle more complex needs
One Blockchain	➡	Multiple, Linked Blockchains	Can partition information & pick different chains for different needs (location, regulation, speed, privacy, etc.)
Public Only	➡	Public, Private, Consortium, or Domain Specific	Solves many regulatory and privacy needs
Proof of Work Only	➡	Different ways to reach Consensus optimized for need – Proof of Work, Stake, Identity, Vote, etc.	Overcomes some of the existing Blockchain issues such as speed and computational cost
Always Open & Distributed	➡	User Choice	Craft blockchain solutions around the business needs

# Challenges

The background of the slide is a photograph of a bridge under construction. Two large tower cranes are positioned on the bridge's piers, which are silhouetted against a dramatic, cloudy sky. The bridge spans a body of water, and the foreground shows the dark silhouette of a hillside.

Legislation/  
Governance

## Technical:

- Energy
- Transactions

Business Cases



## Agenda



**Introduction**



**Block Chain Basics**



**Anonym versus Pseudonym**



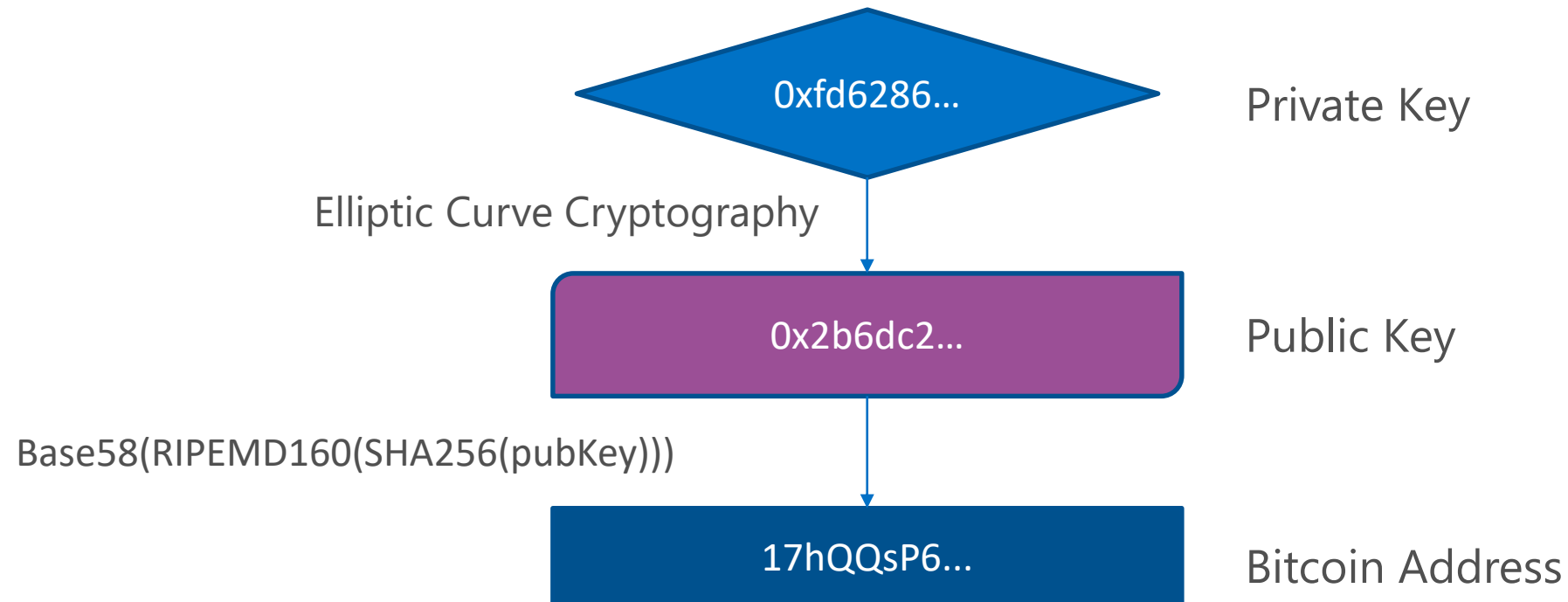
**Getting Data: The one and the many**



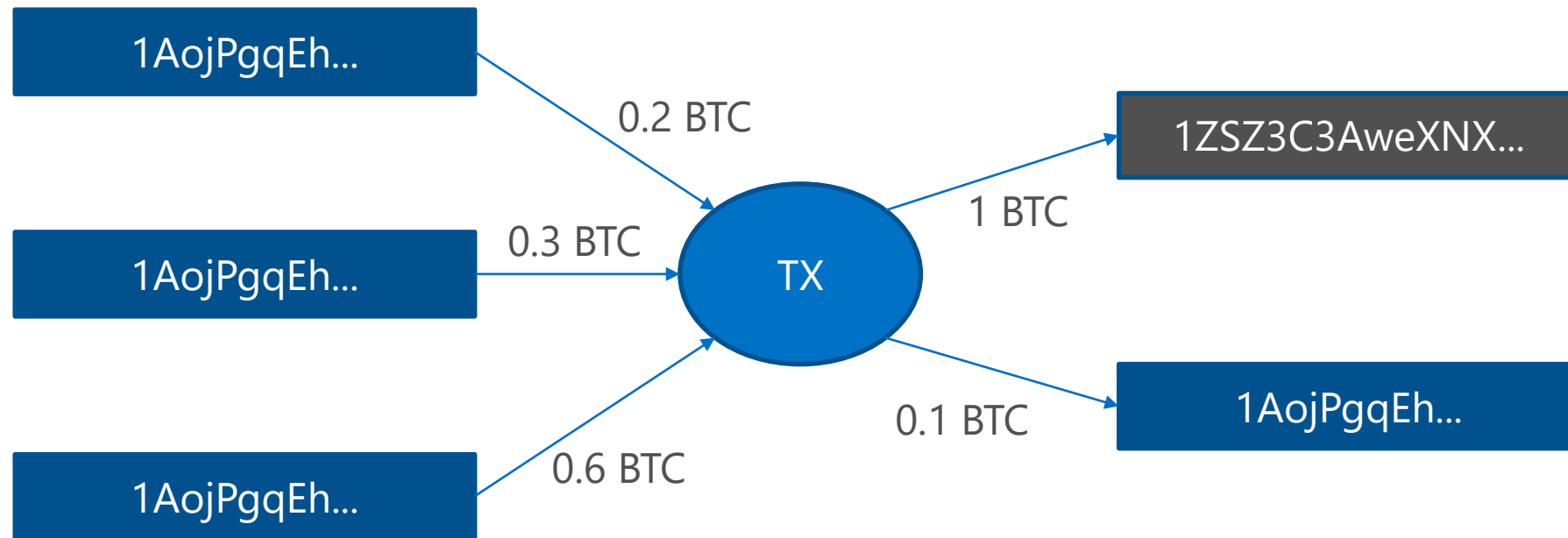
**Getting Data: Doing the Power BI**



# Wie eine Bitcoin Adresse zustande kommt

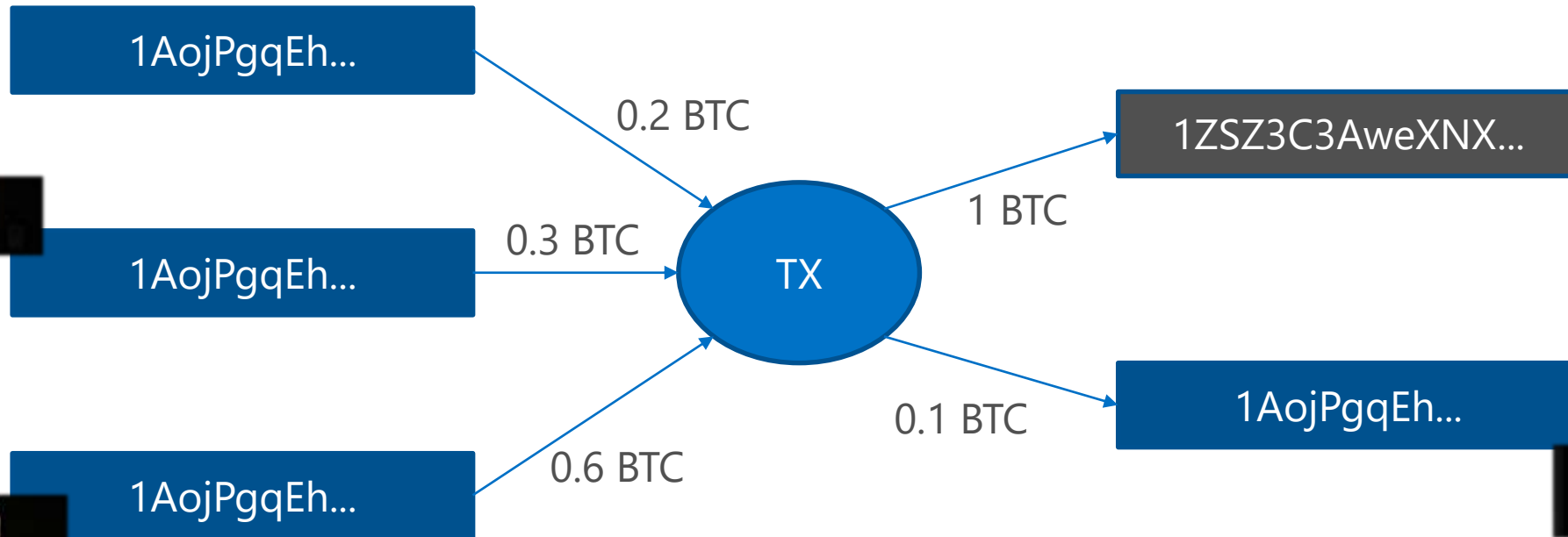


# Eine Bitcoin Transaktion





1AojPgqEh...



Wiederverwendung von Bitcoin Adressen verrät viel über meine Transaktionen.



## Agenda



**Introduction**



**Block Chain Basics**



**Anonym versus Pseudonym**

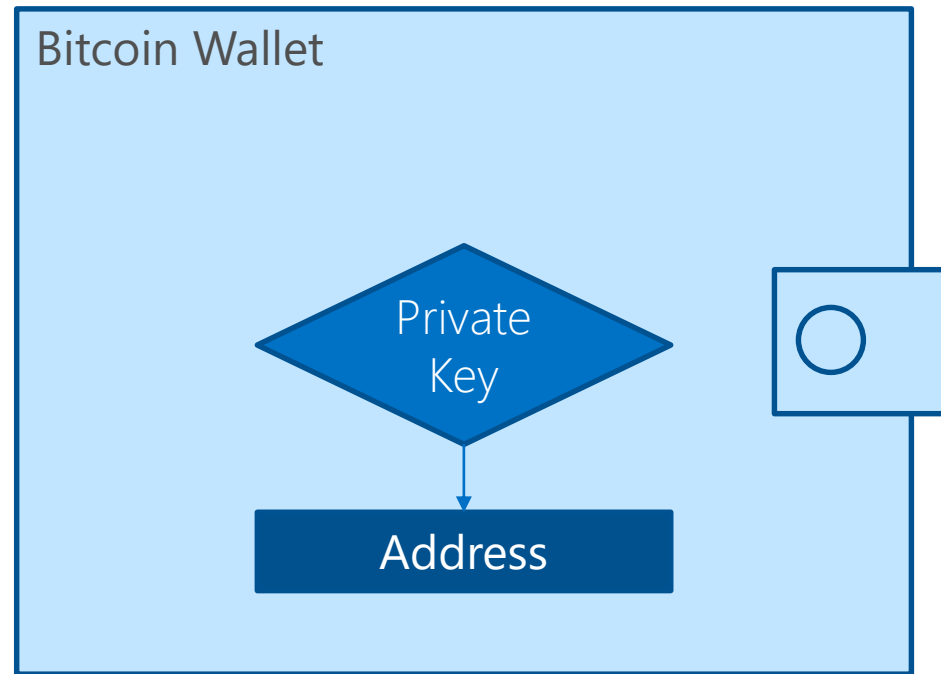


**Getting Data: The one and the many**

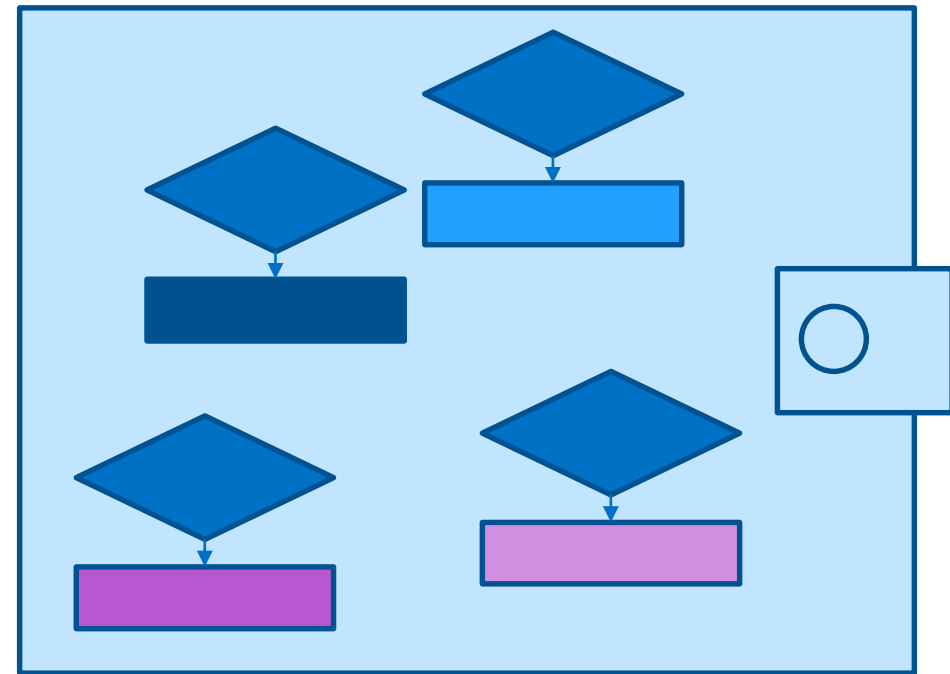
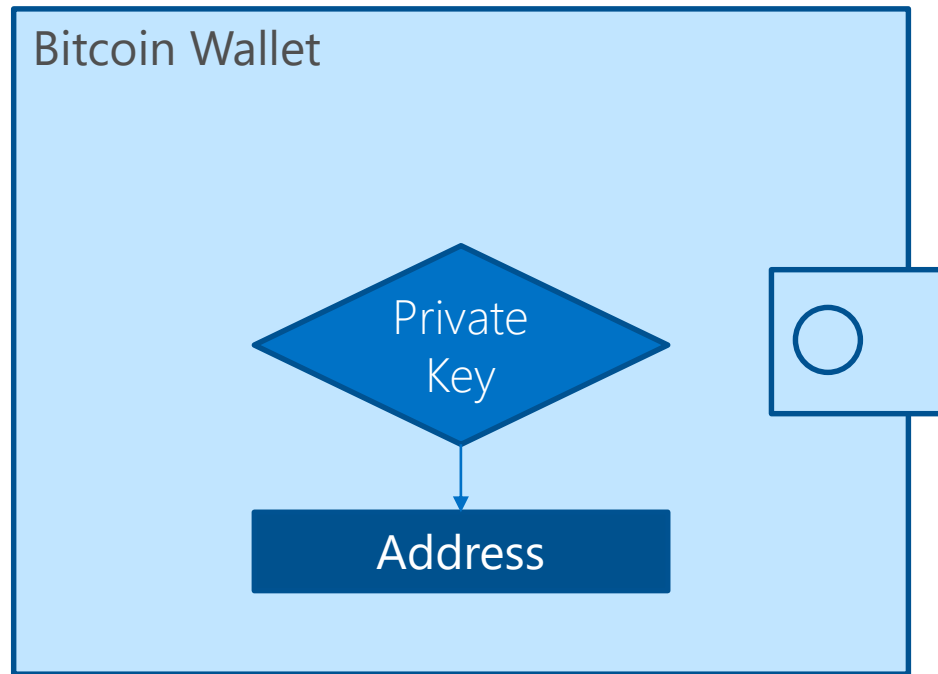


**Getting Data: Doing the Power BI**

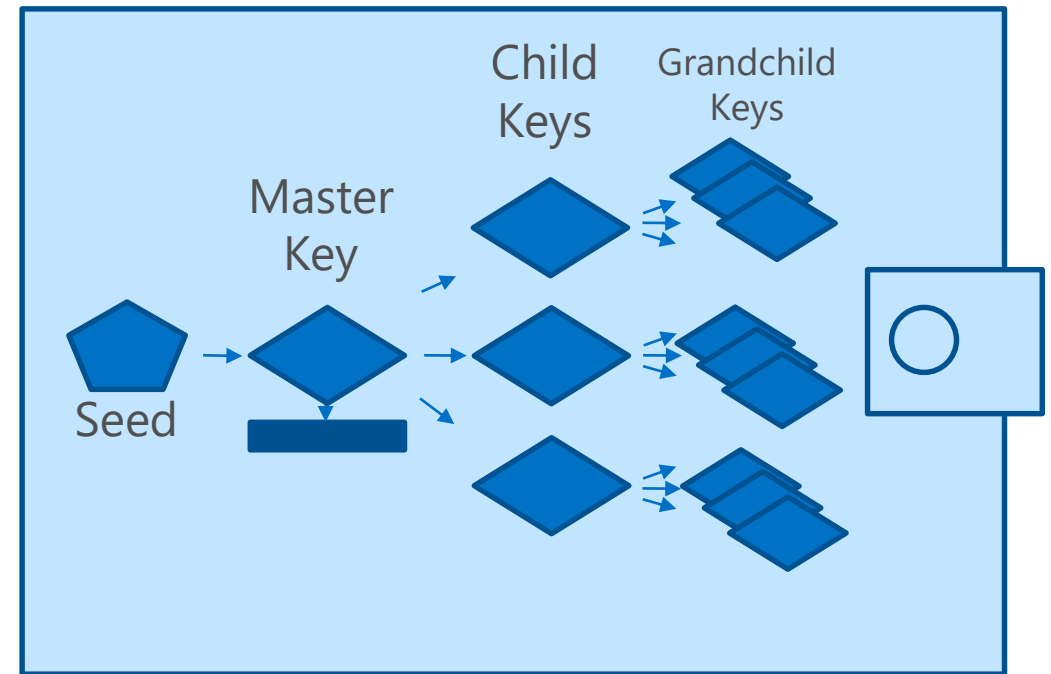
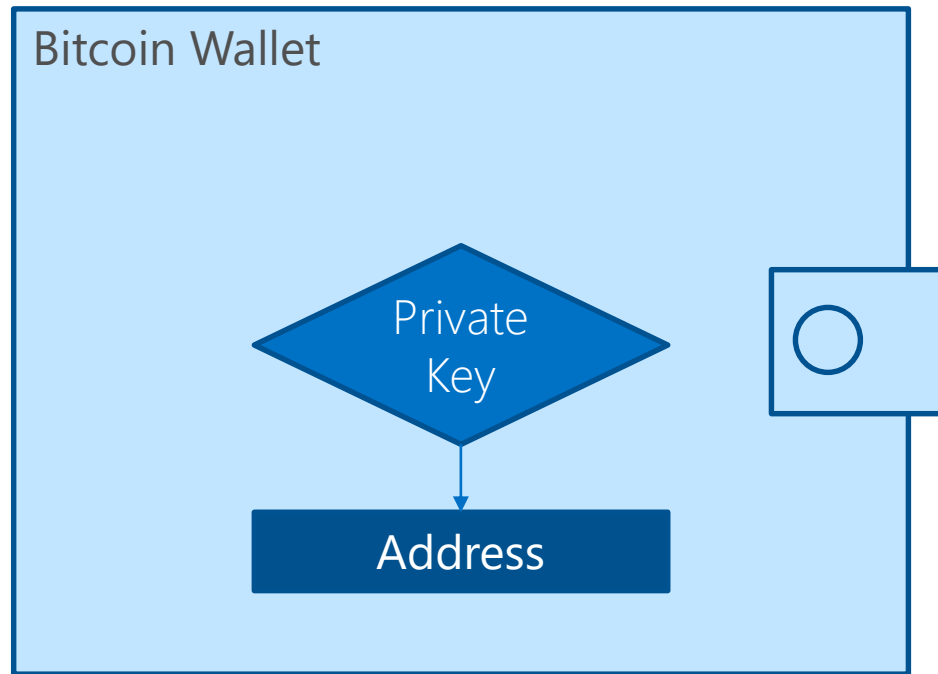
# Bitcoin Wallet



# Wallets mit mehreren Adressen

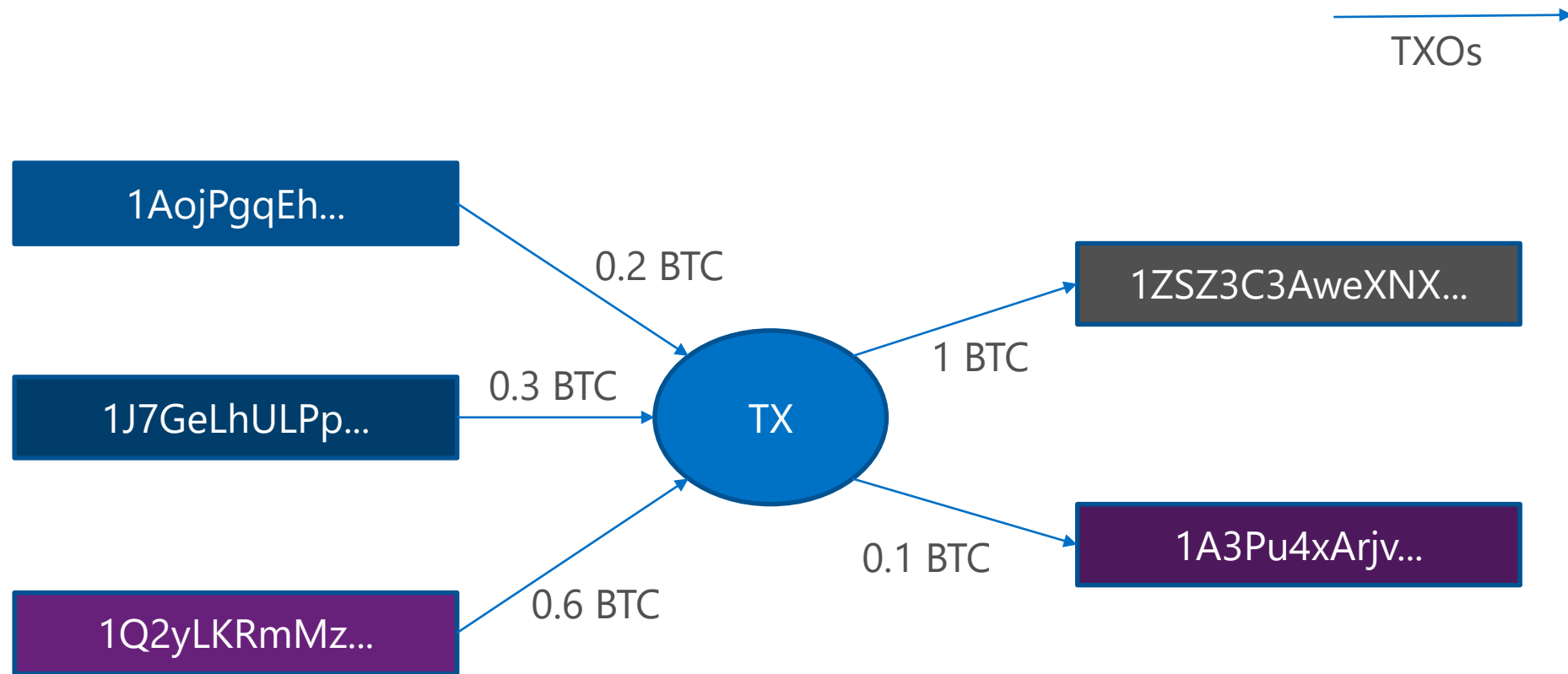


# Deterministic Wallets



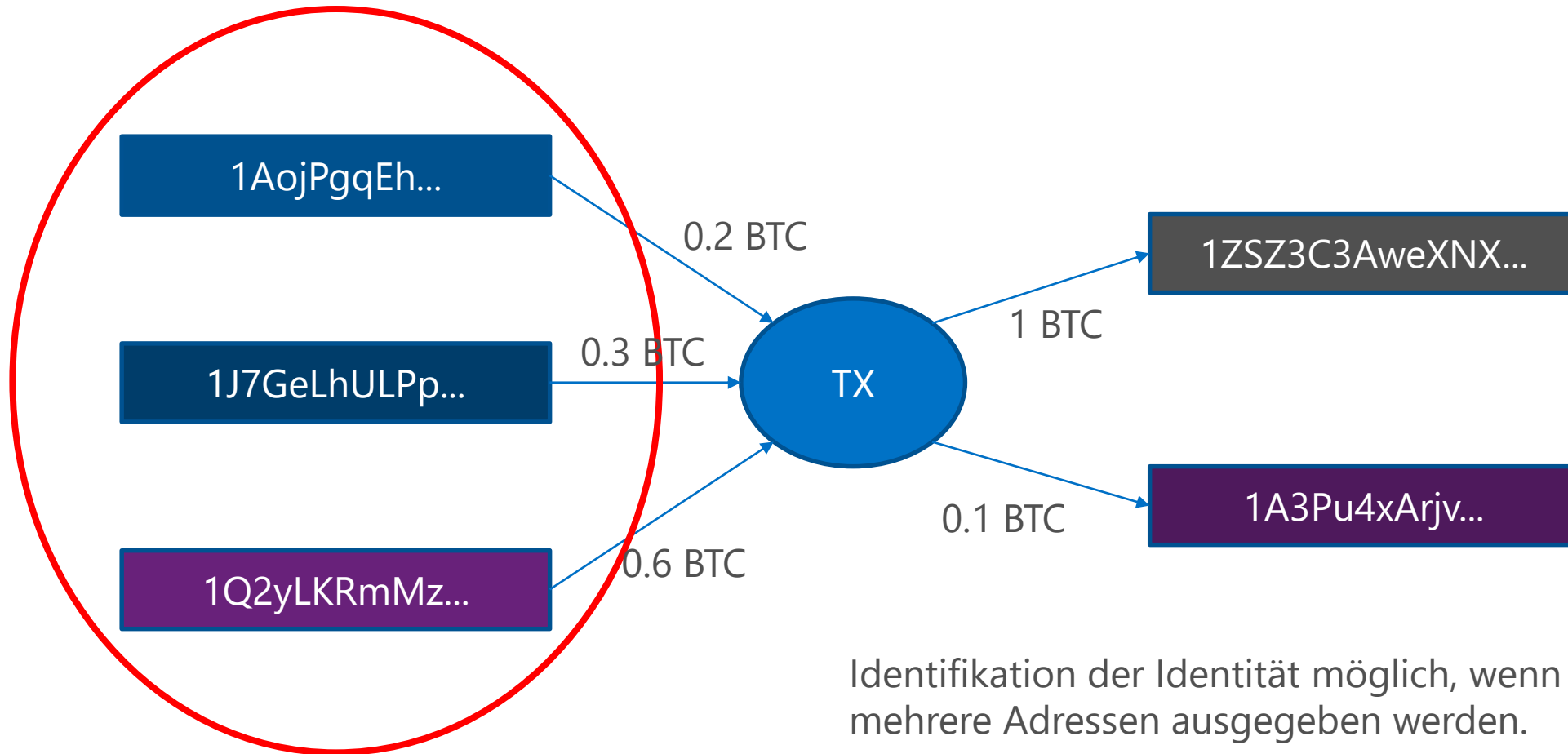


# BTC TX / Verwendung mehrerer Adressen

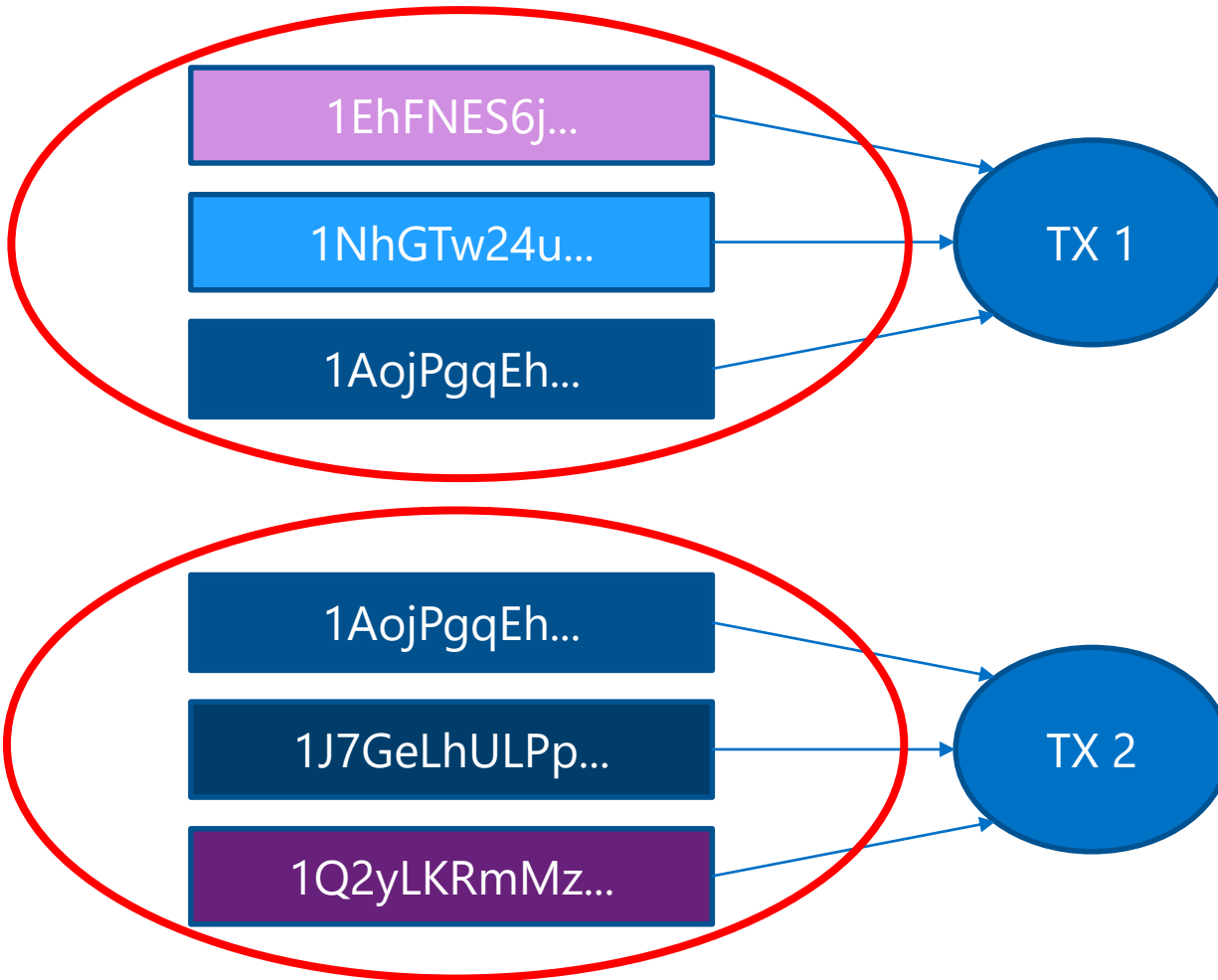


Bitcoin Adressen sollten nur ein mal verwendet werden.

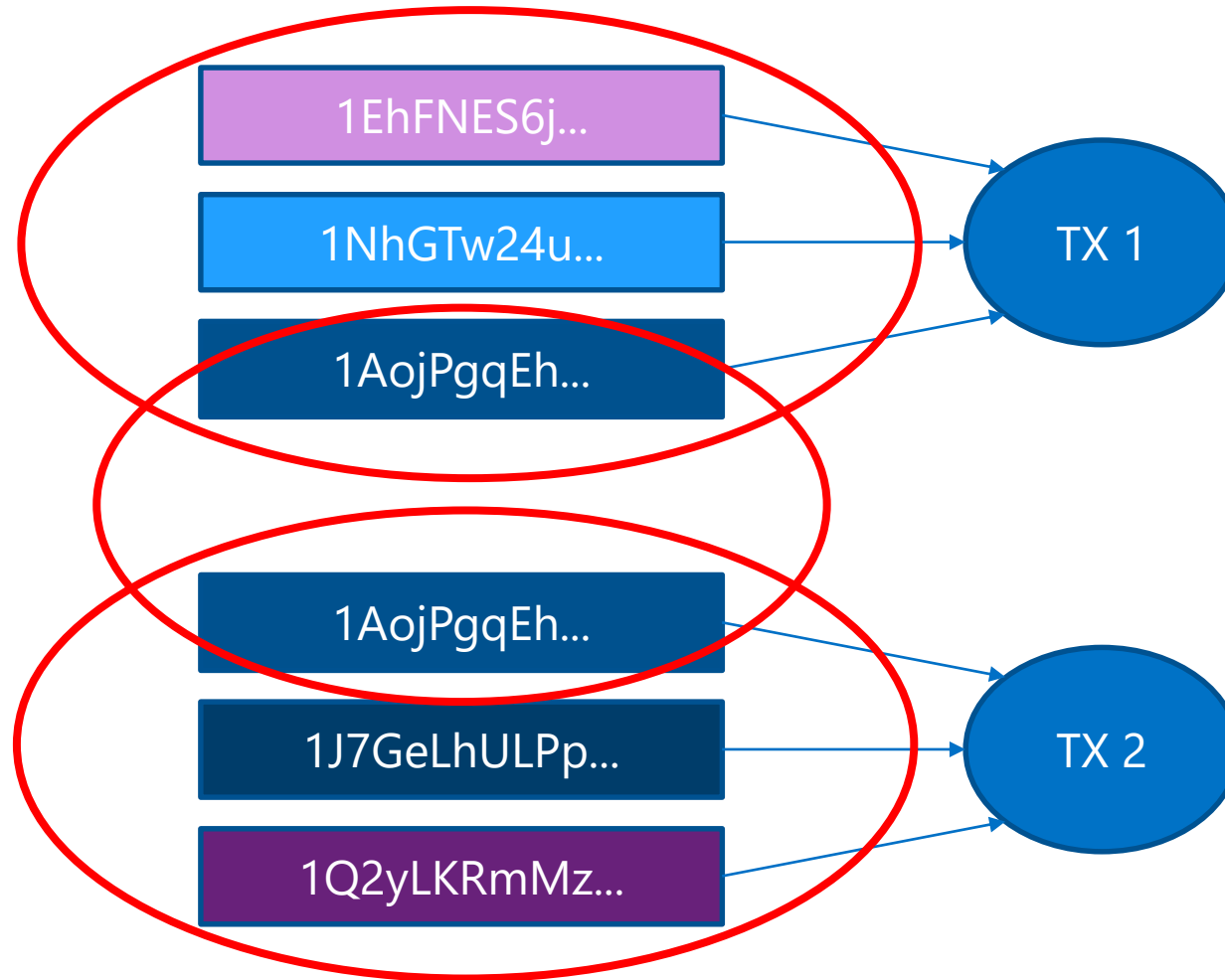
# Gemeinsame Signierung der Inputs



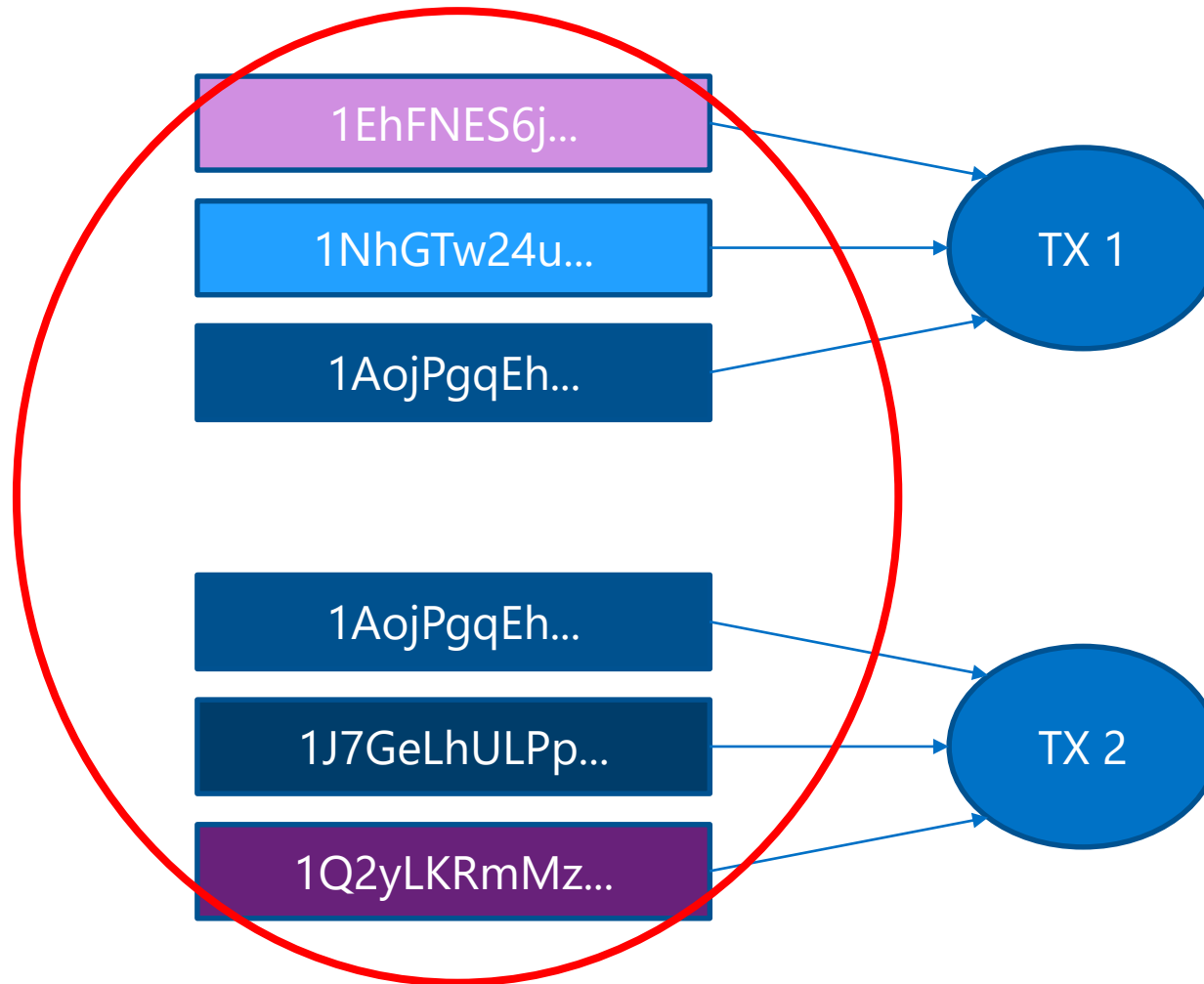
# Gemeinsame Signierung der Inputs



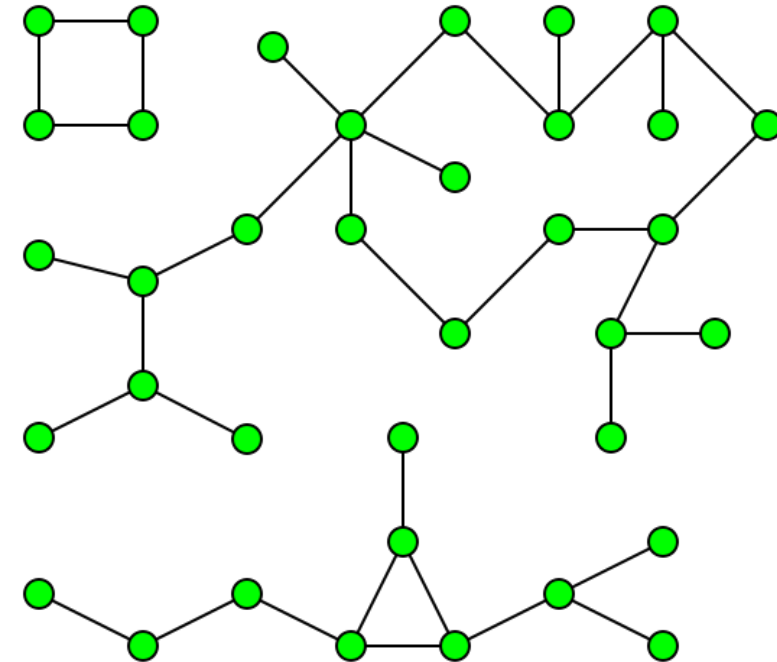
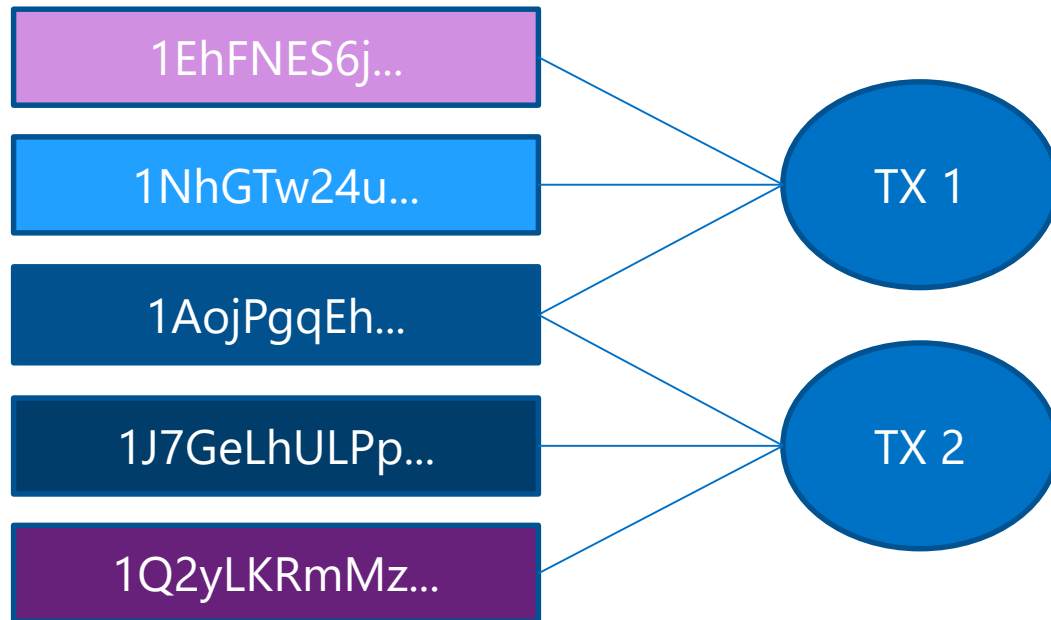
# Gemeinsame Signierung der Inputs



# Gemeinsame Signierung der Inputs

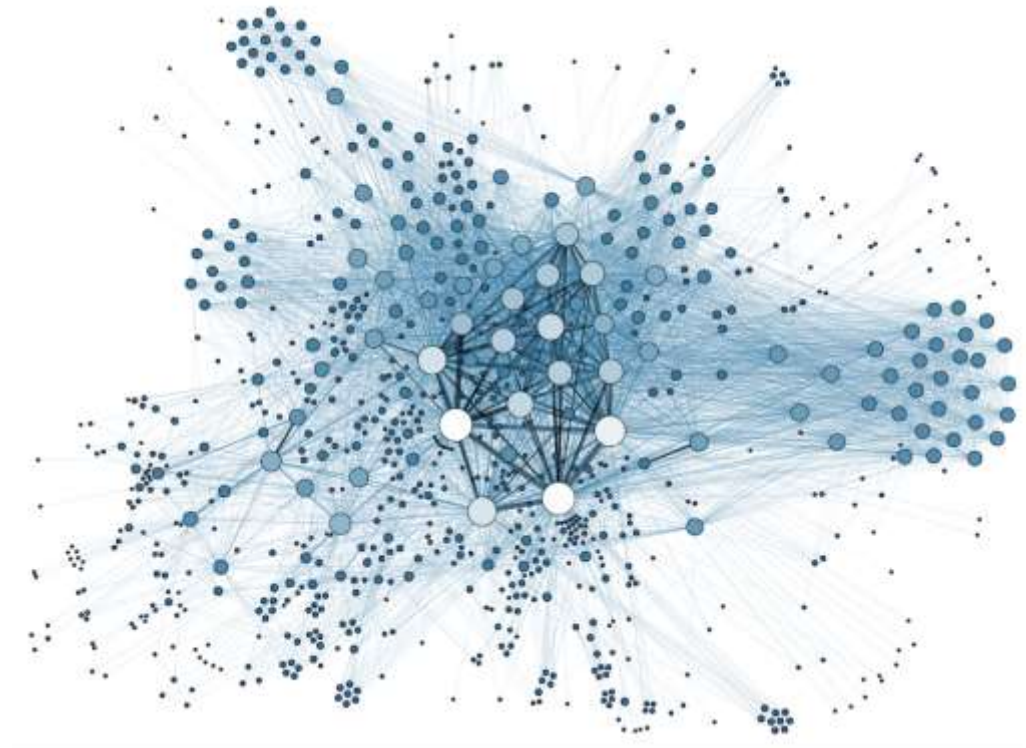


# Graphentheorie: Zusammenhängende Komponenten





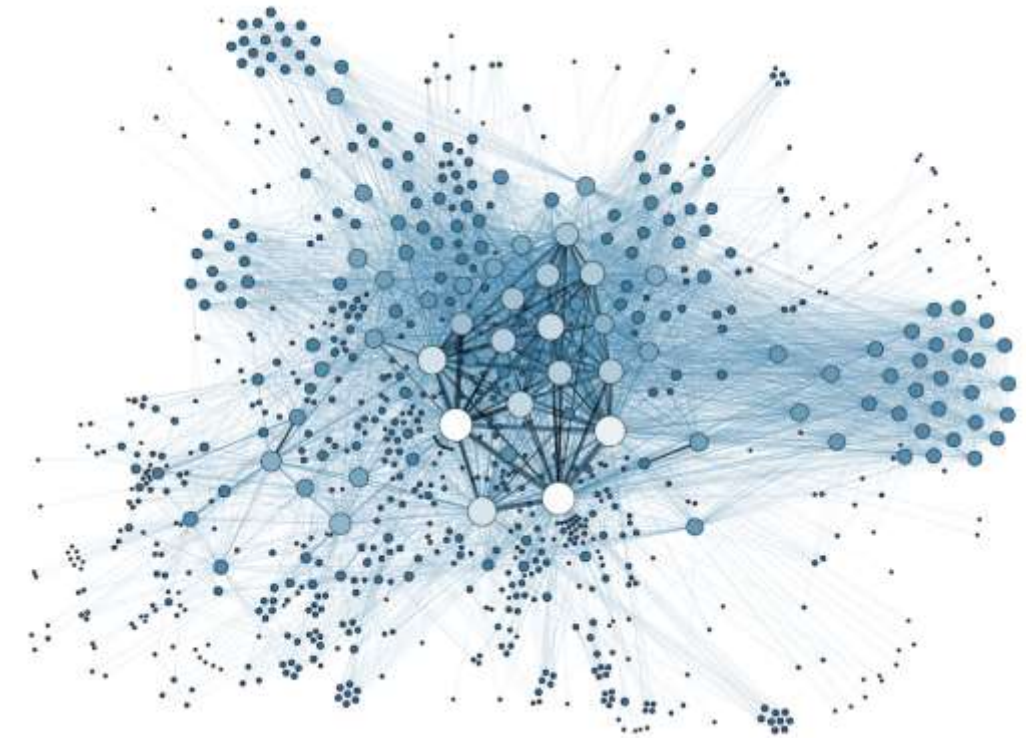
# Idee

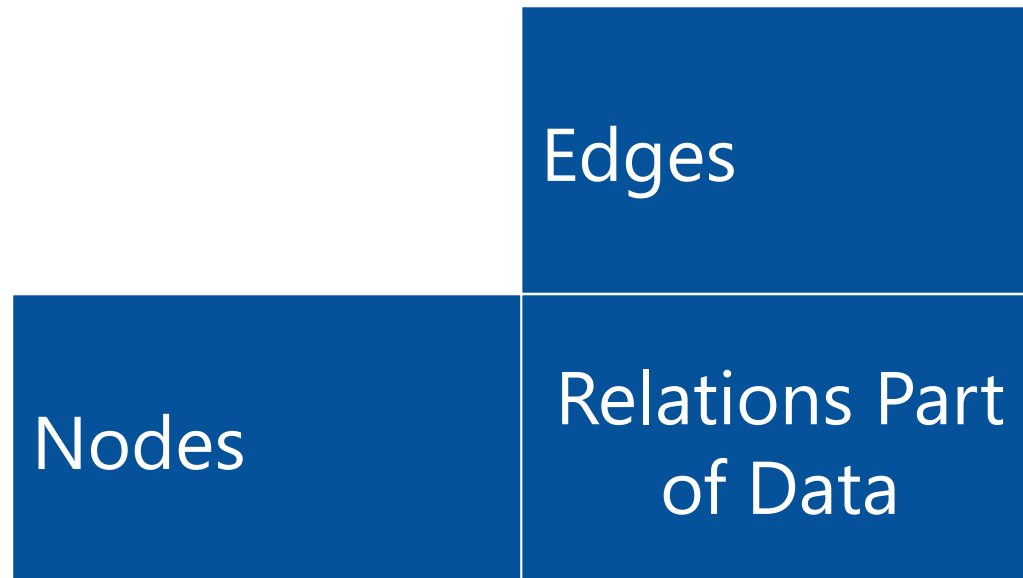


# Neo4J



# Exkurs







PersonID	Name
...	...
N	Peter
...	...

IsFriend	
PersonID1	PersonID2
...	...
N	M
N	L
...	...

Find Peters friends ...

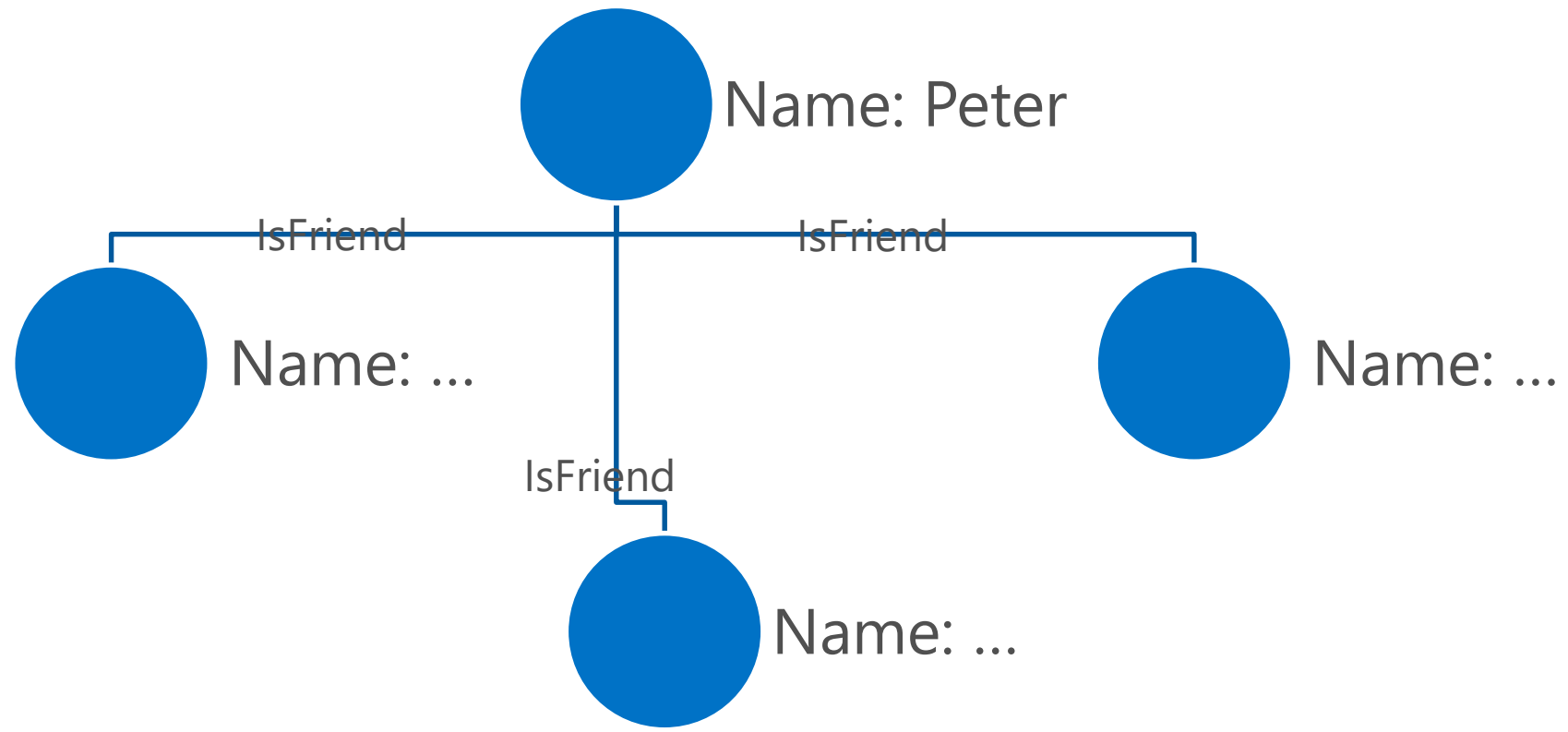
PersonID	Name
...	...
N	Peter
...	...

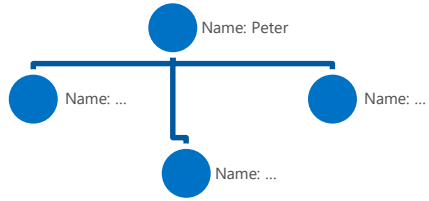
IsFriend	
PersonID1	PersonID2
...	...
N	M
N	L



- Row „Peter“ (Index,  $O(\log n)$ )
- ID Peter ( $O(1)$ )
- Rows in IsFriend with N (Index,  $O(\log x)$ )
- PersonID2 s ( $O(k)$ )
- PersonID s (Index  $O(k \log n)$ )
- Names ( $O(k)$ )





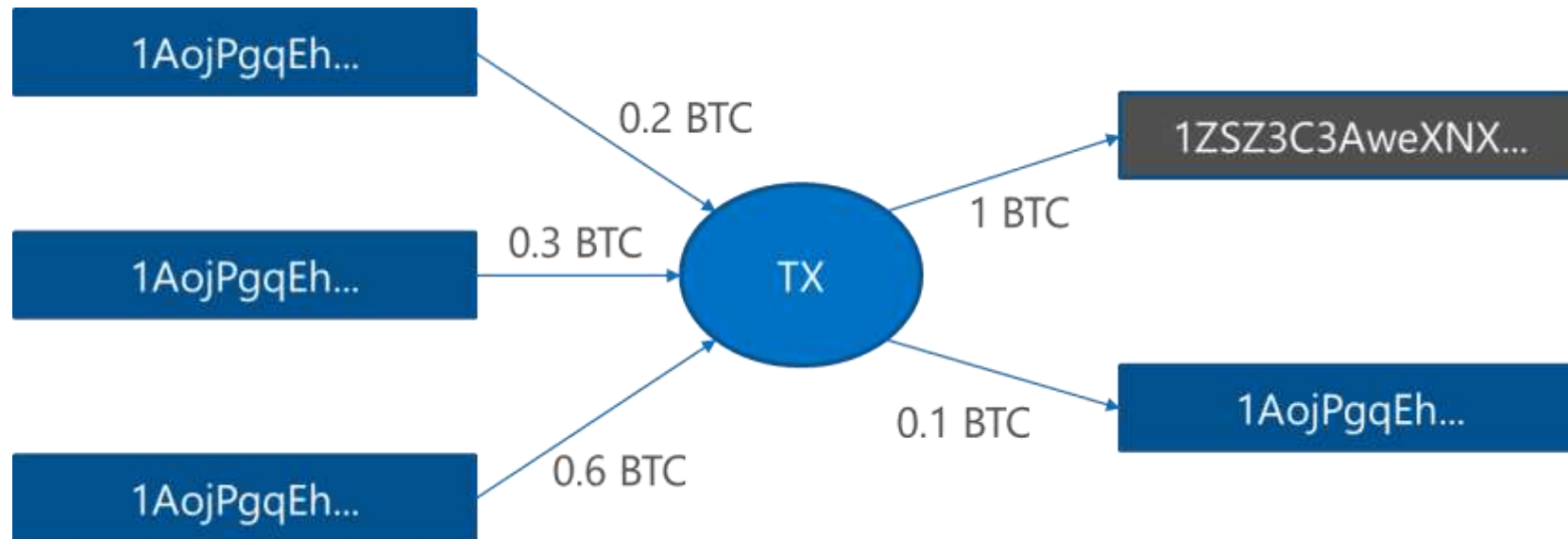


- Node „Peter“ (Index,  $O(\log n)$ )
- IsFriend edges ( $O(k+x)$ )
- Nodes on ends of edges ( $O(k)$ )
- Names ( $O(k * y)$ )

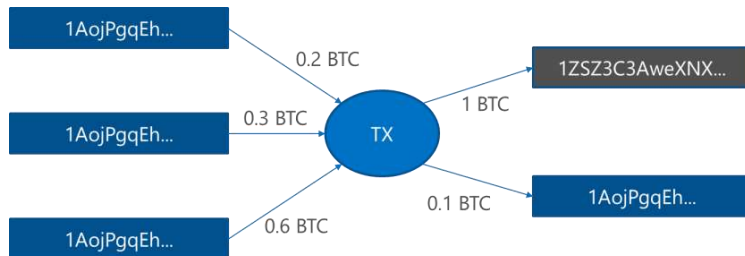
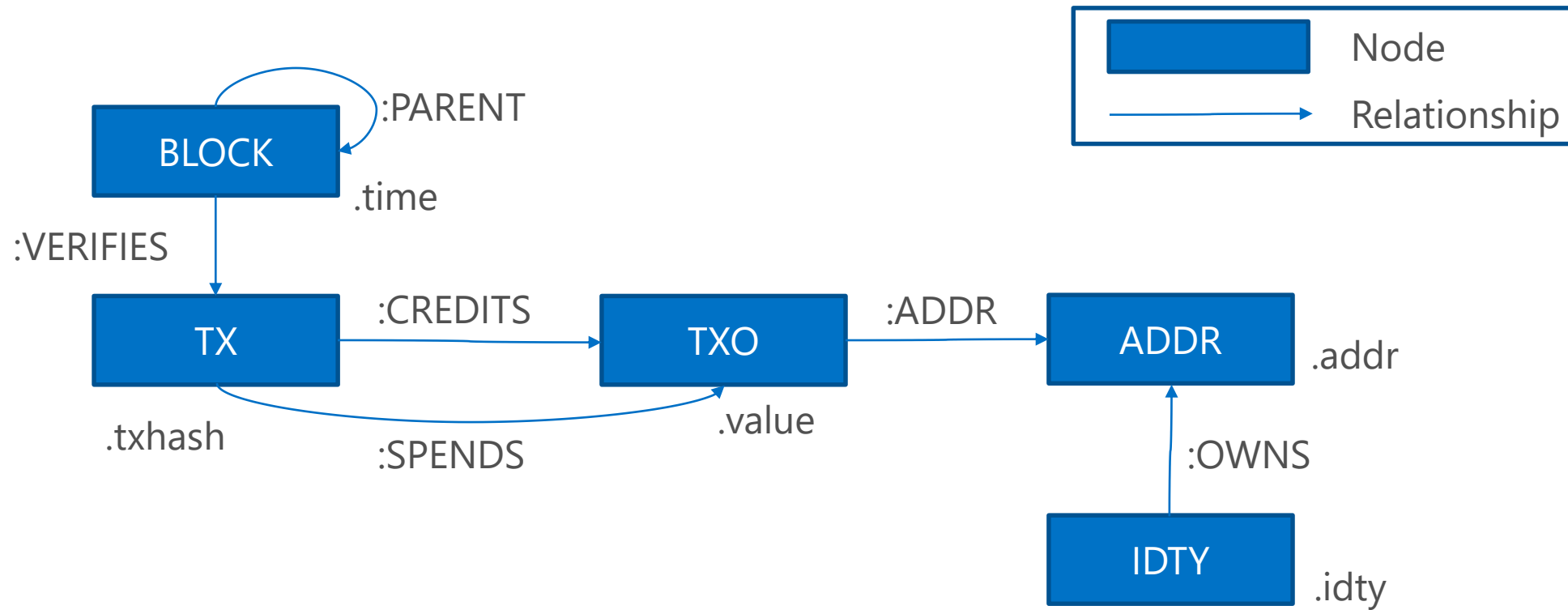
Back to Neo



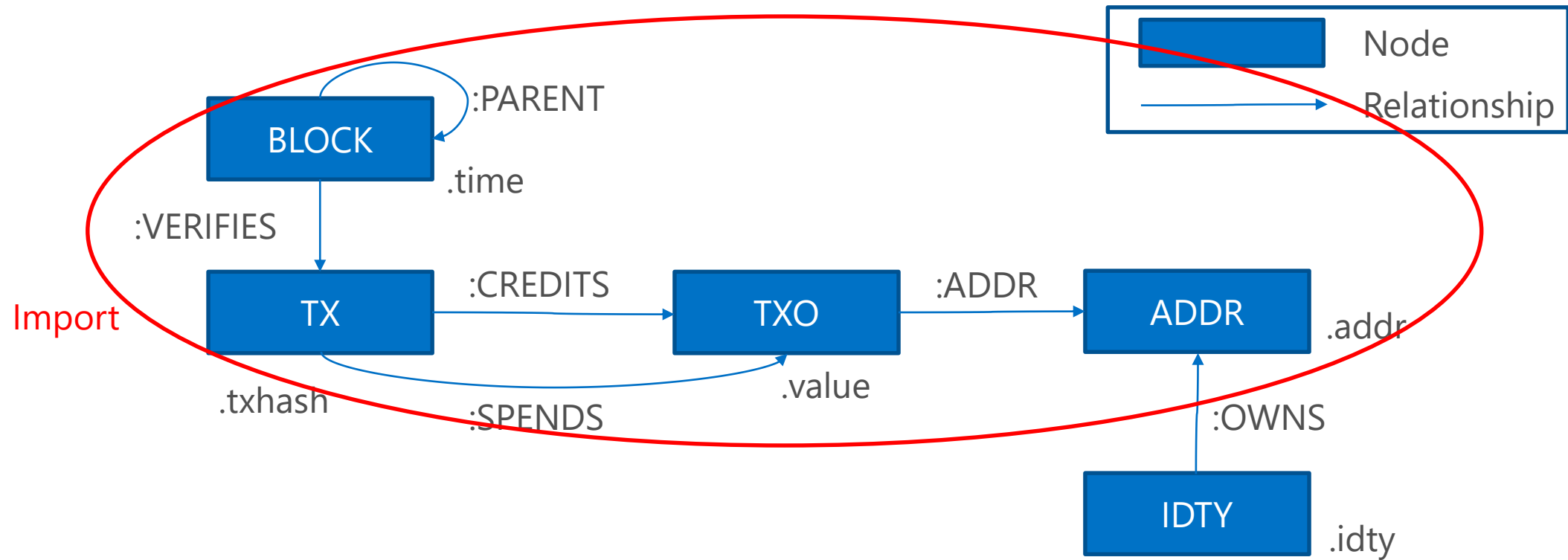
# Neo4j Bitcoin Datenmodell



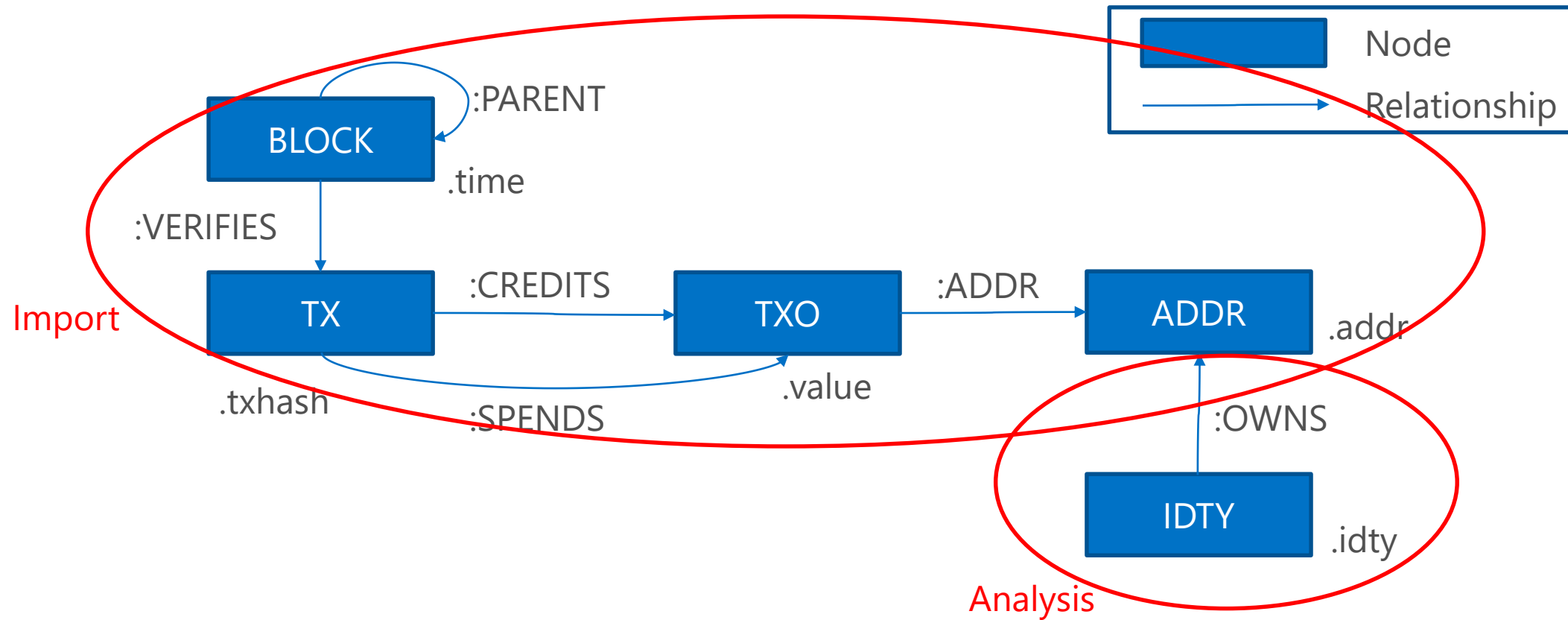
# Neo4j Bitcoin Datenmodell



# Neo4j Bitcoin Datenmodell



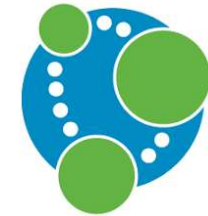
# Neo4j Bitcoin Datenmodell





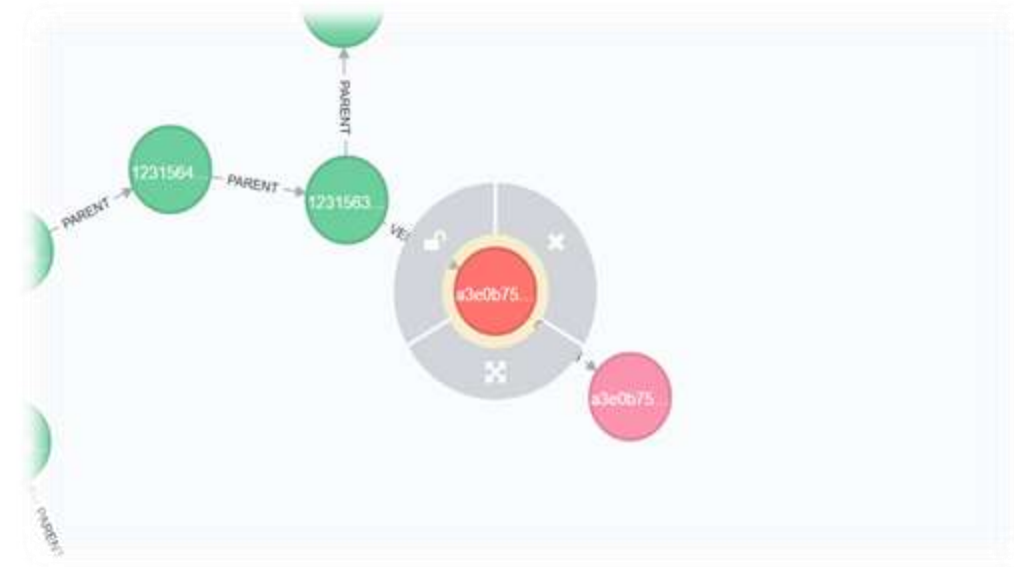


Demo

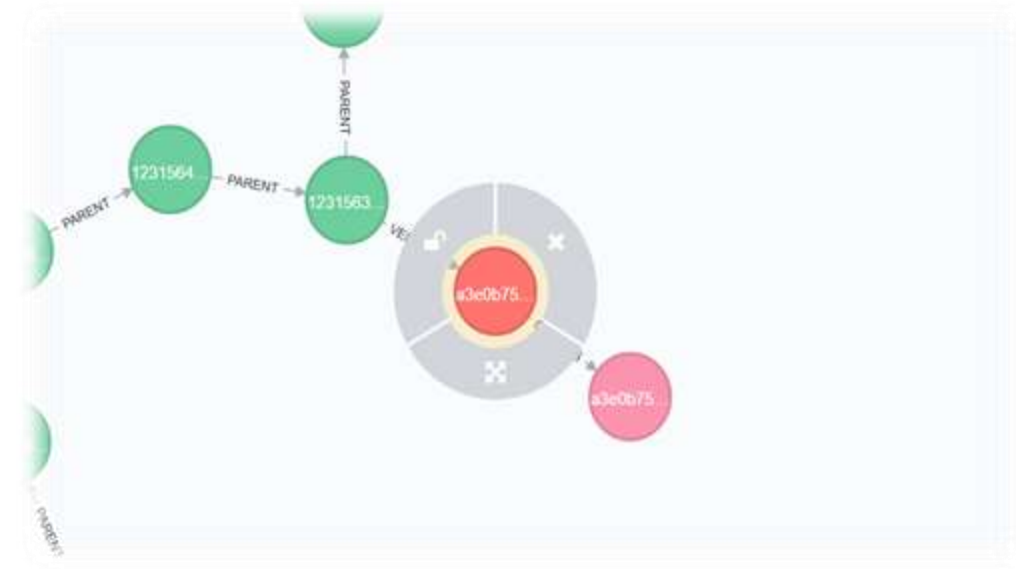


# Demo

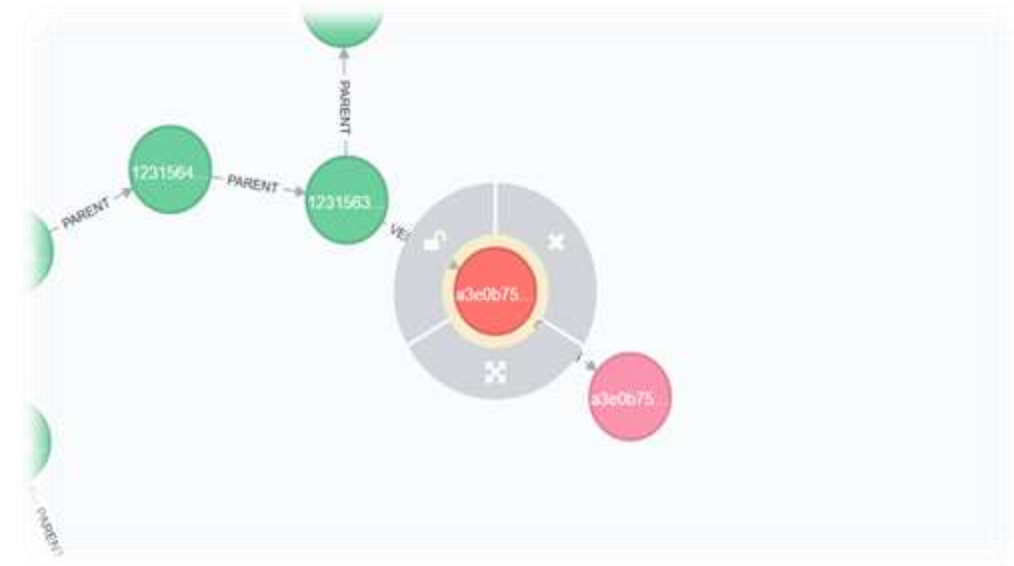




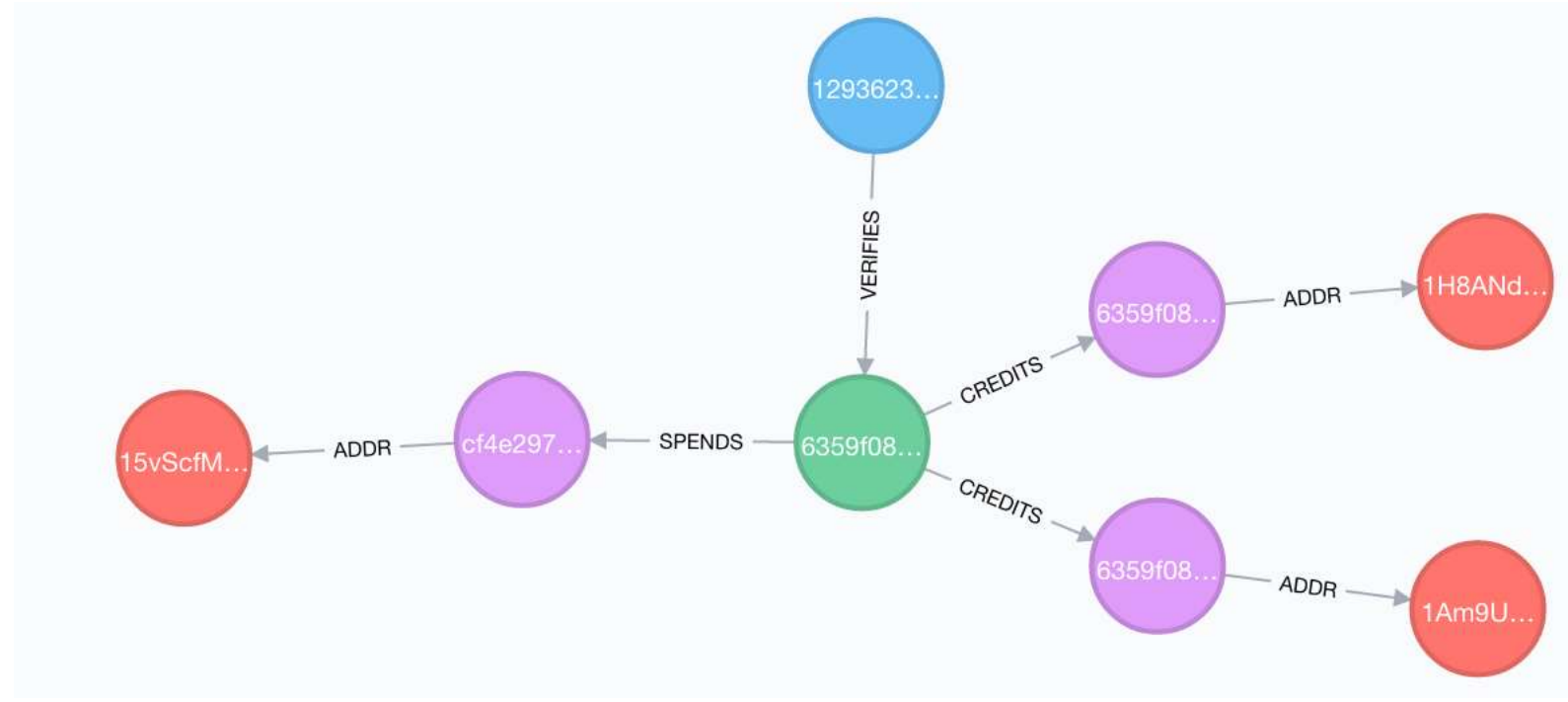
MATCH (n:BLOCK) RETURN n LIMIT 10



MATCH (n:IDTY) RETURN n LIMIT 10



MATCH (n:IDTY)-[:OWNS]->(a:ADDR) where a.addr = '...' RETURN n



```
MATCH (a:ADDR)<--(txo:TX0)<--(tx:TX)<-[[:VERIFIES]]-(b:BLOCK)
WHERE tx.txhash = '6359f0868171b1d194cbee1af2f16ea598ae8fad666d9b012c8ed2b79a236ec4'
RETURN a, txo, tx, b
```

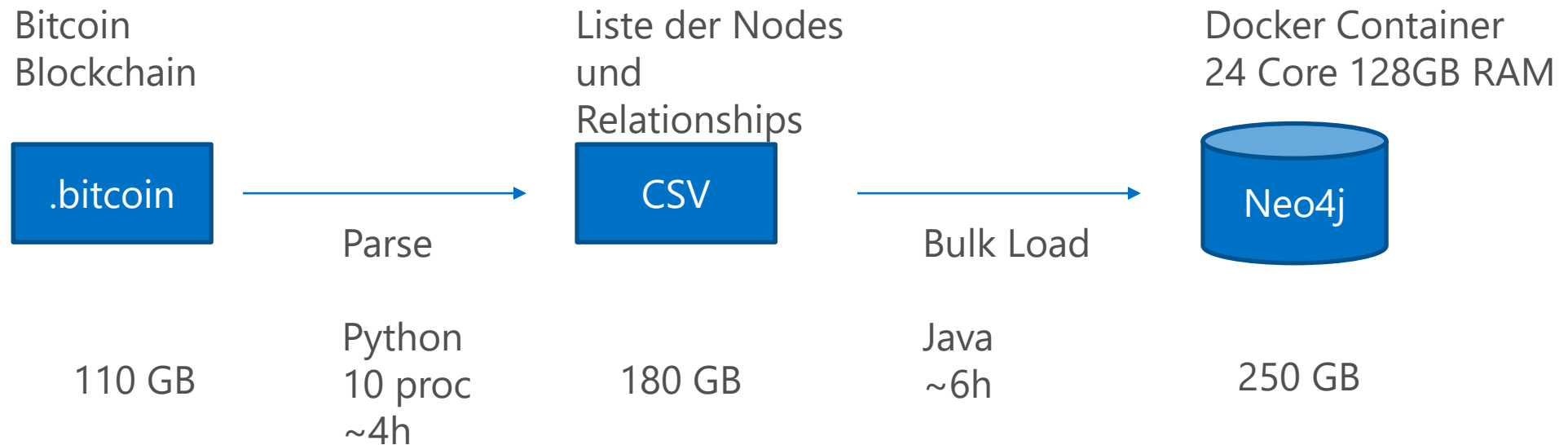


ADDRESS	BTC	TIME
15vScfMHNrXN4QvWe54q5hwhfVoYwG79CS1	-3	1293623863
1Am9UTGfdnxabvcywYG2hvzr6qK8T3oUZT	2.99	1293623863
1H8ANdafjpqYntniT3Ddxh4xPBMCSz33pj	0.01	1293623863

```
MATCH (a:ADDR)<--(txo:TXO)<-[r]-(tx:TX)<-[ :VERIFIES]-(b:BLOCK)
WHERE tx.txhash = '6359f0868171b1d194cbee1af2f16ea598ae8fad666d9b012c8ed2b79a236ec4'
RETURN a.addr AS ADDRESS
, CASE WHEN TYPE(r)='CREDITS' THEN 1 ELSE -1 END * txo.value/10^8 AS BTC
, b.time AS TIME
```

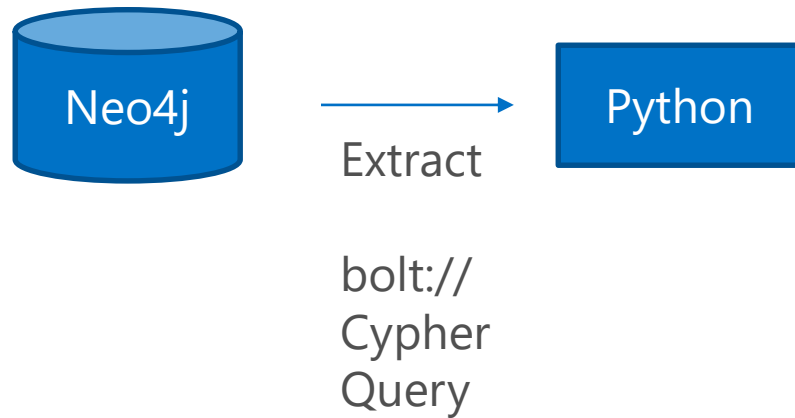


# Vorgehen initiale Befüllung

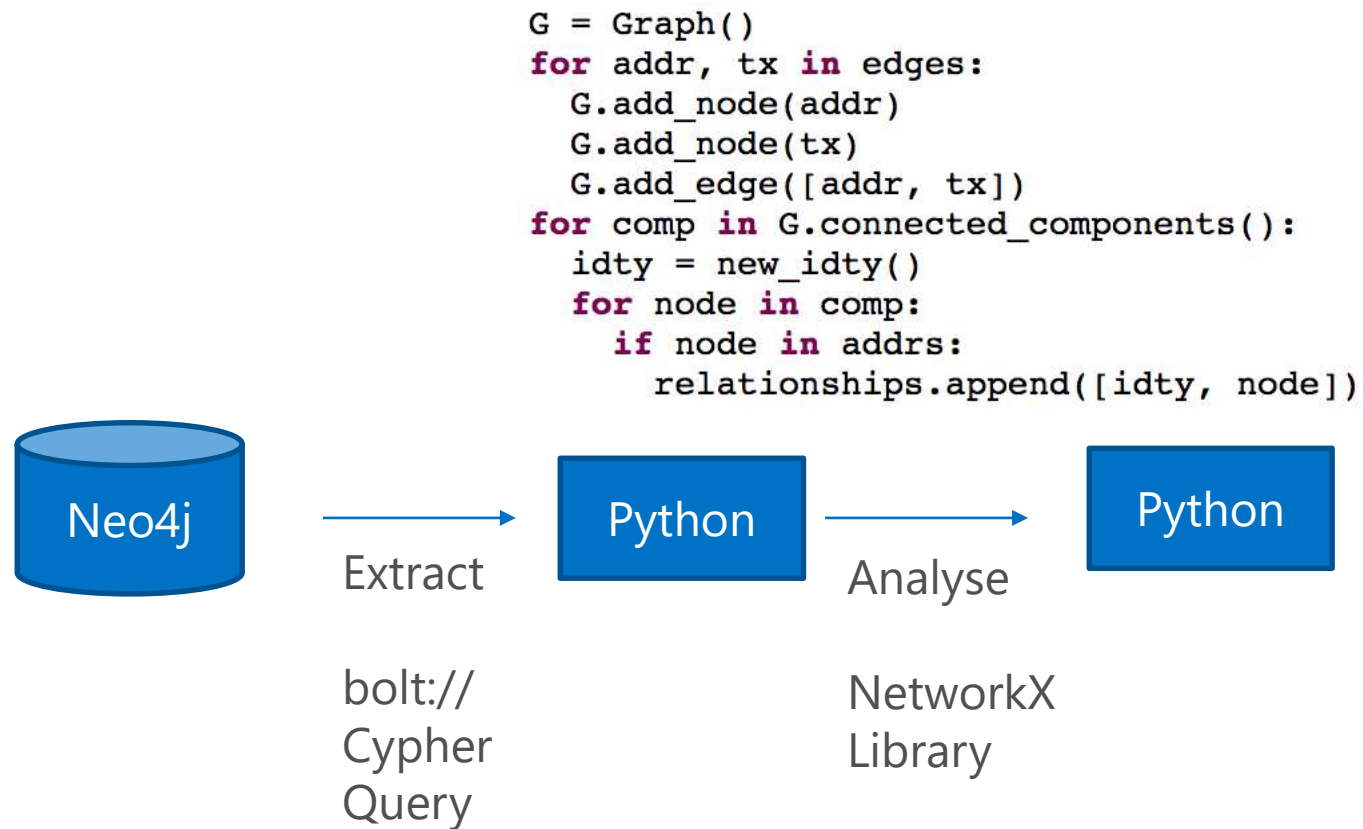


# Vorgehen Netzwerkanalyse

```
MATCH (tx:TX)-[:SPENDS]->(tx0)-[:ADDR]->(a:ADDR)
RETURN tx.txhash AS txhash, a.addr AS addr
```

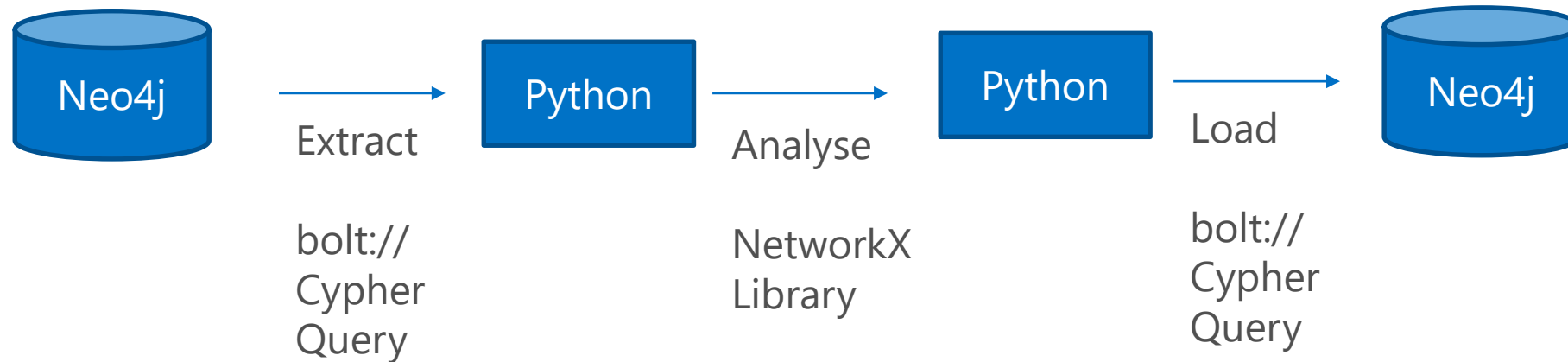


# Vorgehen Netzwerkanalyse



# Vorgehen Netzwerkanalyse

```
MATCH (addr:ADDR {addr:"1HB5XMLmzFVj8ALj6mfBsbifRoD4miY36v"})  
MERGE (idty:IDTY {name:"RYZ3T4R9"})  
CREATE (idty)-[:OWNS]->(addr)
```





## Agenda



**Introduction**



**Block Chain Basics**



**Anonym versus Pseudonym**



**Getting Data: The one and the many**



**Getting Data: Doing the Power BI**

**KI** analytics  
Cypher

{ REST }  
Adapter





Demo

{ REST }





let

```
content = "{\"statements\": [{\"statement\": \"Cypherquery \"}]}",  
Quelle = Json.Document(Web.Contents("http://trex.ki-performance.local:5501/db/data/transaction/commit",  
    [Content = Text.ToBinary(content)])),
```



```
MATCH (n:IDTY)-[:OWNS]->(a:ADDR)<-[:ADDR]-(txo:TXO)<-[:CREDITS]-(tx:TX)
, (tx)-[:SPENDS]->(:TXO)-->(u:ADDR)
, (tx)<-[:VERIFIES]-(blk:BLOCK)
WHERE n.name = 'RYZ3T4R9'
WITH n, txo, u, blk
OPTIONAL MATCH (u)--(b:IDTY)
WITH DISTINCT n.name as toi, CASE WHEN b IS NOT NULL THEN b.name ELSE u.addr END as fromi,
CASE WHEN b IS NOT NULL THEN 1 ELSE 0 END as isidty, txo.value/10^8 as BTC, blk.time as time
RETURN toi, fromi, sum(BTC), time, isidty
```



Demo

