KI group

THE AZURE BLOCKCHAIN WORKBENCH

Christoph Seck | KI Group

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BUSINESS MODELS
& PROCESSES

KI mobility KI finance
KI challenge.rs KI growth
KI chemicals

EXPERIENCES , DESIGN AND LIFESTYLE

dreaminc GROUP
dreaminc MEDIA
dreaminc SPACES
dreaminc ENTERTAINMENT
Food Experts Group

SOFTWARE
& DATA

KI performance
KI decentralized
KI analytics
KI labs
MOBILAB

KI INTRODUCING group

HOME FOR ENTREPRENEURS,
CREATORS AND SOLVERS

INVESTMENTS,
COMPANYBUILDING
AND ECOSYSTEM

KI capital

HUMAN RESOURCES

KI professionals KI connect

FOUNDED
1999

>280
EMPLOYEES
> 150 ENGINEERS

>300
PROJECTS

5 LOCATIONS

KI group

COLOGNE
STUTTGART
BERLIN
MUNICH
LISBON

PASSION FOR TECH AND INNOVATIONS

HOME FOR ENTREPRENEURS, CREATORS AND SOLVERS

KI performance

KI group

THE AZURE BLOCKCHAIN WORKBENCH

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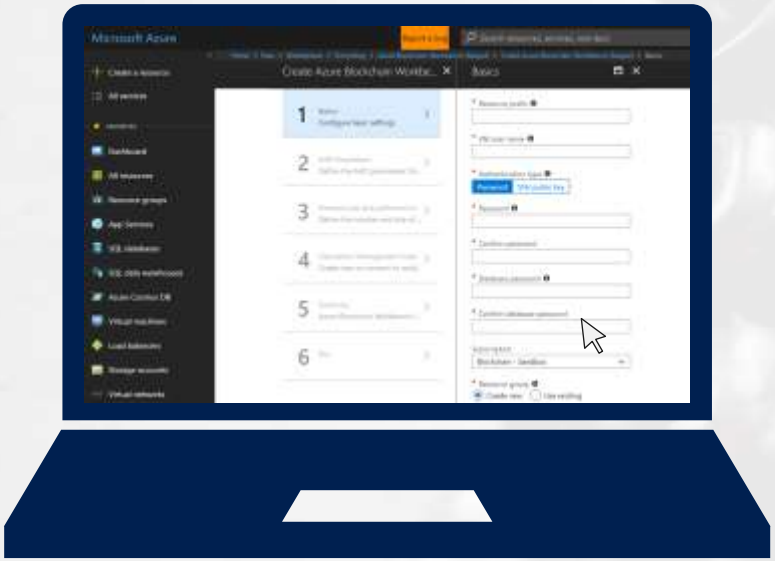
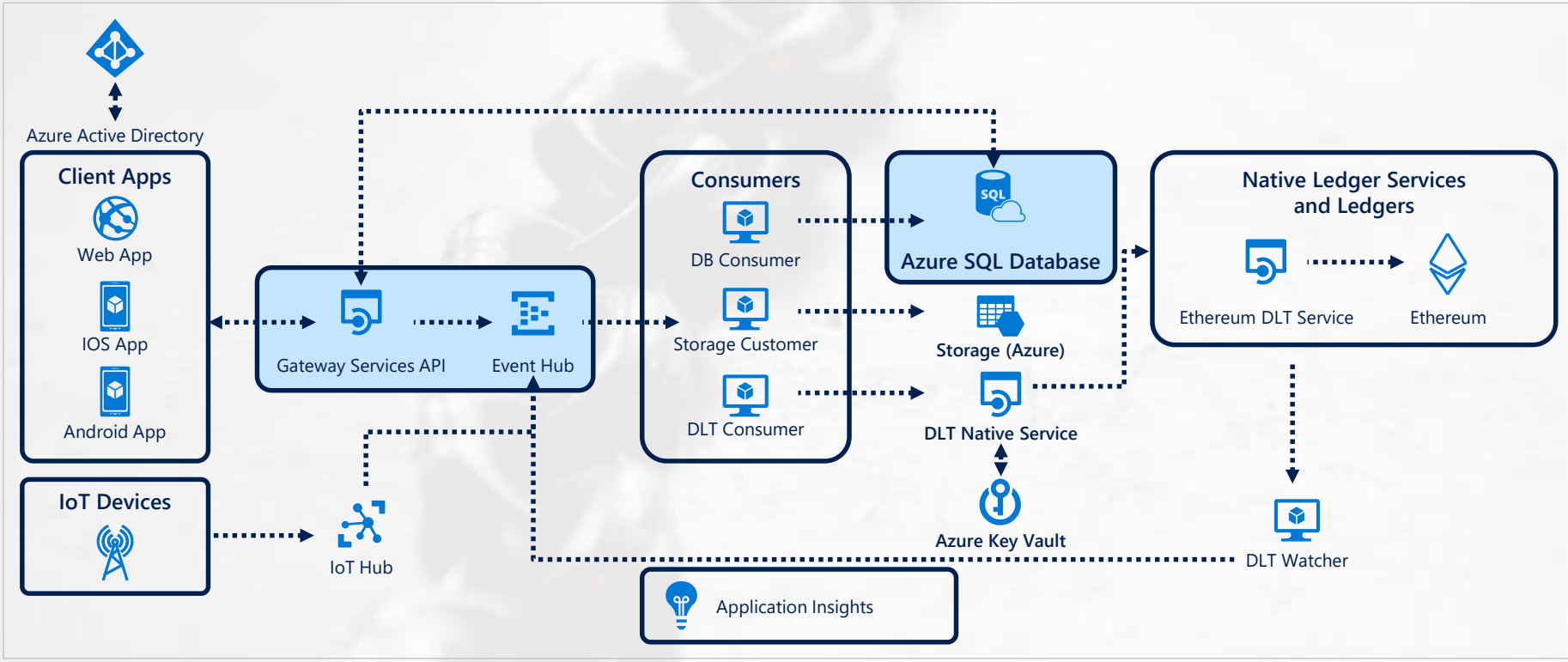
Blockchain PoCs:
3 Month -> 1 Week

Deploy

Permissioned Blockchain and supporting infrastructure


Microsoft Azure
Create Azure Blockchain Workbe...
Basics
1
2
3
4
5
6


Azure Active Directory
Client Apps
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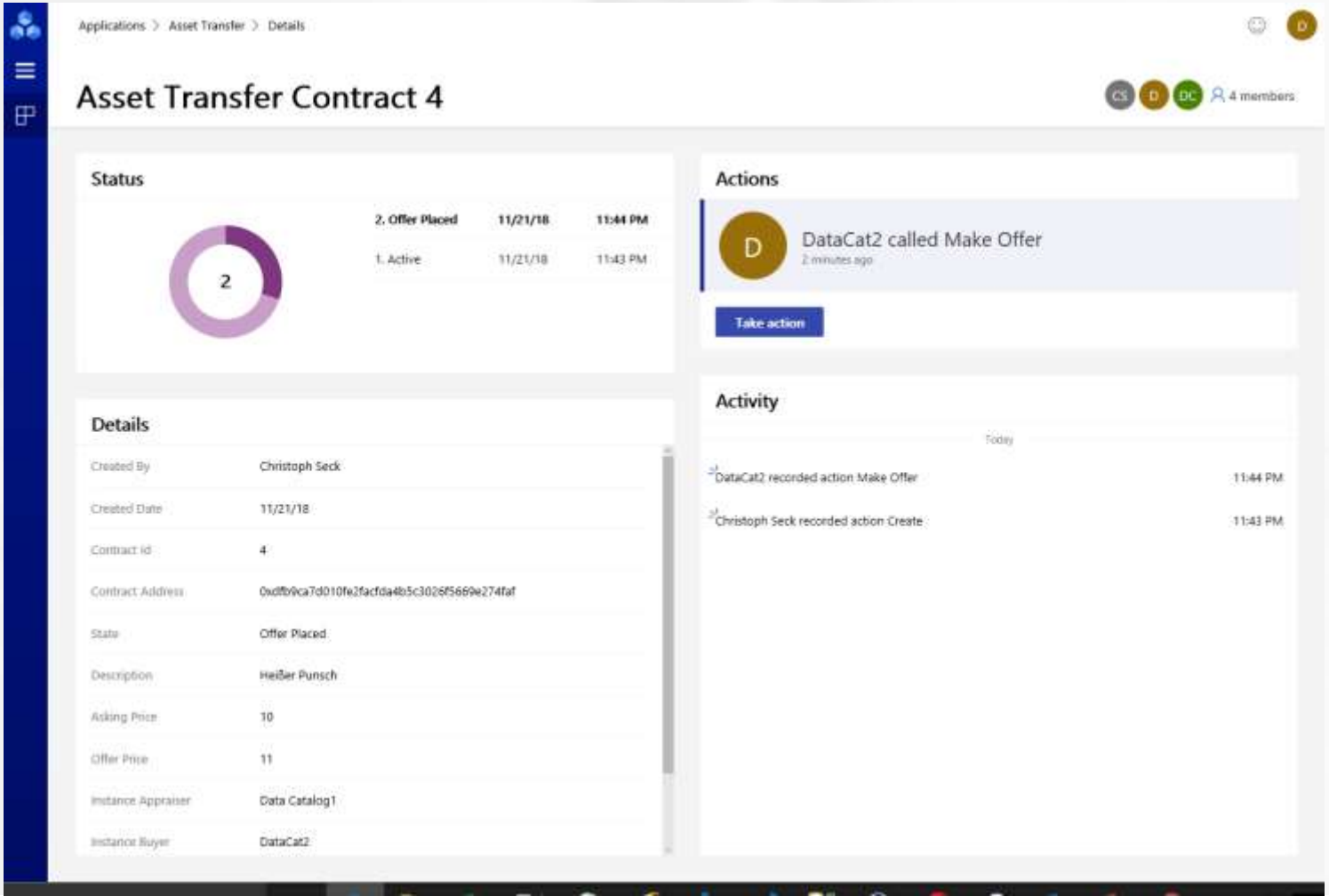
IOS App
Android App
IoT Devices
Gateway Services API
Event Hub
IoT Hub
Consumers
DB Consumer
Storage Customer
DLT Consumer
Azure SQL Database
Storage (Azure)
DLT Native Service
Azure Key Vault
Native Ledger Services and Ledgers
Ethereum DLT Service
Ethereum
DLT Watcher
Application Insights

Deploy
Permissioned Blockchain and supporting infrastructure

UI
Adminstration and simple Application


Applications > Asset Transfer > Details
Asset Transfer Contract 4
4 members
Status
2
2. Offer Placed 11/21/18 11:44 PM
1. Active 11/21/18 11:43 PM
Actions
D
DataCat2 called Make Offer
2 minutes ago
Take action
Details
Created By Christoph Seck
Created Date 11/21/18
Contract Id 4
Contract Address 0xdfb9ca7d010fe2facfda4b5c3026f5669e274faf
State Offer Placed
Description Heißer Punsch
Asking Price 10
Offer Price 11
Instance Appraiser Data Catalog1
Instance Buyer DataCat2
Activity
Today
DataCat2 recorded action Make Offer 11:44 PM
Christoph Seck recorded action Create 11:43 PM

Deploy
Permissioned Blockchain and supporting infrastructure

UI
Adminstration and simple Application

Deploy
Permissioned Blockchain and supporting infrastructure

UI
Adminstration and simple Application

REST API
Create and interface contracts etc.

42?

DO YOU SPEAK BLOCKCHAIN?

- Anyone owns Bitcoin?
- A Smart Contract is …
- Knows Hyperledger Fabric?
- Heard about Ethereum?
- A Permissioned Blockchain is …

Agenda

- Why Blockchain?
- From Coins to Smart Contract
- The Workbench
- Beyond Workbench and PoCs
- Current Use Cases

Agenda

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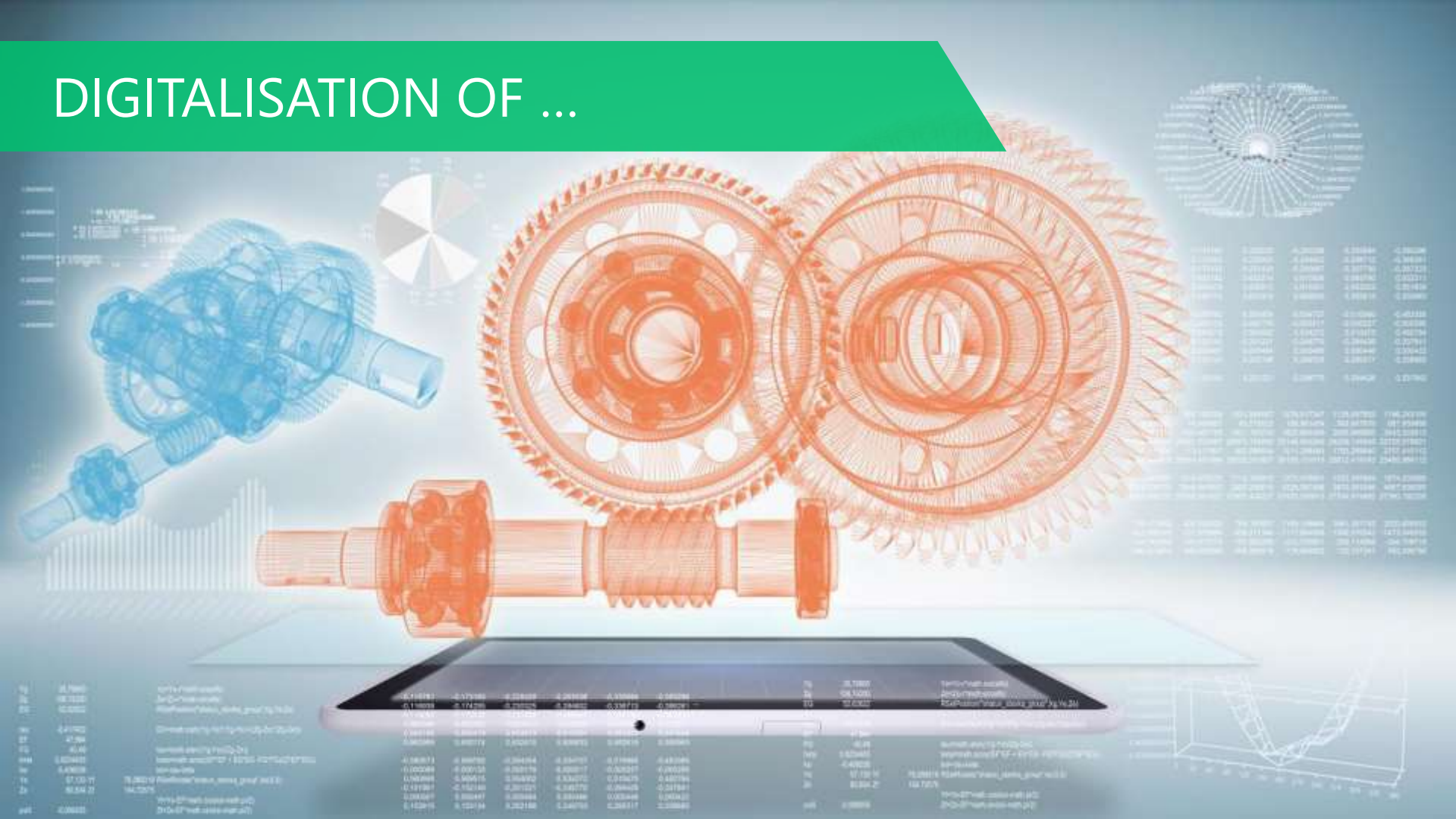
DIGITALISATION OF …



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DIGITALISATION OF …

Key data, representing real objects in softare driven processes

Dependence on Reality

- Data quality
- Process gaps
- Complexity
- Bottlenecks

Dependence on Reality

- Data quality
- Process gaps
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Dependence on Reality

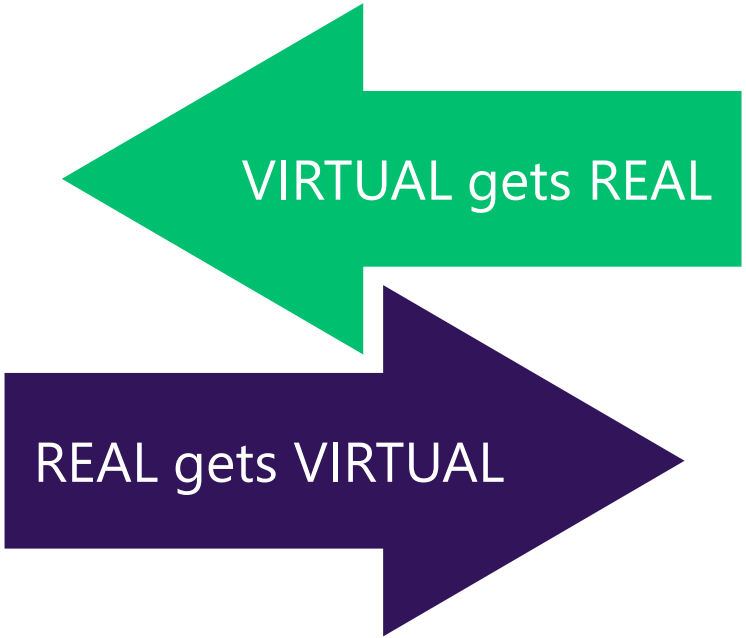
- Data quality
- Process gaps
- Complexity
- Bottlenecks

The things themselves are digital

“CONSENSUS”

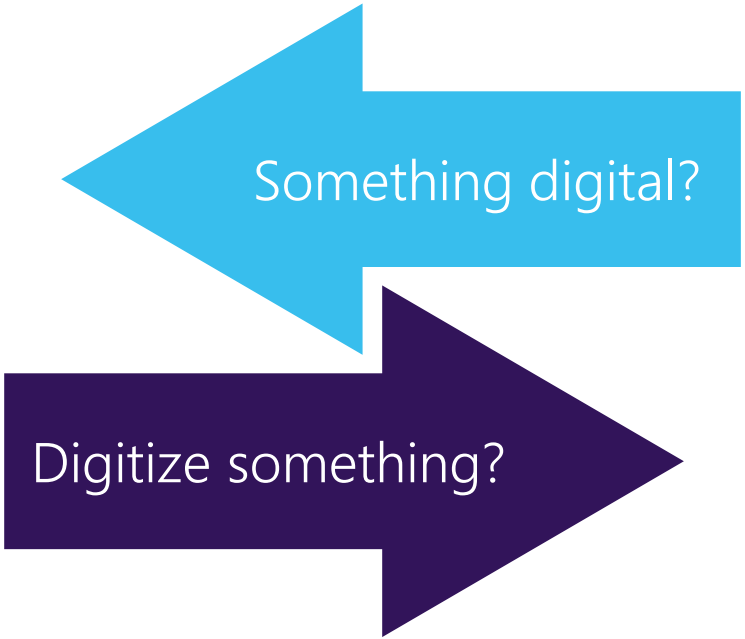
Intersubjectivity as the hallmark of reality

Software eats the world



Blockchain Business Case?

Blockchain Business Case?



A decentral
Database for
transactions

Agenda

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BLOCKCHAIN 2.0 – „SMART CONTRACTS“

State Machines - Contracts in the blockchain

Smart Contracts in Ethereum

Contract

Smart Contract

Logic

Properties

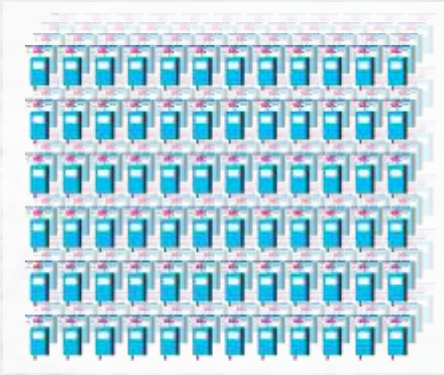
Static

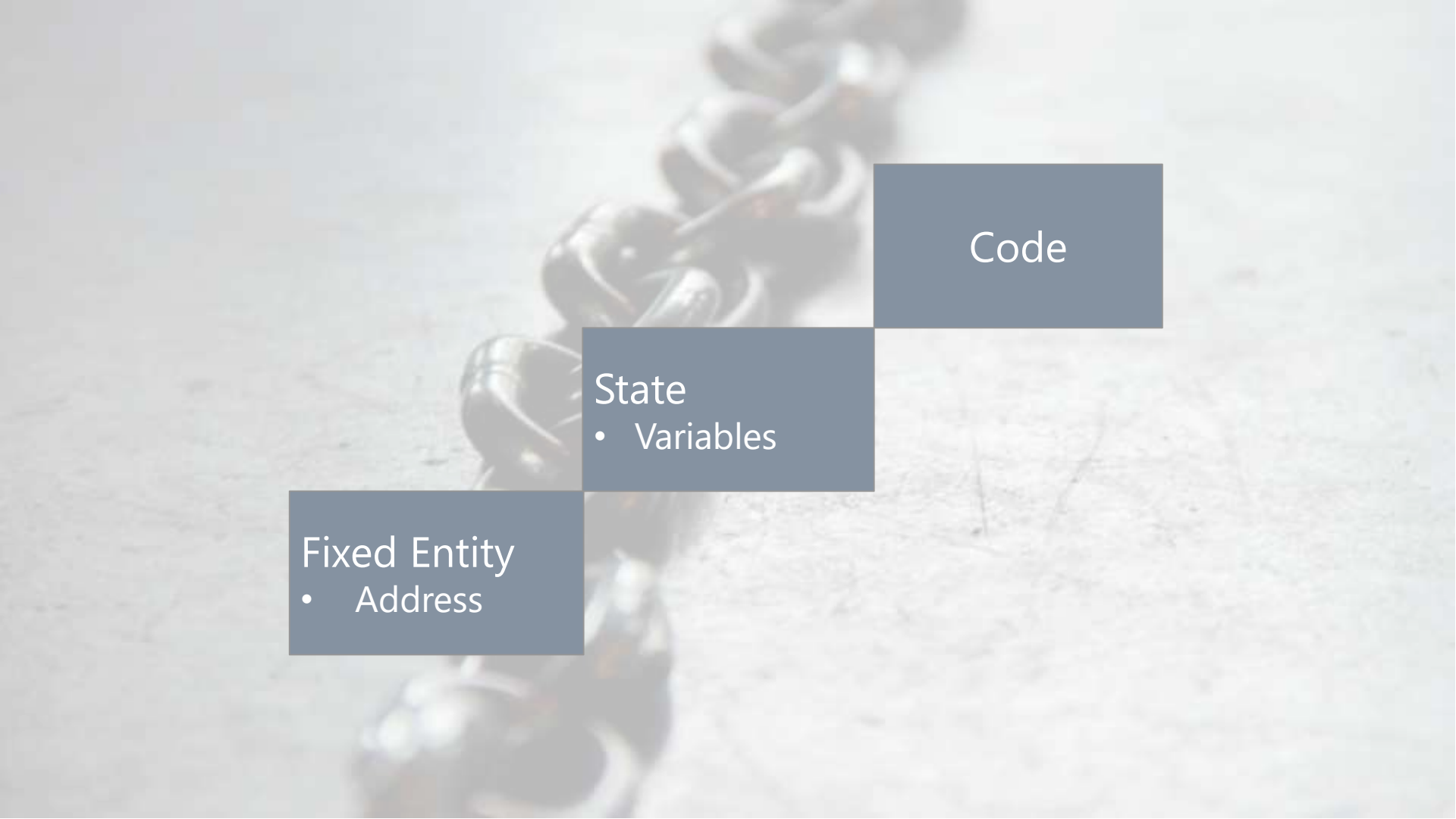
Variable

Ledger

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

Deployed to Nodes



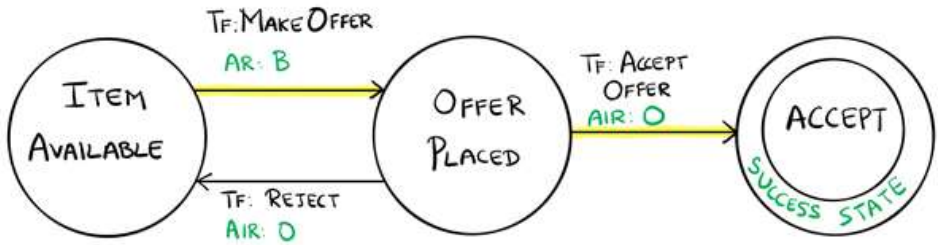

Code
State
• Variables
Fixed Entity
• Address

Code
State
• Variables
Fixed Entity
• Address
Roles

Simple Marketplace State Transitions

Application Roles:

- Owner (O)
- Buyer (B)



Legend

- Tf: Transition Function
- AR: Allowed Role
- AIR: Allowed Instance Role
- A Happy Path

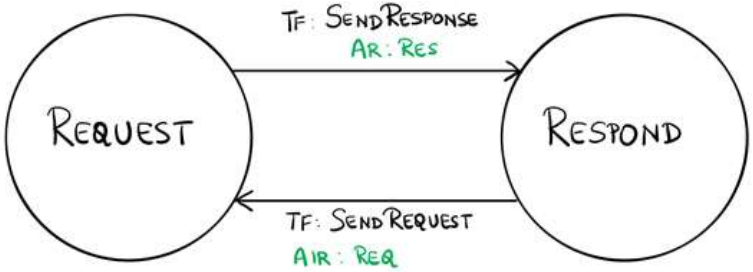
Hello Blockchain State Transitions

Application Roles

- Requestor (req)
- Responder (res)

Legend

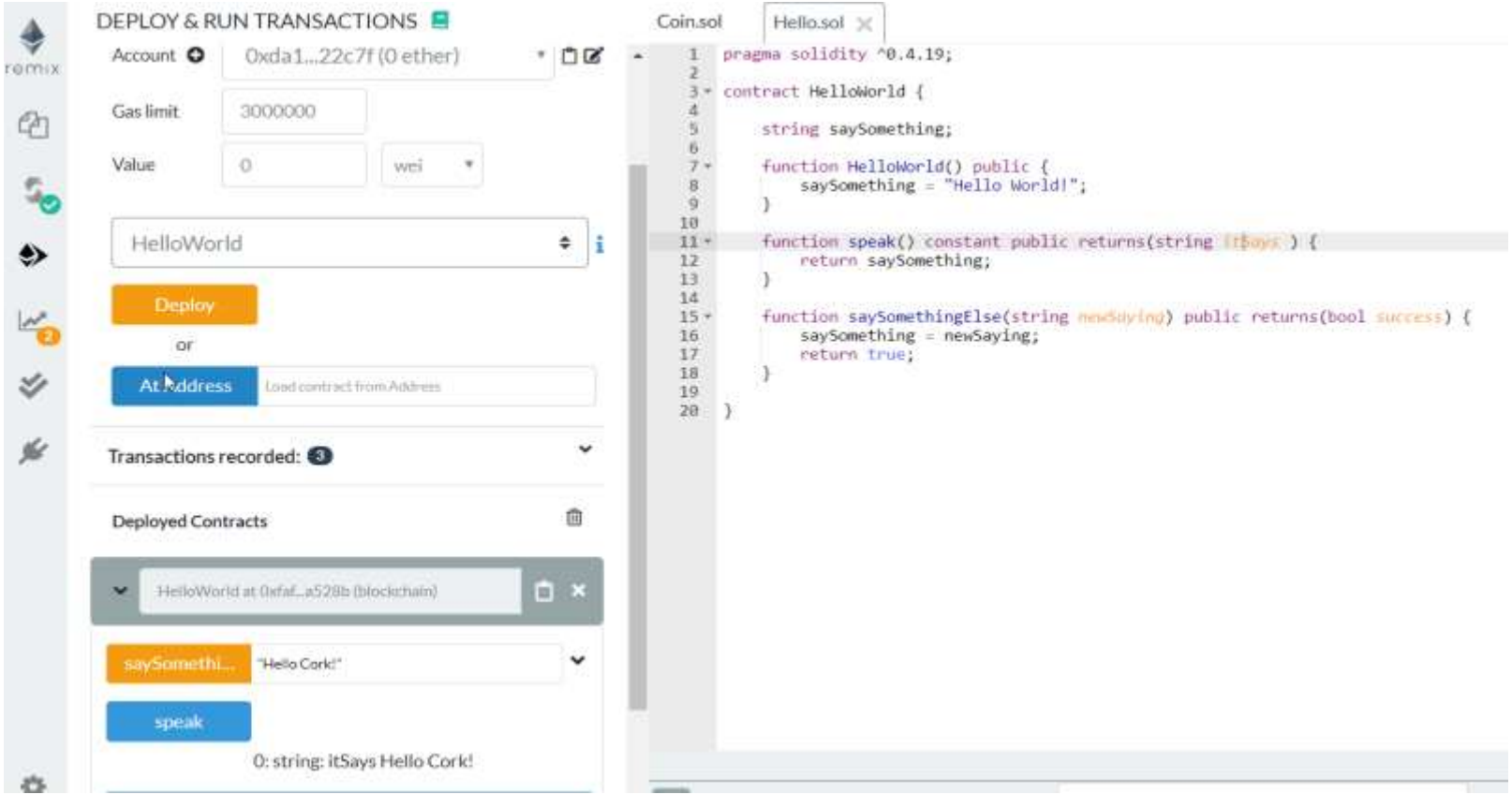
- Tf: Transition Function
- Ar: Allowed Role
- Air: Allowed Instance Role



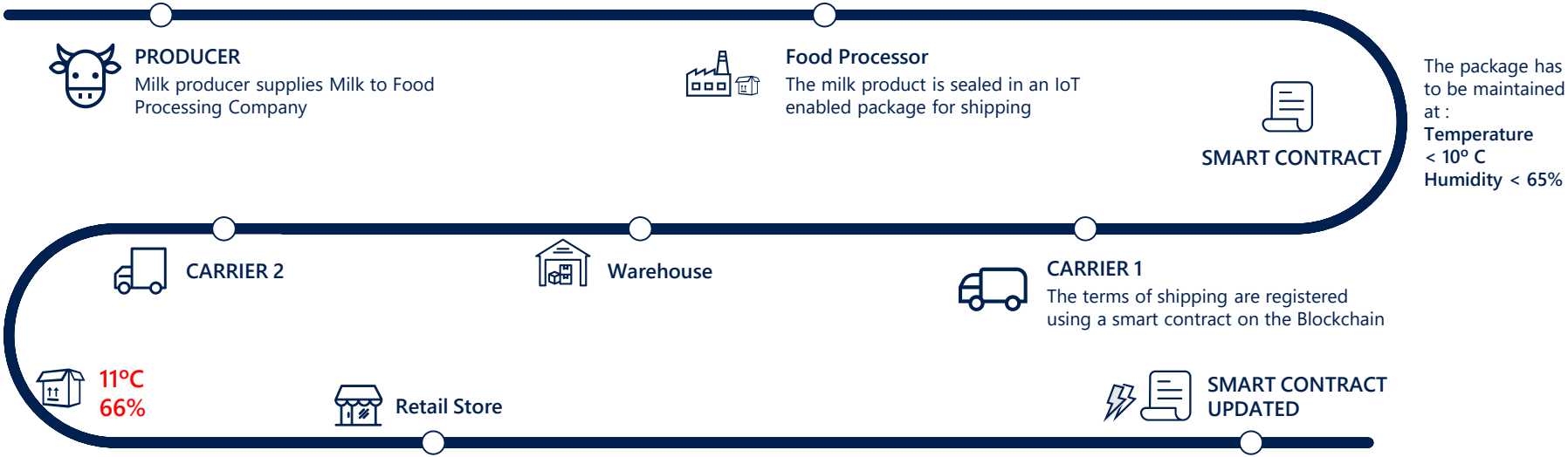
https://remix.ethereum.org

Remix IDE

https://remix.ethereum.org/



Blockchain in Action: Refrigerated Transport



The conditions of the contract have been violated.
Carrier 3 is liable for penalty as the temperature of the package when it reached the retail store was above the prescribed limit

IoT Enabled

SHARED LEDGER

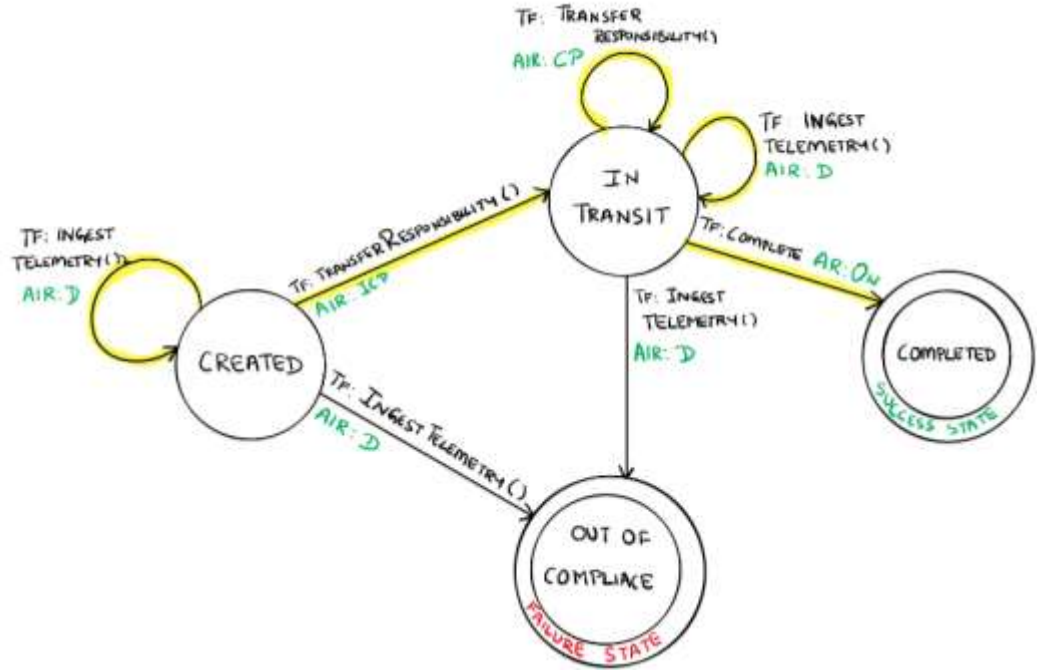
Origin	Carrier 1	Warehouse	Carrier 2
8°C	9°C	9°C	11°C
60%	64%	64%	66%

At various points in the journey, the IoT device from the package sends the Temperature & Humidity data which are recorded on the blockchain

Telemetry Compliance State Transitions

Application Roles:
- Initiating Counterparty (ICP)
- Counterparty (CP)
- Device (D)
- Owner (OW)
- Observer (OB)

Legend:
- A happy path
- TF: Transition Function
- AIR: Allowed Instance Role
- AR: Allowed Role
- States change when AIR or AR call/perform action in TF.



TECHNICAL CHALLENGES

We've heard developers say...

We have a workflow we want to model on blockchain, but it would take us ***months of development time and hundreds of thousands of dollars*** *to create a PoC.*

It's ***difficult to connect to our existing IT infrastructure,*** *and our blockchain application sits on an island.*

Our company is ***unsure of which vendors will be around for the long haul,*** *what products they have, and how they will support our strategic direction.*

I'm spending all of my time ***scaffolding together an infrastructure,*** *not writing smart contracts.*

Blockchain isn't an option for us, because we would have to put ***sensitive data on an unsecure platform.***

And makes developing an end-to-end blockchain app a huge undertaking

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Deploy
Permissioned Blockchain and supporting infrastructure

UI
Adminstration and simple Application

REST API
Create and interface contracts etc.

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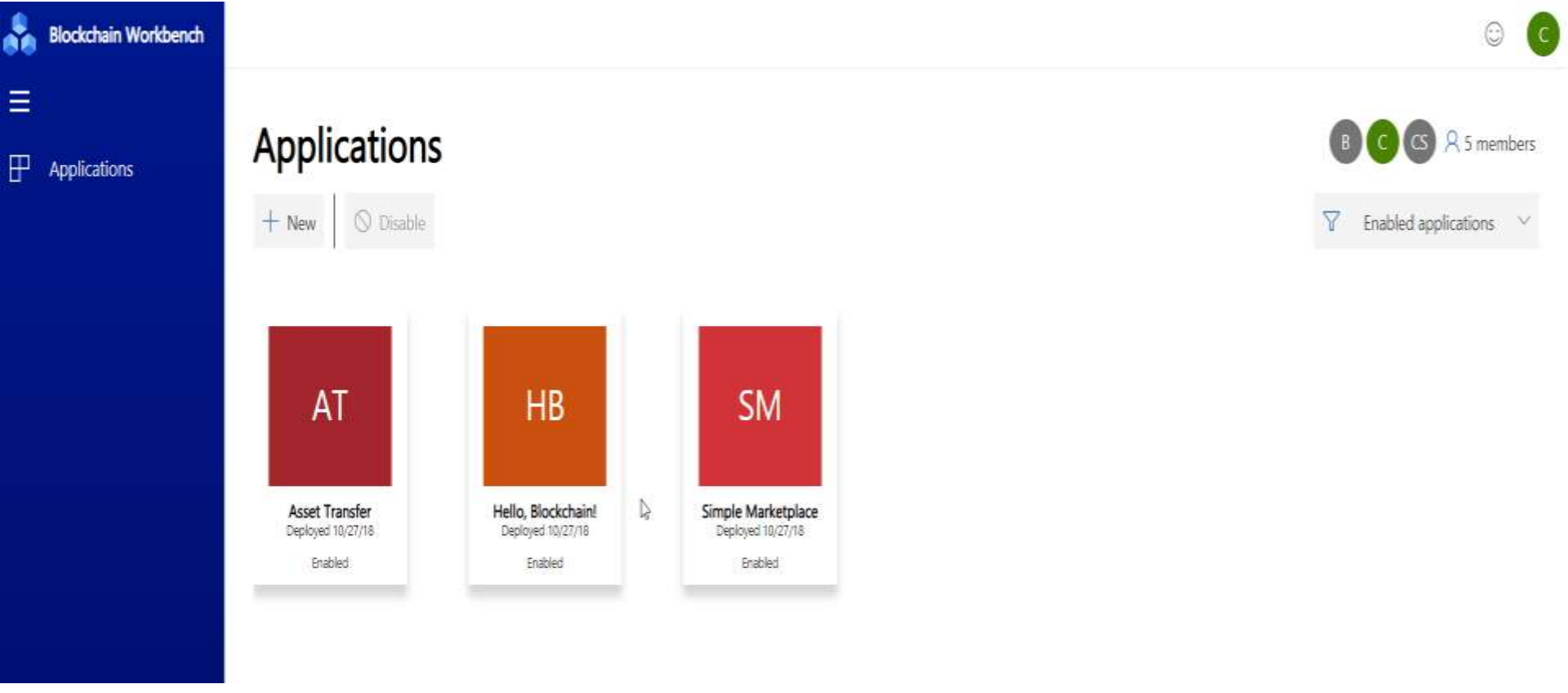
Blockchain Workbench
Applications
C
Applications
B
C
CS
5 members
New
Disable
Enabled applications
AT
Asset Transfer
Deployed 10/27/18
Enabled
HB
Hello, Blockchain!
Deployed 10/27/18
Enabled
SM
Simple Marketplace
Deployed 10/27/18
Enabled

Hello Blockchain State Transitions

Application Roles

- Requestor (req)
- Responder (res)

Legend

- Tf: Transition Function
- Ar: Allowed Role
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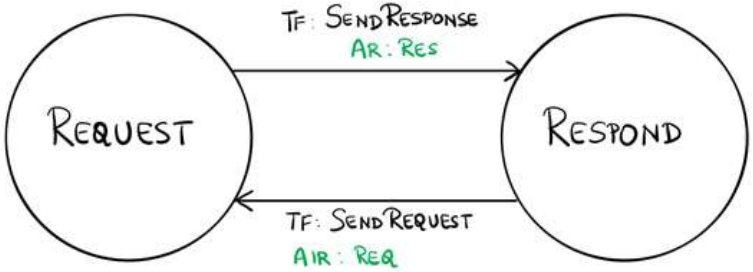

Blockchain Workbench
Applications
Applications
New
Enabled applications
AT
HB
SM
Asset Transfer
Hello, Blockchain!
Simple Marketplace

Demo

Generating Contract Templates

```
pragma solidity ^0.4.0;

contract IFairTradeProperty
{
    IFairTradeCertificate public TradeCertificate;
    function Certify();
    function RevokeCertification();
    function IsOwner(address owner) returns(bool);
}

contract IFarm is IFairTradeProperty
{
}

contract IRawCocoaBatch
{
    IFarm public Farm;
    address public OfferOwner;
    function MakeOffer(address offerOwner, uint price);
}

contract IFairTradeCocoaMarketplace
{
    function RequestFarmCertification(IFairTradeProperty farm) returns (IFairTra
    function RequestManufacturerCertification(IFairTradeProperty manufacturer) r
    function SellRawCocoa(IRawCocoaBatch batch);
    function MakeRawCocoaOffer(IRawCocoaBatch batch, uint price);
    function RegisterCertifiedFarm(IFairTradeCertificate certificate);
    function RegisterCertifiedManufacturer(IFairTradeCertificate certificate);
    function AcceptRawCocoaOffer(IRawCocoaBatch batch);
}

contract IFairTradeCertificate
{
    IFairTradeCocoaMarketplace public MarketPlace;
}

contract IManufacturer is IFairTradeProperty
```

Smart contract (business logic)

```
{
  "Roles": {
    "Farmer": {
      "Farm": {
        "Role": "Initiator",
        "Actions": [
          null,
          "RequestCertification",
          "SellRawCocoa"
        ]
      },
      "RawCocoaBatch": {
        "Role": "Participant",
        "Actions": [
        "AcceptOffer",
        "RejectOffer"
        ]
      }
    },
    "Buyer": {
      "Manufacturer": {
        "Role": "Participant",
        "Actions":[
        "PurchaseRawCocoa"
        ]
      }
    },
    "Manufacturer": {
      "Marketplace": {
        "Role": "Initiator",
        "Actions": [
        null
        ]
      },
      "Manufacturer": {
```

Metadata

Blockchain application

Deploy
Permissioned Blockchain and supporting infrastructure

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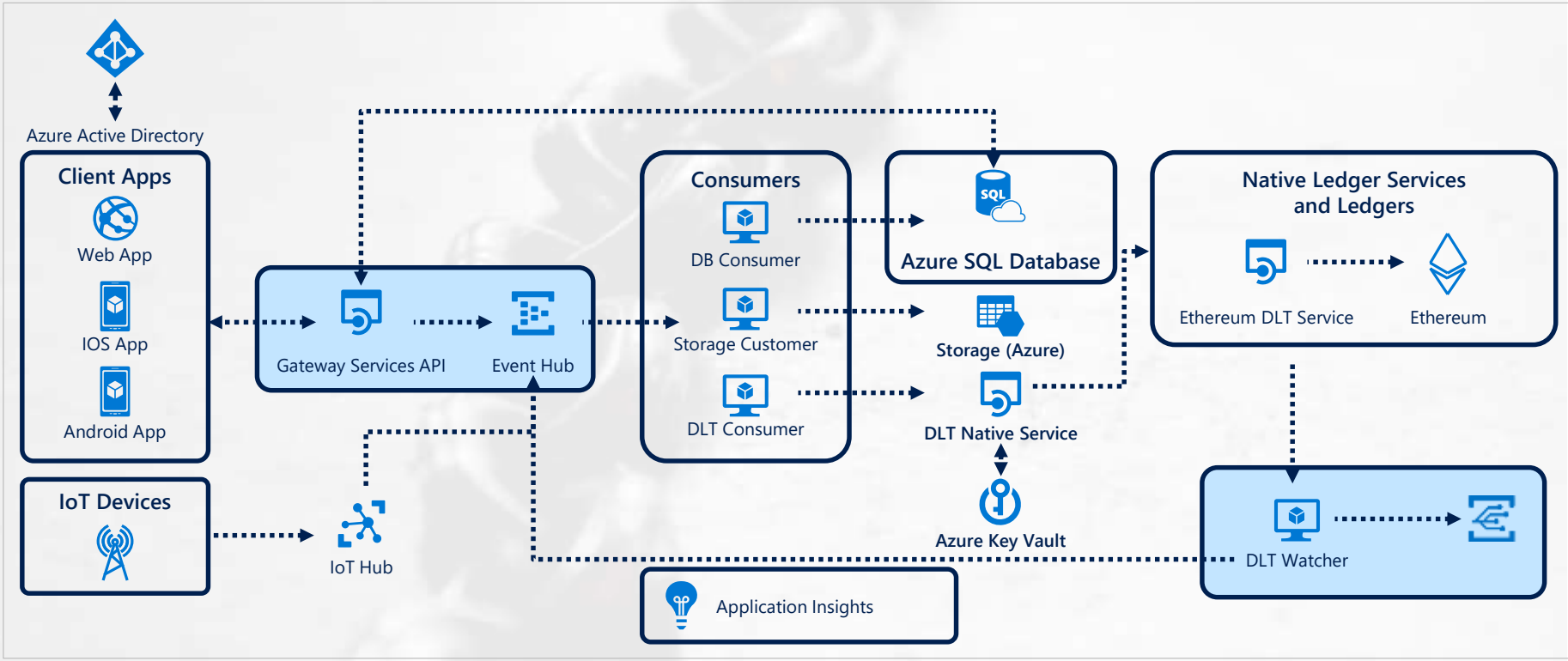
Create and interface contracts etc.


Azure Active Directory
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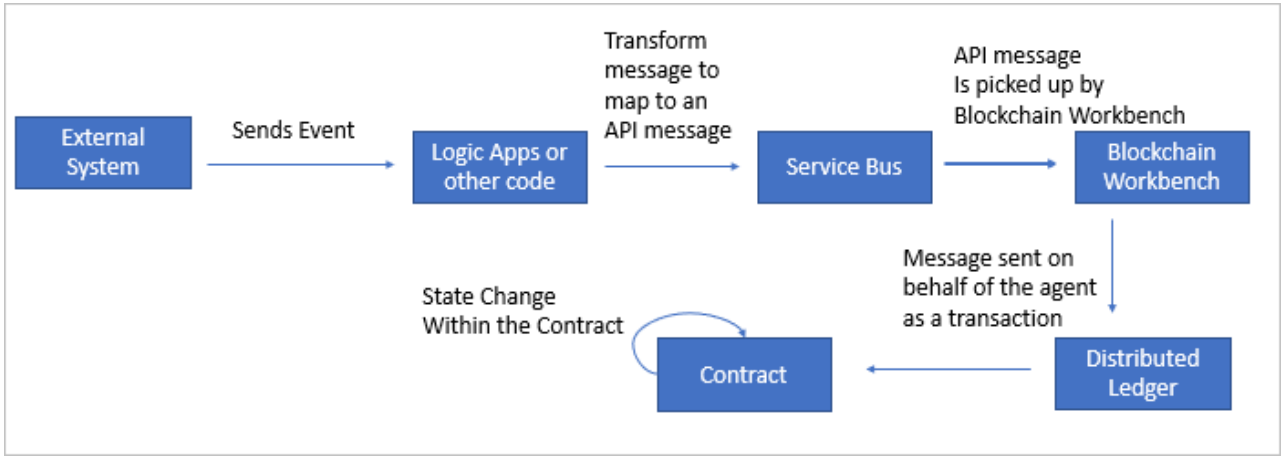
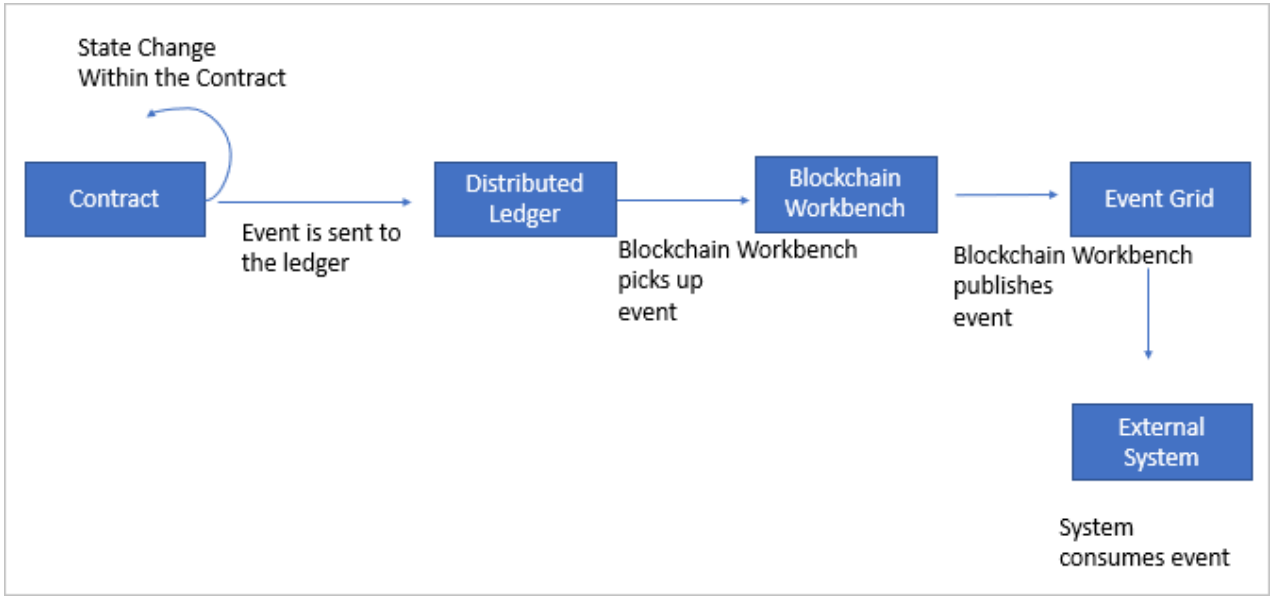
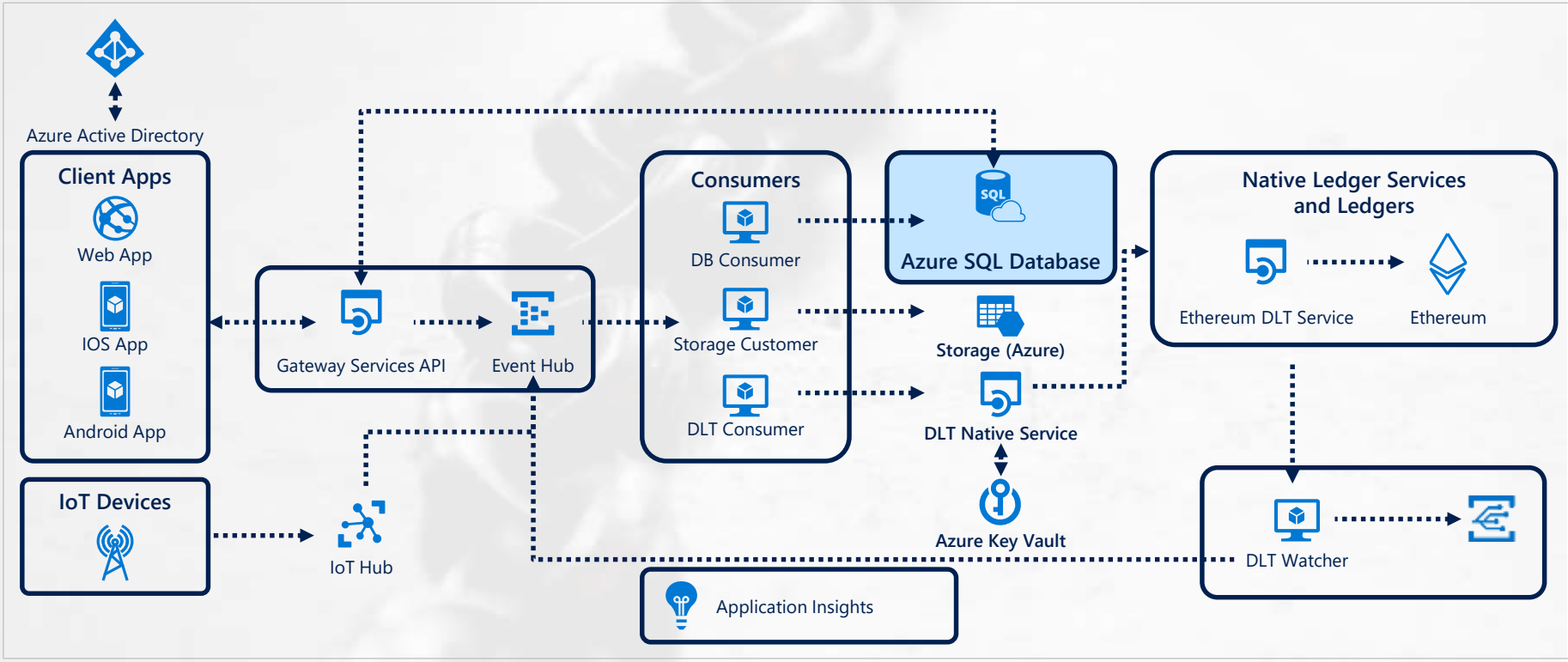
Web App
IOS App
Android App
IoT Devices
Gateway Services API
Event Hub
IoT Hub
Consumers
DB Consumer
Storage Customer
DLT Consumer
Azure SQL Database
Storage (Azure)
DLT Native Service
Azure Key Vault
Native Ledger Services and Ledgers
Ethereum DLT Service
Ethereum
DLT Watcher
Application Insights

Handling Messages from Outside



Notifying external Systems

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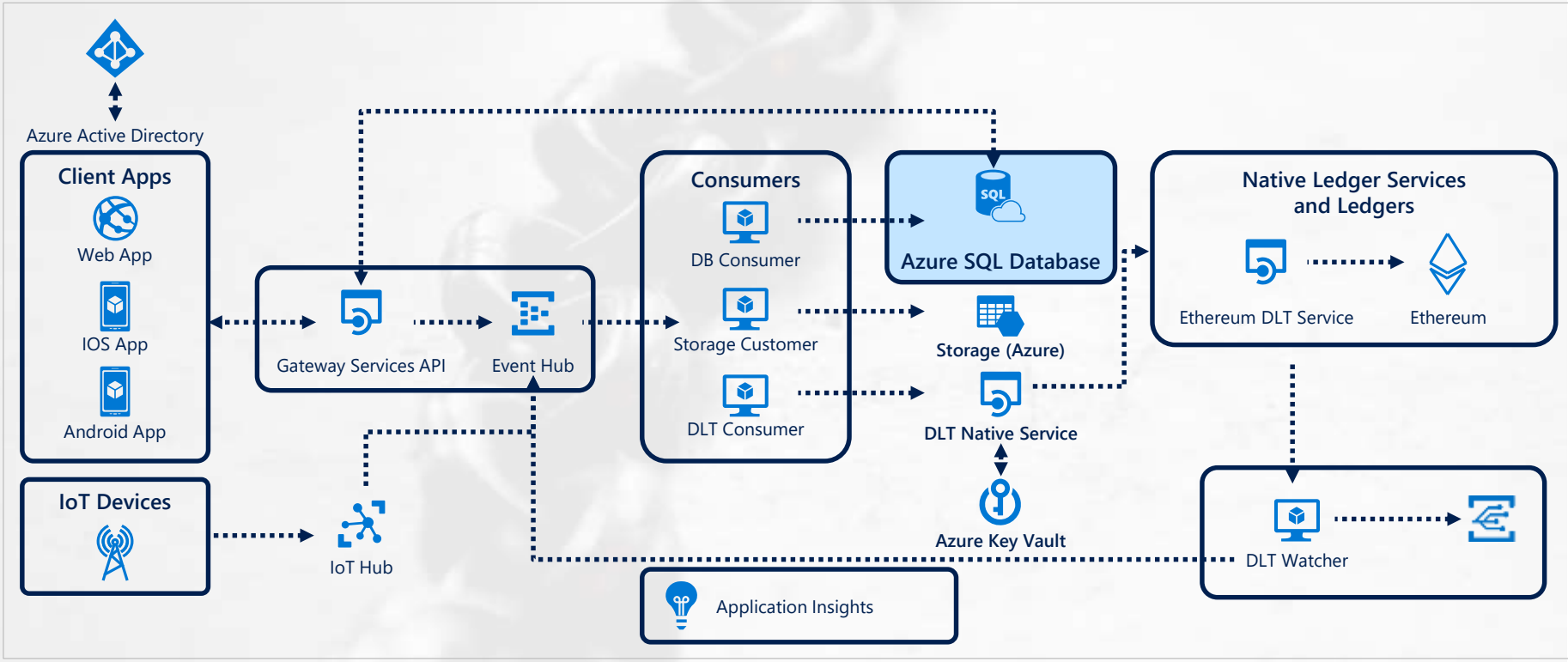
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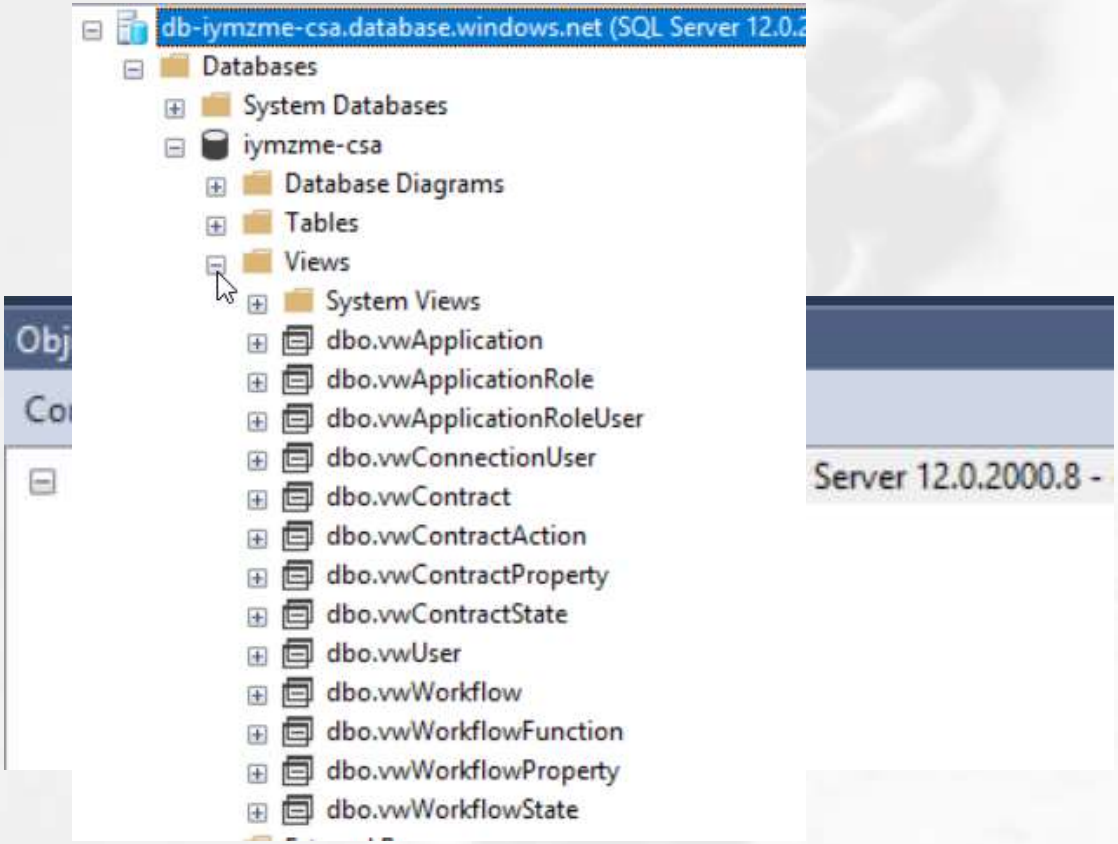
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Databases
System Databases
iymzme-csa
Database Diagrams
Tables
Views
System Views
dbo.vwApplication
dbo.vwApplicationRole
dbo.vwApplicationRoleUser
dbo.vwConnectionUser
dbo.vwContract
dbo.vwContractAction
dbo.vwContractProperty
dbo.vwContractState
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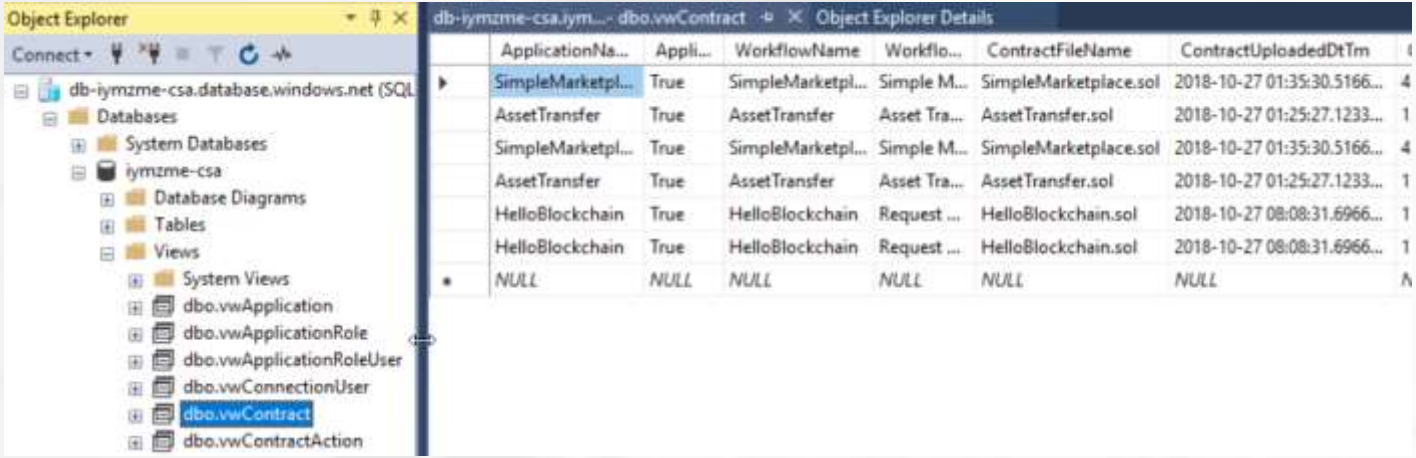
dbo.vwWorkflowProperty
dbo.vwWorkflowState
Server 12.0.2000.8 -


Object Explorer
Connect
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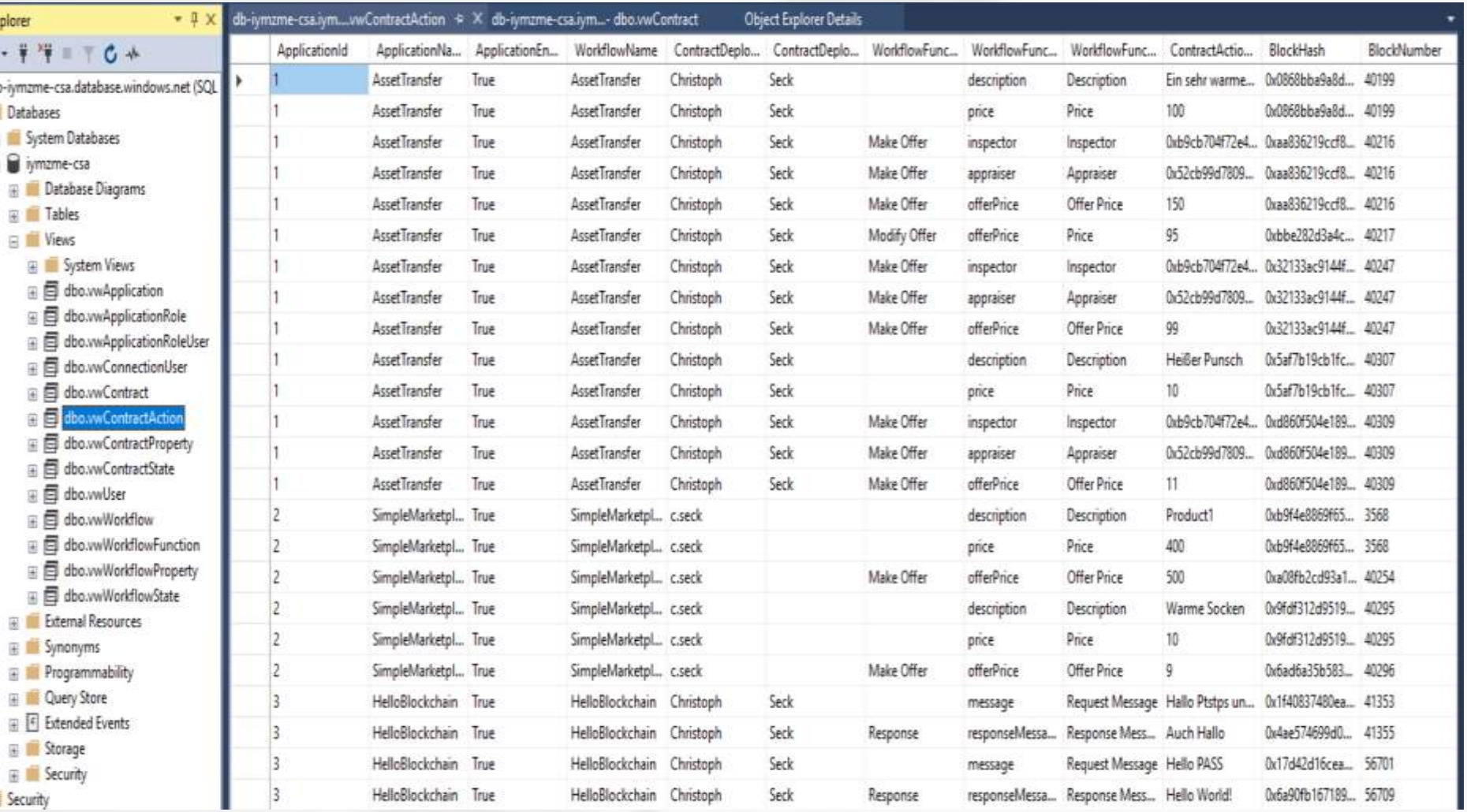
Databases
System Databases
iymzme-csa
Database Diagrams
Tables
Views
System Views
dbo.vwApplication
dbo.vwApplicationRole
dbo.vwApplicationRoleUser
dbo.vwConnectionUser
dbo.vwContract
dbo.vwContractAction
db-iymzme-csa.iym...- dbo.vwContract
Object Explorer Details
ApplicationNa... Appli... WorkflowName Workflo... ContractFileName ContractUploadedDtTm
SimpleMarketpl... True SimpleMarketpl... Simple M... SimpleMarketplace.sol 2018-10-27 01:35:30.5166... 4
AssetTransfer True AssetTransfer Asset Tra... AssetTransfer.sol 2018-10-27 01:25:27.1233... 1
SimpleMarketpl... True SimpleMarketpl... Simple M... SimpleMarketplace.sol 2018-10-27 01:35:30.5166... 4
AssetTransfer True AssetTransfer Asset Tra... AssetTransfer.sol 2018-10-27 01:25:27.1233... 1
HelloBlockchain True HelloBlockchain Request ... HelloBlockchain.sol 2018-10-27 08:08:31.6966... 1
HelloBlockchain True HelloBlockchain Request ... HelloBlockchain.sol 2018-10-27 08:08:31.6966... 1
NULL NULL NULL NULL NULL NULL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dbo.vwConnectionUser
dbo.vwContract
dbo.vwContractAction
dbo.vwContractProperty
dbo.vwContractState
dbo.vwUser
dbo.vwWorkflow
dbo.vwWorkflowFunction
dbo.vwWorkflowProperty
dbo.vwWorkflowState
External Resources
Synonyms
Programmability
Query Store
Extended Events
Storage
Security
Security
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db-iymzme-csa.iym...- dbo.vwContract
Object Explorer Details
ApplicationId
ApplicationNa...
ApplicationEn...
WorkflowName
ContractDeplo...
ContractDeplo...
WorkflowFunc...
WorkflowFunc...
WorkflowFunc...
ContractActio...
BlockHash
BlockNumber
1 AssetTransfer True AssetTransfer Christoph Seck description Description Ein sehr warme... 0x0868bba9a8d... 40199
1 AssetTransfer True AssetTransfer Christoph Seck price Price 100 0x0868bba9a8d... 40199
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2 SimpleMarketpl... True SimpleMarketpl... c.seck description Description Product1 0xb9f4e8869f65... 3568
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3 HelloBlockchain True HelloBlockchain Christoph Seck message Request Message Hallo Ptstps un... 0x1f40837480ea... 41353
3 HelloBlockchain True HelloBlockchain Christoph Seck Response responseMessa... Response Mess... Auch Hallo 0x4ae574699d0... 41355
3 HelloBlockchain True HelloBlockchain Christoph Seck message Request Message Hello PASS 0x17d42d16cea... 56701
3 HelloBlockchain True HelloBlockchain Christoph Seck Response responseMessa... Response Mess... Hello World! 0x6a90fb167189... 56709

Agenda

- Why Blockchain?
- From Coins to Smart Contract
- The Workbench
- **Beyond Workbench and PoCs**
- Current Use Cases

Resource group	: CSKIBlockchain	Member name	: cs4kipbcwblscoxubloc
Status	: Available	Protocol	: Quorum
Location	: West Europe	Pricing Tier	: Basic (1 vCore, 2 nodes)
Subscription	: KI-PER C.SEC Azure	Consortium	: cs4kipbcwblscoxucons
Subscription ID	: 91f71c6d-0d34-4856-8f68-ede4d413f41d	RootContract address	: 0xb255f55e8d600f09ebc1035dd2118acec1018912
		Member account	: 0x365a23d97c1fa141c16b23b1a3b936b9c47a77a7

Consortium
Invite or remove members from the consortium.
Start >

Let your voice be heard
Give feedback on Azure Blockchain Service.
Go

Blockchain Development Kit
Sample code and accelerators to get you started.
Go

Show data for last: 1 hour | 6 hours | 12 hours | 1 day | 7 days | 30 days

Blocks

validator-node-0 cs4kipbcwblscoxubloc
720

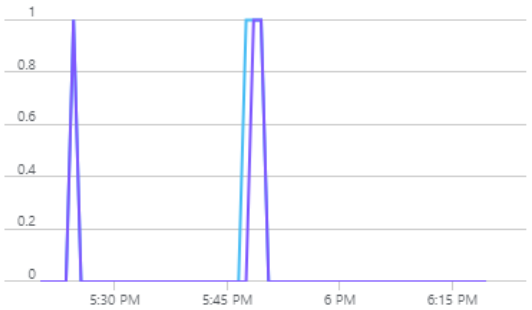
transaction-node cs4kipbcwblscoxubloc
720

Transactions

transaction-node cs4kipbcwblscoxubloc
5

validator-node-0 cs4kipbcwblscoxubloc
5

Pending Transactions



transaction-node cs4kipbcwblscoxubloc
1

validator-node-0 cs4kipbcwblscoxubloc
1

cs4kipbcwblscoxubloc

Azure Blockchain Service - PREVIEW

Search (Ctrl+/)

Overview
Activity log
Access control (IAM)
Tags

Settings
Properties
Locks
Export template
Pricing tier
Transaction nodes

Monitoring
Alerts
Metrics
Diagnostic settings
Logs

Support + troubleshooting
New support request

Delete

Resource group	: CSKIBlockchain	Member name	: cs4kipbcwblscoxubloc
Status	: Available	Protocol	: Quorum
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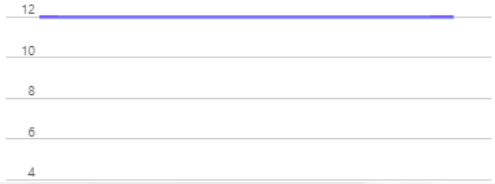
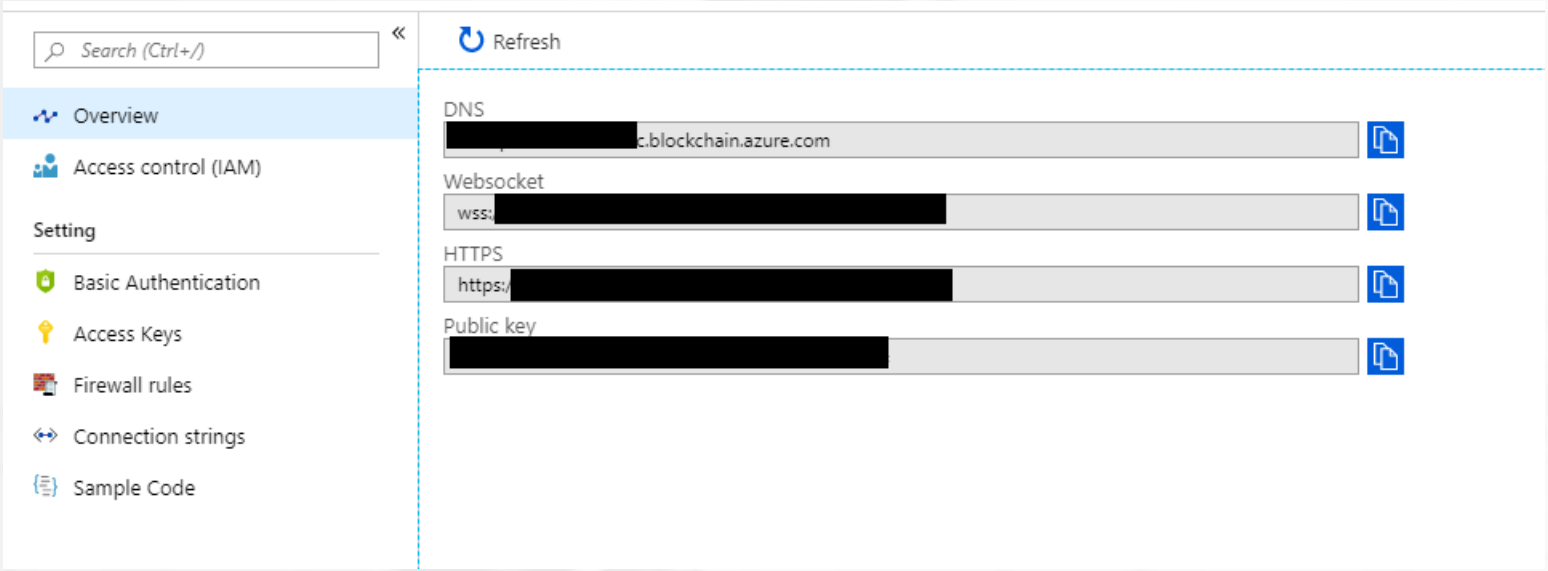
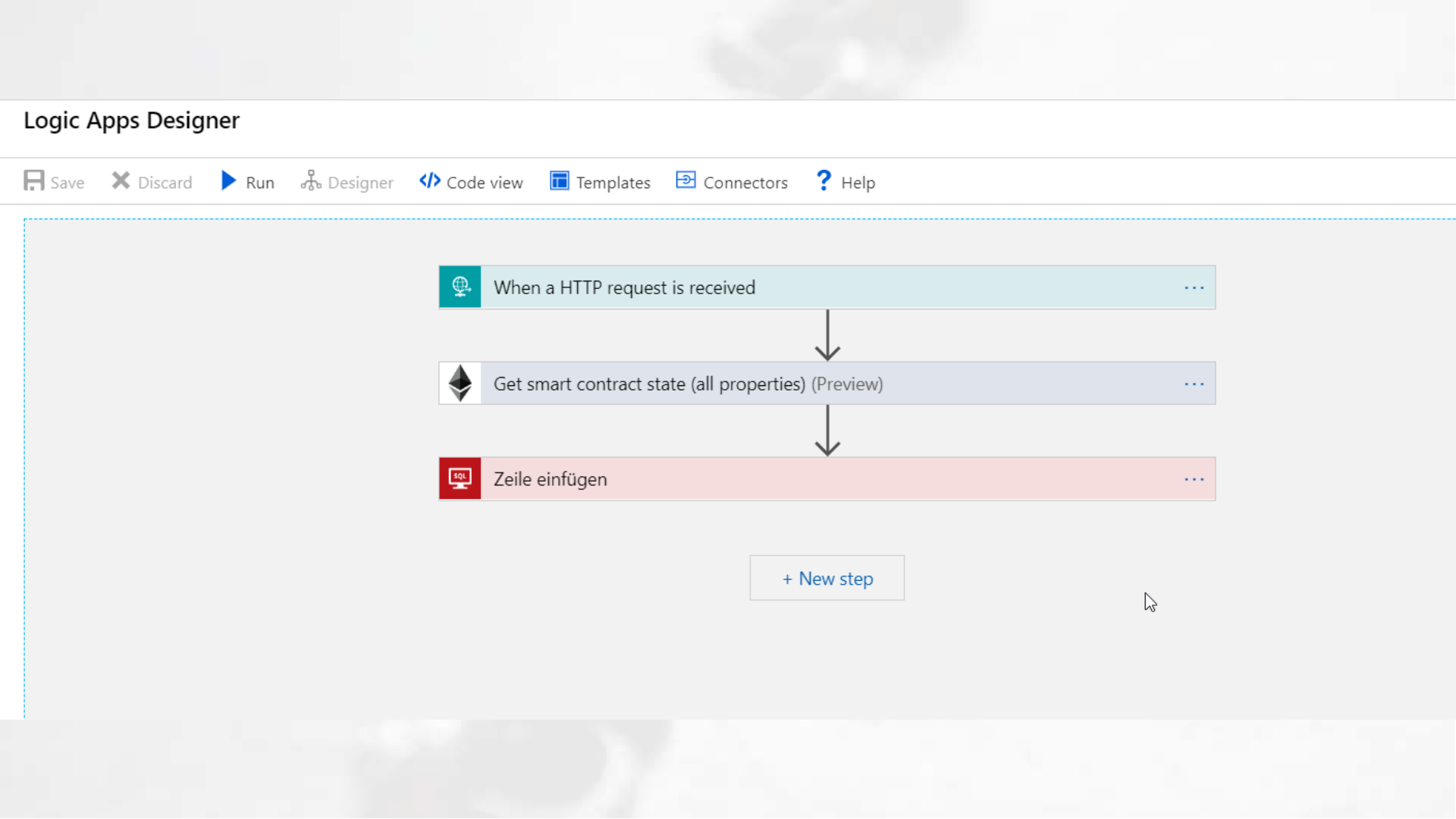
Blocks

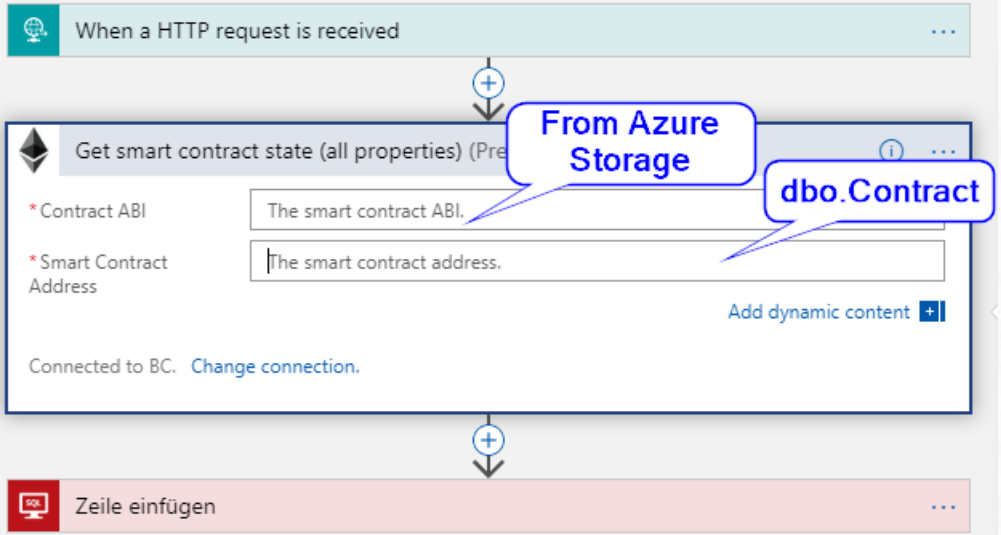


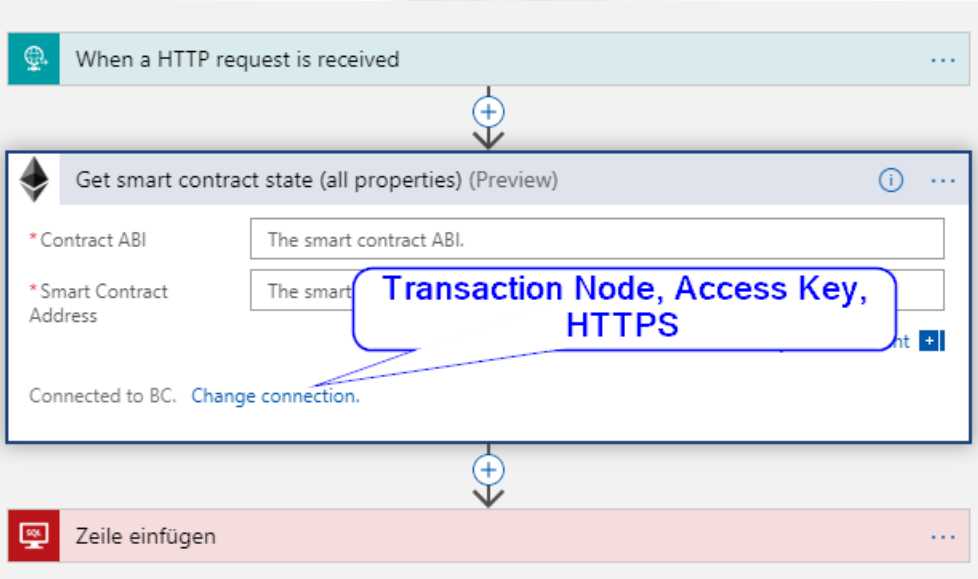
Transactions

Pending Transactions


Search (Ctrl+/)
Overview
Access control (IAM)
Setting
Basic Authentication
Access Keys
Firewall rules
Connection strings
Sample Code
Refresh
DNS
c.blockchain.azure.com
Websocket
wss:
HTTPS
https:
Public key


Logic Apps Designer
Save
Discard
Run
Designer
Code view
Templates
Connectors
Help
When a HTTP request is received
Get smart contract state (all properties) (Preview)
Zeile einfügen
+ New step


When a HTTP request is received
Get smart contract state (all properties) (Pre
From Azure Storage
dbo.Contract
*Contract ABI
The smart contract ABI.
*Smart Contract Address
The smart contract address.
Add dynamic content
Connected to BC. Change connection.
Zeile einfügen


When a HTTP request is received
Get smart contract state (all properties) (Preview)
*Contract ABI
The smart contract ABI.
*Smart Contract Address
The smart
Transaction Node, Access Key, HTTPS
Connected to BC.
Change connection.
Zeile einfügen

Agenda

- Why Blockchain?
- From Coins to Smart Contract
- The Workbench
- Beyond Workbench and PoCs
- **Current Use Cases**

TRUCK PAYMENT

Truck payment in high-riskmarkets

PoC:

Risc Mitigation

Key Risks:

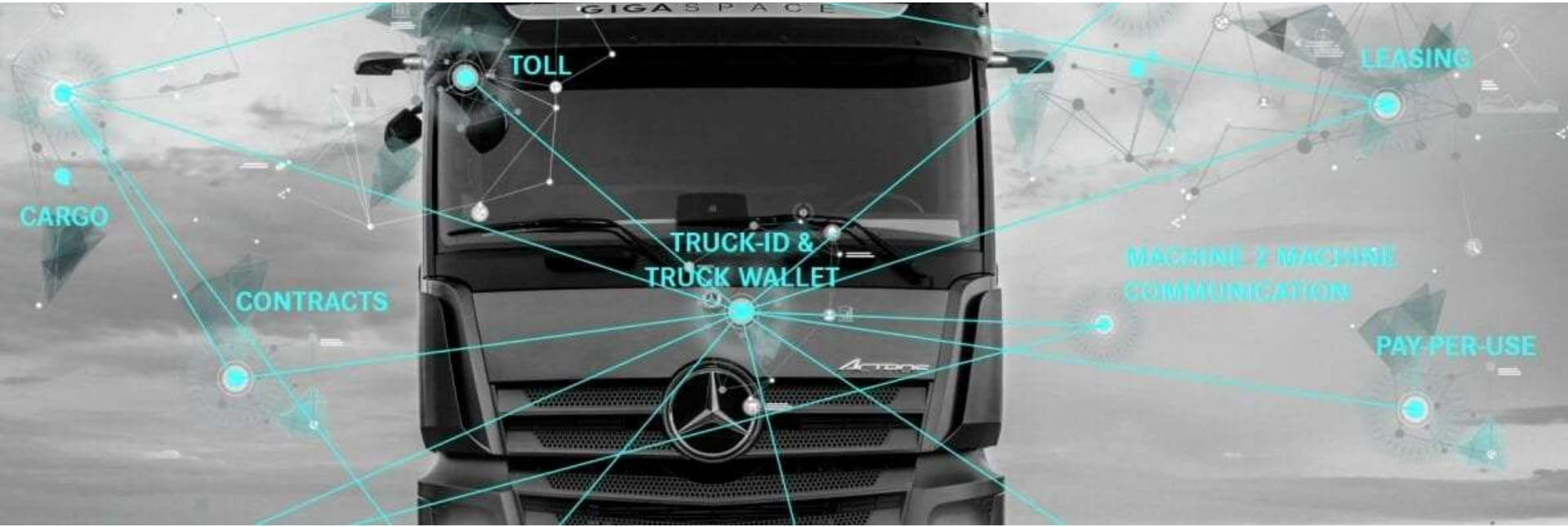
- Banking Infrastructure
- Legal trust

Infrastructure:

Pay with Crypto Currency

Legal trust:

Truck knows if it is payed
and acts according to contract


GIGASPACE
TOLL
LEASING
CARGO
TRUCK-ID &
TRUCK WALLET
CONTRACTS
MACHINE 2 MACHINE
COMMUNICATION
PAY-PER-USE

- Handelblatt Diamond Star
- Digitale Identität, rechtsverbindlich
- Truck-ID: Machine to Machine („M2M“) Interaktion
- Truck Wallet: Selbständiges Bezahlen

https://www.linkedin.com/posts/commerzbank-ag_sebastian-kraft-and-me-had-the-pleasure-to-activity-6575298709414785024-VAKV
https://media.daimler.com/marsMediaSite/de/instance/ko/Pilotprojekt-Daimler-Trucks-bringt-Lkw-das-Bezahlen-bei.xhtml?oid=44097488

Standard Digitalisierungs Gewinne

Aktivposten

- Zahlungsverhalten
- Weitere Fahrzeugdaten
- Weitere Kundendaten
- Wirtschaftliches Umfeld

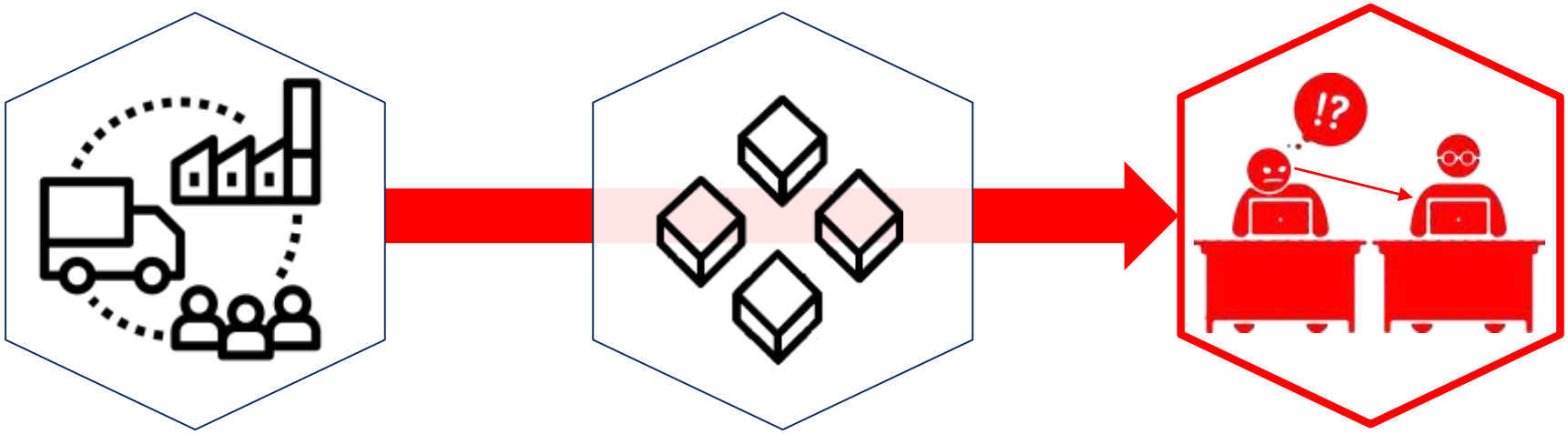
BENEFITS

- Bewertung potentieller Kunden
- Bewertung Zahlungspläne
- Bewertung Incentives
- Drohende Ausfälle
- Refinanzierung
- Umstellung Zahlungsplan

HERAUS-FORDERUNGEN

- Zugang Blockchaindaten
- Kombination mit weiteren Datenquellen
- Analytics
- Privacy

Block- & Supply Chains Avoid Trust Cost

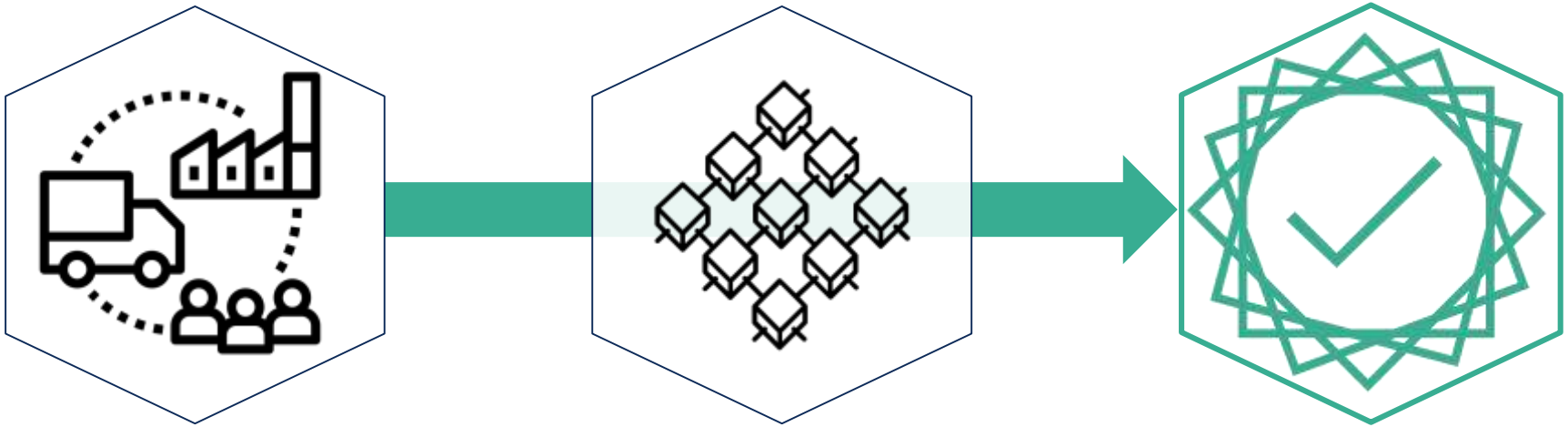


New business partners trying to cooperate on global networks

Disparate infrastructure and regulation

Trust cost in contracts, time, manual work, lawyers, negotiation, escrows…

Block- & Supply Chains



New business partners trying to cooperate on global networks

Shared, permissioned, cryptographic secure, trust-proof

ONE SHARED TRUTH

What´s in our production?

Rubber
Quality Proof

Pallet Pooling

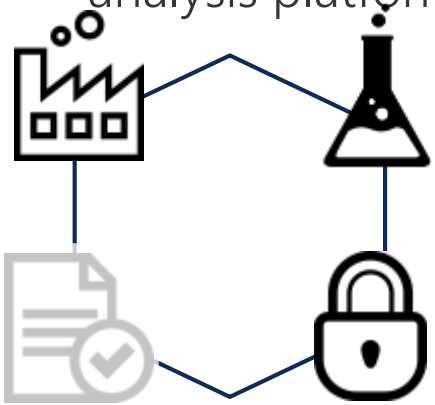
Food Supply
Chain

What´s in our production? ➡ Rubber Quality Proof

Firestone & Ford tire scandal

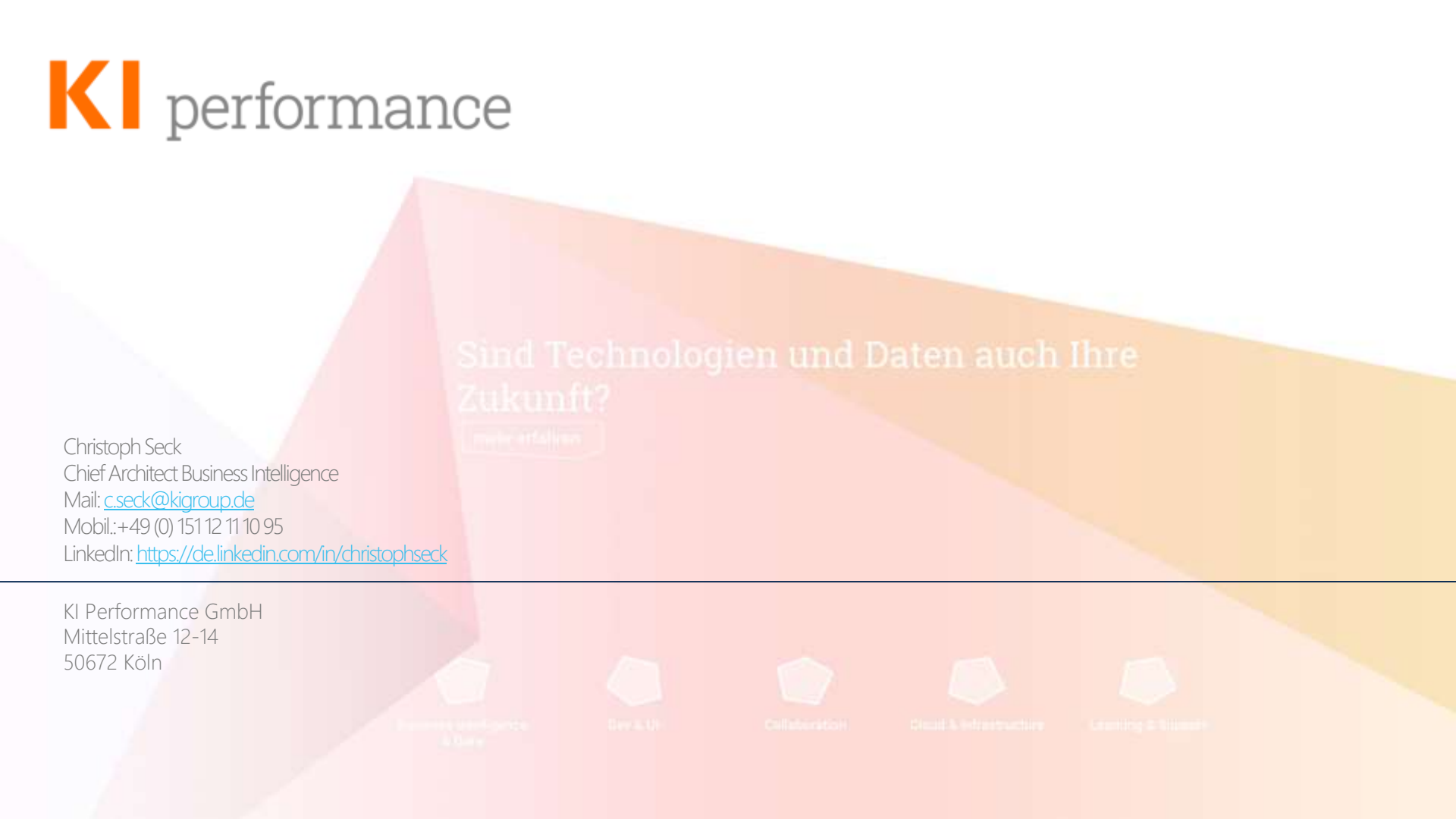
- 800 injuries
- 23 million tires replaced
- End of 100y partnership
- $1,6 bn lawsuit
- -50% market price

Production data exchange & analysis platform



- Chemical formula & CoA reports *"on the blockchain"*
- Document-hashes, raw material barcodes/RFID create production history
- Original documents are revealed and compared to the hash, **only** in accident case

KI performance



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LinkedIn: https://de.linkedin.com/in/christophseck

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