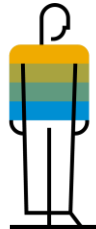




CPL200 – SAP S/4HANA and Blockchain Integration

EXTERNAL

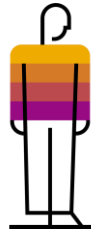
Speakers 2017



Las Vegas

September 25 - 29

Alexander Schäfer



Bangalore

October 25 - 27

N/A



Barcelona

November 14 - 16

Andreas Krompholz

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Agenda

Introduction to Blockchain

- Value Drivers for Blockchain

Architecture for Blockchain Applications

- How to build business application on top of Blockchain?

Example: Guarantee Insurance

- Asset Transfer of Insurance Guarantees

SAP Cloud Platform Blockchain

- Develop with SAP Leonardo Blockchain Service

Introduction to Blockchain



What is the Blockchain Technology?

Blockchain is the underlying technology of Bitcoin (2008)

Composition of Existing Technologies

- Decentralized peer-to-peer technology
- Private/Public key encryption and hashing algorithms
- Consensus algorithm

Database

A Blockchain can be seen as a specific type of a distributed database with transparency, immutability and a decentral operation mode

Bitcoin: A Peer-to-Peer Electronic Cash System

Satoshi Nakamoto
satoshin@gmx.com
www.bitcoin.org

Abstract. A purely peer-to-peer version of electronic cash would allow online payments to be sent directly from one party to another without going through a financial institution. Digital signatures provide part of the solution, but the main benefits are lost if a trusted third party is still required to prevent double-spending. We propose a solution to the double-spending problem using a peer-to-peer network. The network timestamps transactions by hashing them into an ongoing chain of hash-based proof-of-work, forming a record that cannot be changed without redoing the proof-of-work. The longest chain not only serves as proof of the sequence of events witnessed, but proof that it came from the largest pool of CPU power. As long as a majority of CPU power is controlled by nodes that are not cooperating to attack the network, they'll generate the longest chain and outpace attackers. The network itself requires minimal structure. Messages are broadcast on a best effort basis, and nodes can leave and rejoin the network at will, accepting the longest proof-of-work chain as proof of what happened while they were gone.

1. Introduction

Commerce on the Internet has come to rely almost exclusively on financial institutions serving as trusted third parties to process electronic payments. While the system works well enough for most transactions, it still suffers from the inherent weaknesses of the trust based model. Completely non-reversible transactions are not really possible, since financial institutions cannot avoid mediating disputes. The cost of mediation increases transaction costs, limiting the minimum practical transaction size and cutting off the possibility for small casual transactions, and there is a broader cost in the loss of ability to make non-reversible payments for non-reversible services. With the possibility of reversal, the need for trust spreads. Merchants must be wary of their customers, hassling them for more information than they would otherwise need. A certain percentage of fraud is accepted as unavoidable. These costs and payment uncertainties can be avoided in person by using physical currency, but no mechanism exists to make payments over a communications channel without a trusted party.

What is needed is an electronic payment system based on cryptographic proof instead of trust, allowing any two willing parties to transact directly with each other without the need for a trusted third party. Transactions that are computationally impractical to reverse would protect sellers from fraud, and routine escrow mechanisms could easily be implemented to protect buyers. In this paper, we propose a solution to the double-spending problem using a peer-to-peer distributed timestamp server to generate computational proof of the chronological order of transactions. The system is secure as long as honest nodes collectively control more CPU power than any cooperating group of attacker nodes.

Value Drivers of Blockchain

MULTI-PARTY
COLLABORATION



INFORMATION IMBALANCE



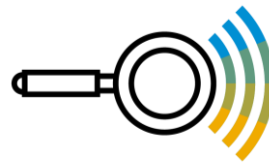
PROCESS
OPTIMIZATION



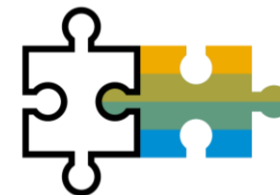
SECURITY



DIGITAL ASSETS



TRANSPARENCY &
AUDITABILITY



Blockchain Deployment Options

Public



Open for everyone to participate and read/write.

Permissionless
Blockchain

Consortium



Access and permissions controlled by pre-selected

set of nodes
Permissioned
Blockchain



Overview: Smart Contracts in Blockchains



A **smart contract** is a piece of code embedded in the Blockchain and being executed by each validator.

It can represent a **business contract** and guarantees **automation of business rule execution**.

Smart contract is a new concept and creates challenges:

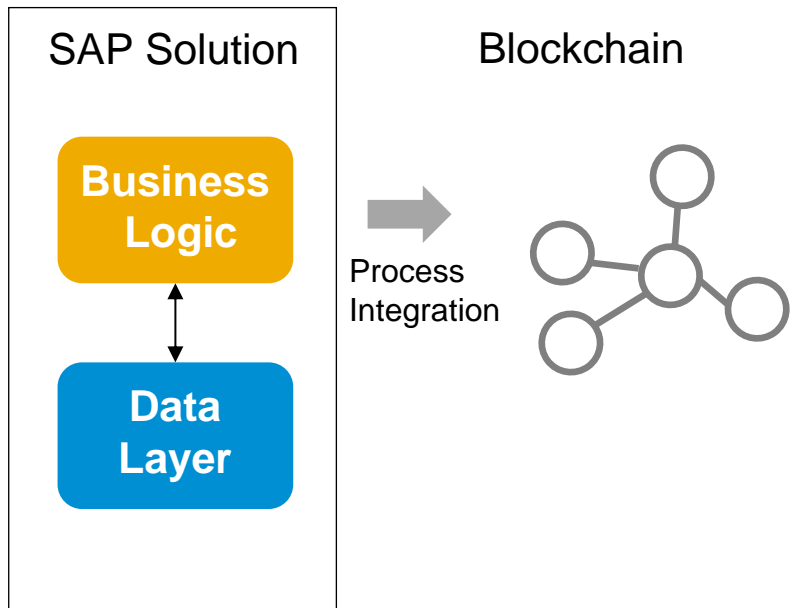
- Code is Law philosophy is not the same as human interpretation of law
- Decentral code execution requires a new development paradigm
- Execution of Smart Contracts increases complexity of the blockchain platform
- Security issues in Smart Contracts can result in higher damage being published in public blockchains

Architecture for Blockchain Applications



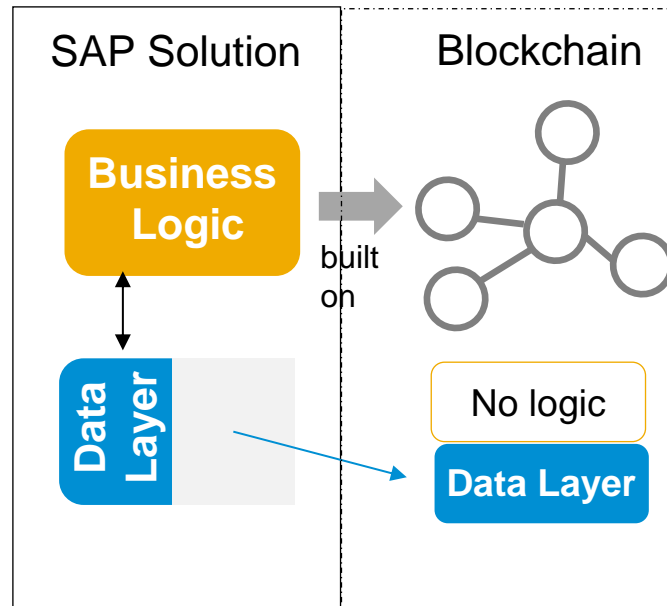
Application Patterns – How much Blockchain is in?

1 Integration with existing blockchains



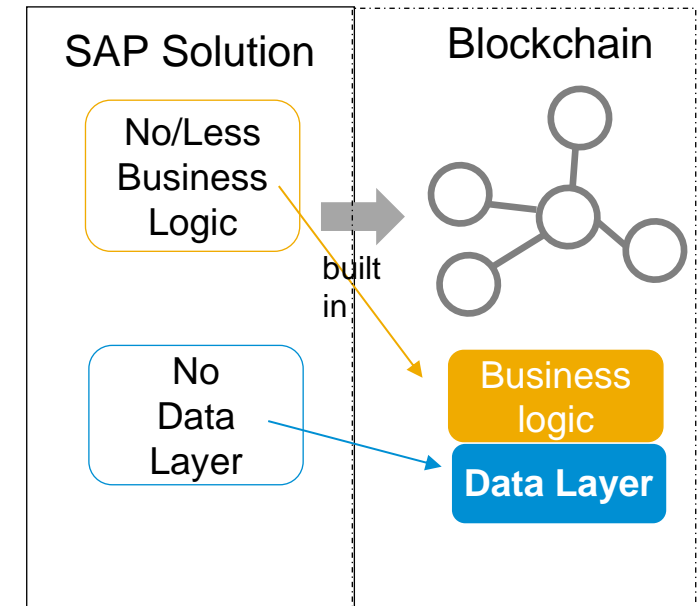
- (Public) Document Proof
- Bitcoin as payment option
- Integration with Ripple

2 Multi-Party Collaboration *without* Smart Contracts



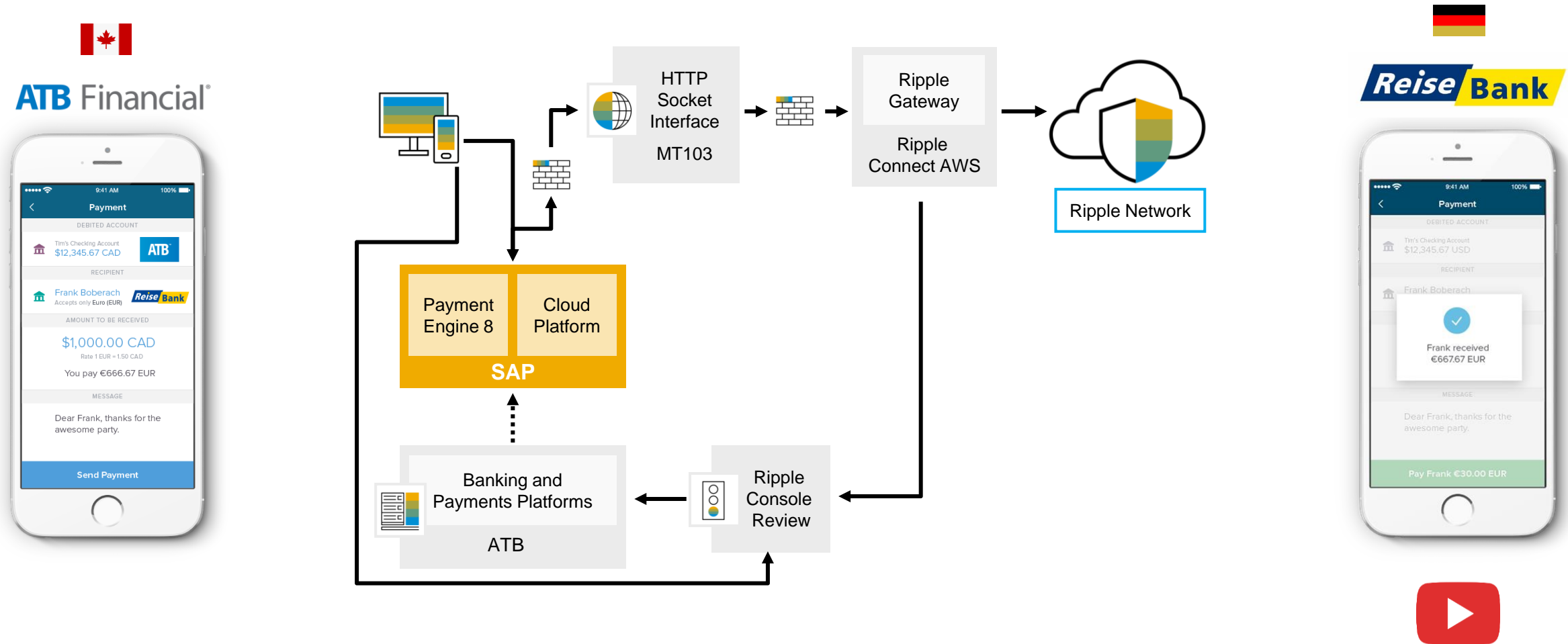
- Transparency Data Platform (Data Storage & Retrieval)
- Intercompany Settlement (Asset transfer)

3 Multi-Party Collaboration *with* Smart Contracts



- Consortium Platform
- Business Networks

Pattern 1: Banking Innovation with SAP & Ripple



Overseas payment process took 20 sec instead of 3 days

Ripple technology is an open-source system based on Internet protocols, permitting domestic and international payments in any combination of currencies to be settled directly between the parties without the need for central clearing houses or correspondent banks.

Pattern 2: Blockchain in a Public Sector Scenario

Proof-Of-Concept with Autonomous Province of South Tyrol (Italy)

Challenge

- Government employees **spend too much time** on stating facts, confirming them or sharing them

Proof-of-Concept Objectives

- Show feasibility of using blockchain technology for public administration
- Demonstrate benefit to reduce manual document authentication by office managers significantly (one-click)
- Build foundation for future extended usage of blockchain for any governmental administrative processes in Italy
- Leverage blockchain and build process extension to non-SAP application based on SAP Cloud Platform

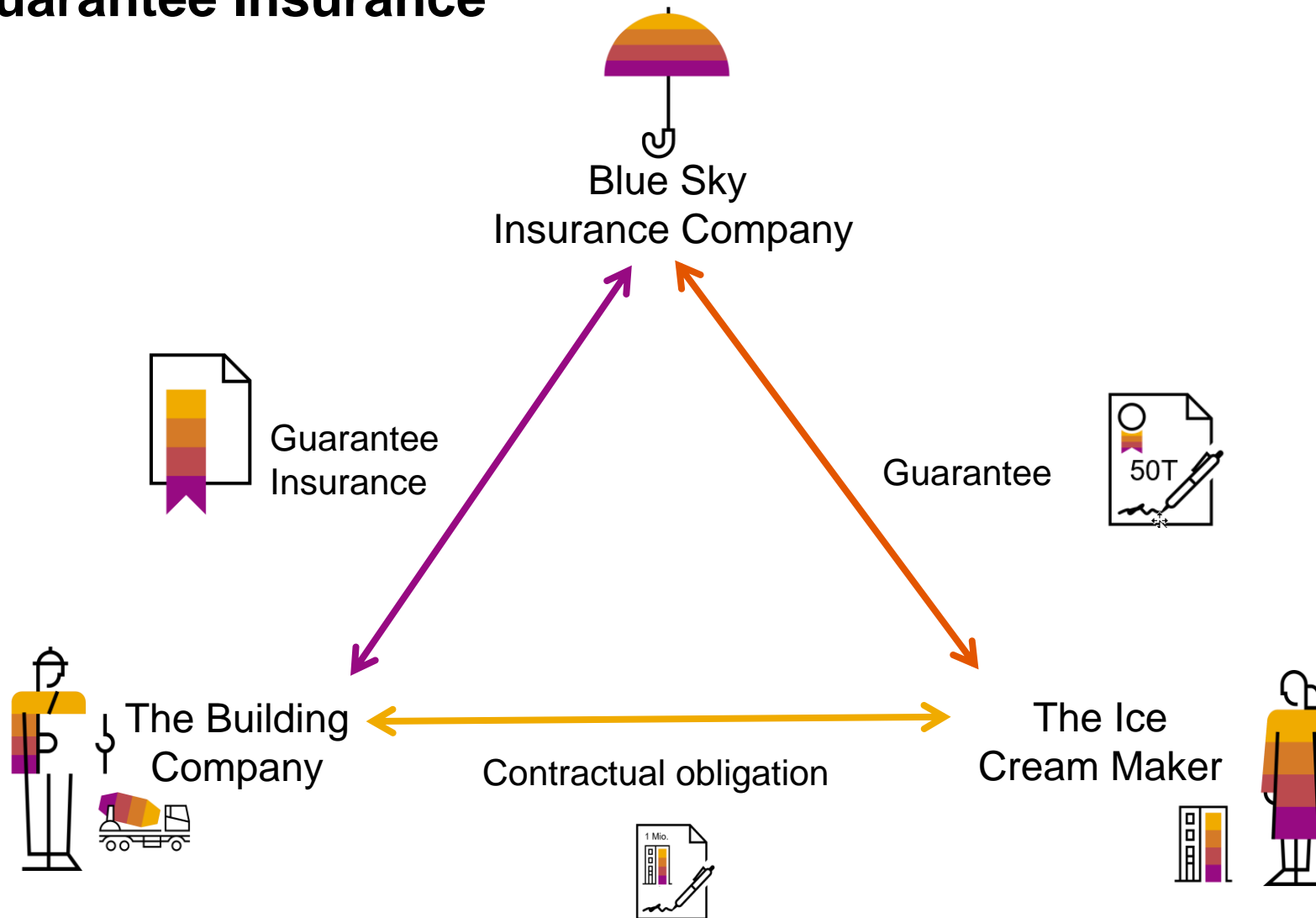


Blog on PoC Details: <http://news.sap.com/blockchain-could-be-a-game-changer-but-not-because-its-cool-technology/>

Example: Guarantee Insurance



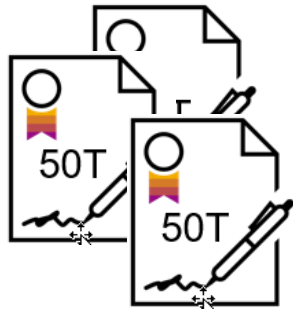
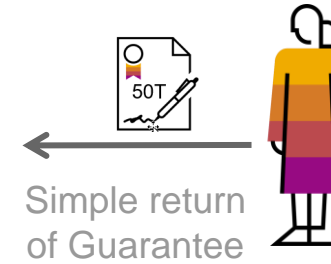
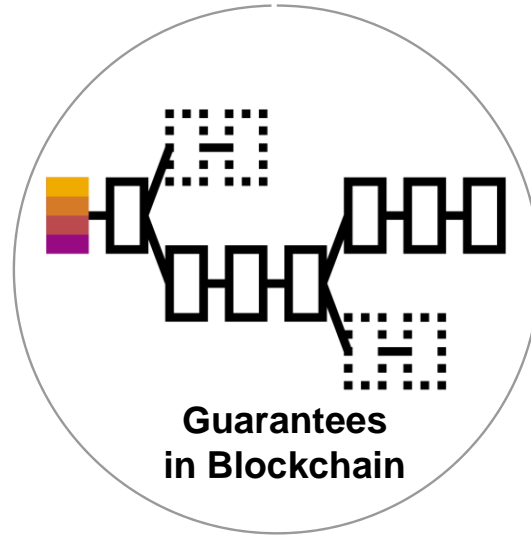
Use Case Guarantee Insurance



Advantages of Guarantees in Blockchain



Reduced processing time



Fraud is avoided as Guarantee cannot be copied.



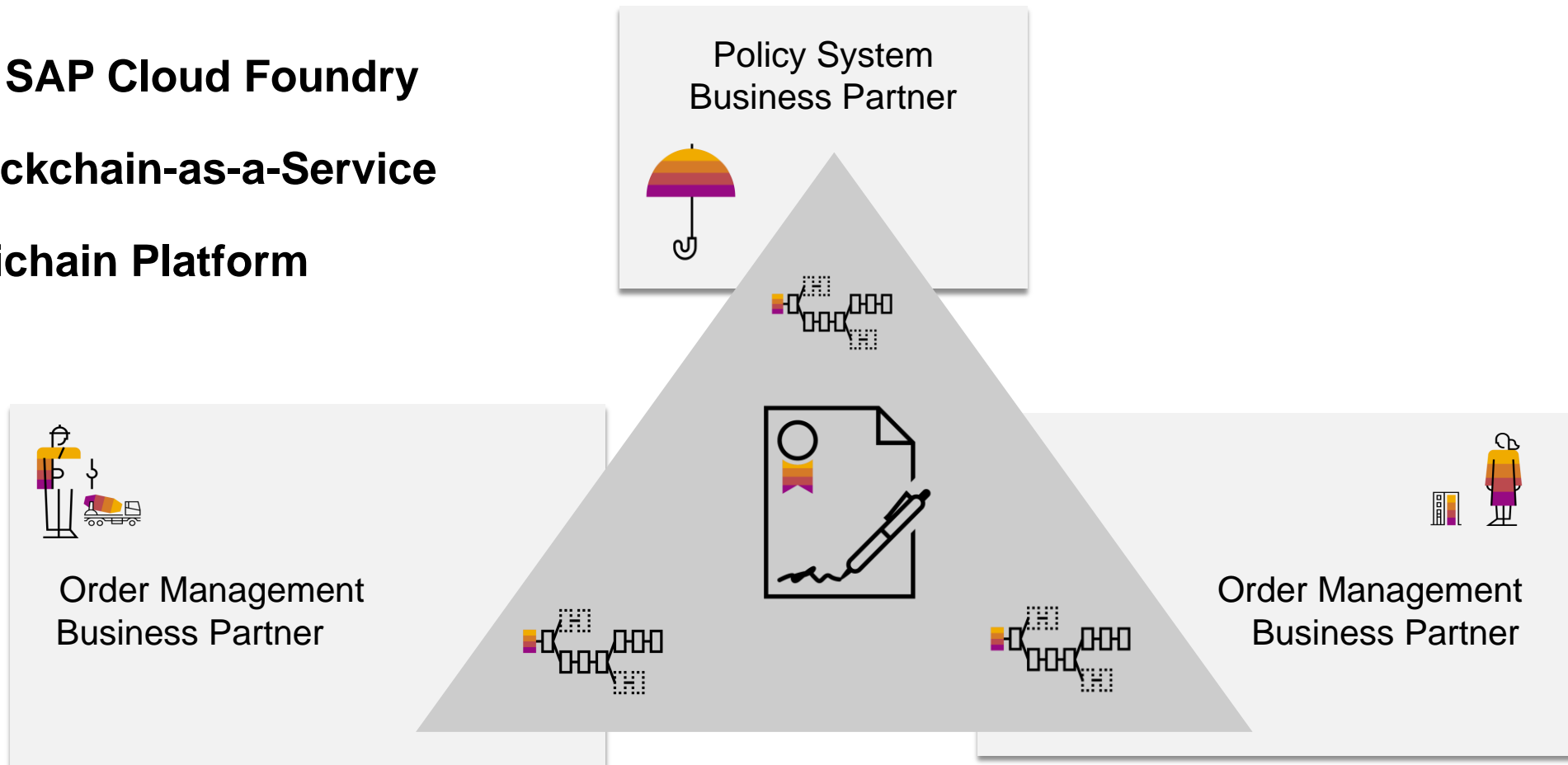
Guarantee indestructible



Ownership of Guarantee is transparent to all involved parties

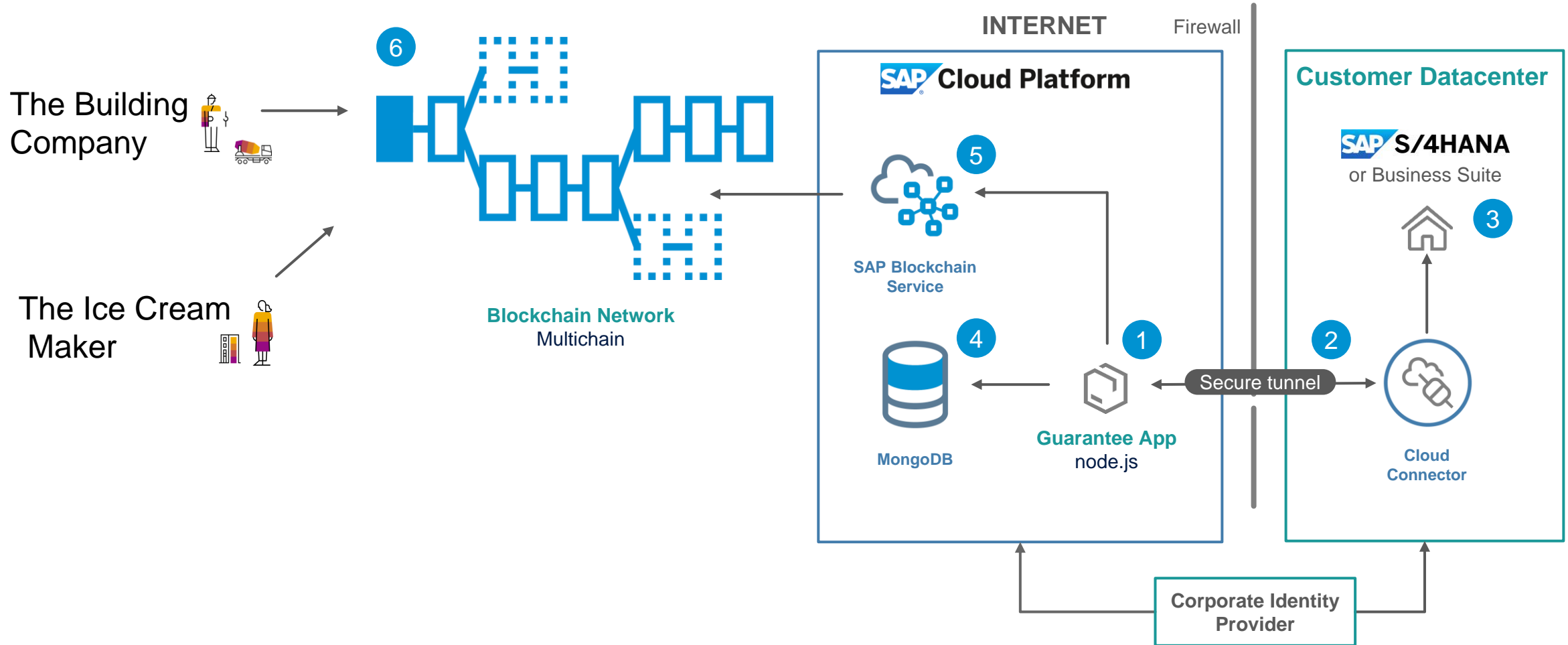
Guarantee transferred to Blockchain

- ✧ SAP together with a German Insurance Company
- ✧ Showcase for Guarantees
- ✧ Based on SAP Cloud Foundry
- ✧ Using Blockchain-as-a-Service
- ✧ With Multichain Platform



Blockchain Architecture and S/4 HANA Integration

Blue Sky Insurance Company 



Demo



Insurance Guarantee Use Case

Demo

Guarantees

🔍 🌐 ☰

The Building Company

Policynumber
46.000.001 - K12

Credit Rating
★★★★★

Policy Status

Current Guarantee Amount

Available Guarantee Amount

Create Guarantee

Guarantee

🔍 🌐 ☰

The Building Company

Guarantee ID
3456-1114

Rating
★★★★★

Guarantee Status
Active

Guarantee Amount
10.000.000 EUR

Transfer Guarantee

Guarantee

Blockchain-Parties

Blockchain-Transaction

Guarantee Data

Principal The Building Company	Guarantee Begin Date 01/01/2010	Type of Guarantee Warranty
Assigned to (Creditor) Chemicals forever	Guarantee End Date 01/01/2018	Reference-ID 234500001
Insurance Company Blue Sky Insurance		

Blockchain-Parties

Insurance ID XXXXXXXXXXXXXXXXXXXX	Principal ID XXXXXXXXXXXXXXXXXXXX	Creditor ID XXXXXXXXXXXXXXXXXXXX
--------------------------------------	--------------------------------------	-------------------------------------

Blockchain-Transactions

Policy Data

Policy Holder
The Building Company

Address
Dusty Road 678
87901 Walldorf

Guarantee Overview

The Building Company

Guarantee Data

Maximum Guarantee Amount
50.000.000 EUR

Current Guarantee Amount
30.000.000 EUR

Items

Guarantees (5)

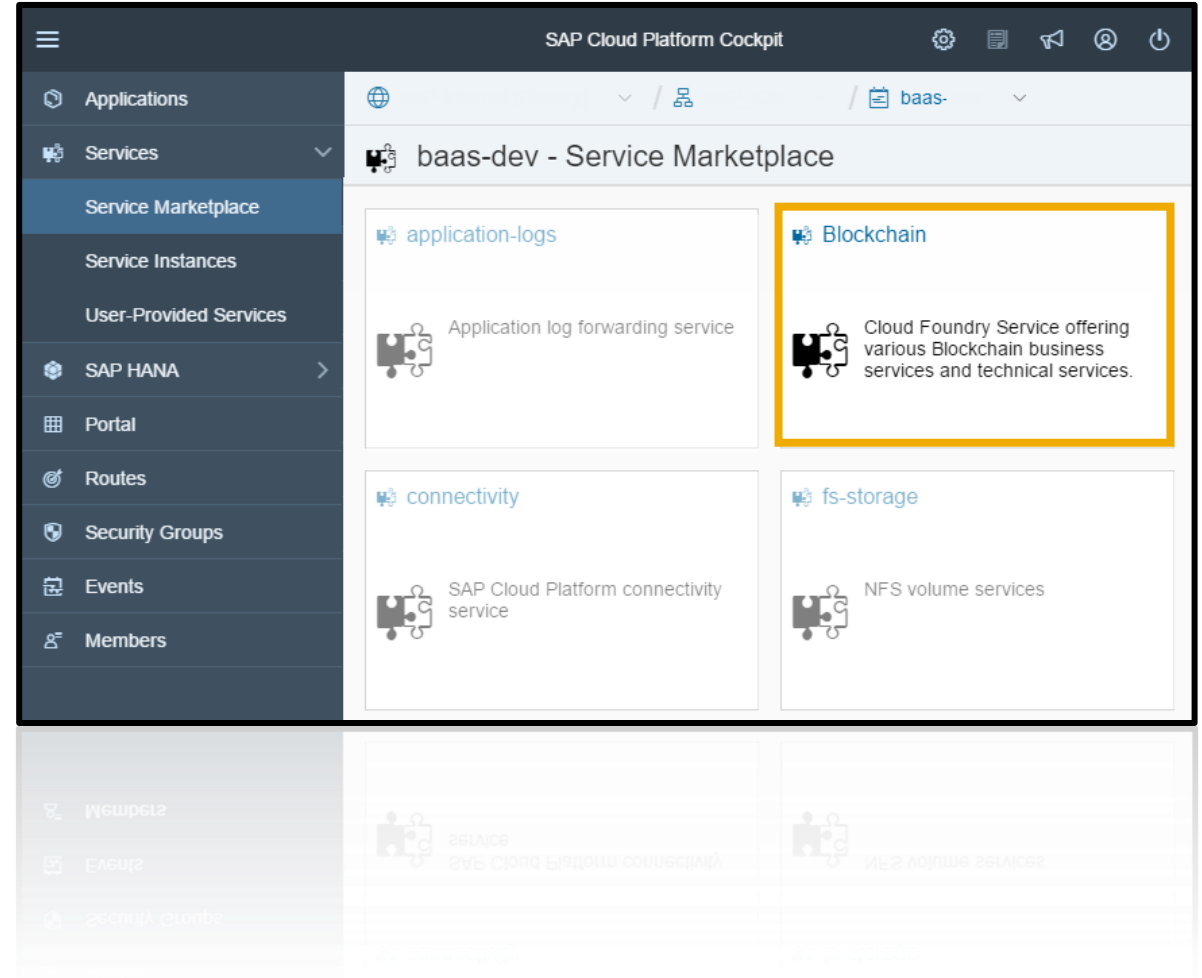
	Assigned to (Creditor)	Guarantee
<input type="checkbox"/>	Chemicals forever	10.000.000
<input type="checkbox"/>	Best IT	5.000.000
<input type="checkbox"/>	Factory Outlet	2.000.000
<input type="checkbox"/>	Your Shop	3.000.000
<input type="checkbox"/>	Icecream Makers	10.000.000

SAP Cloud Platform Blockchain



Develop with SAP Leonardo Blockchain Service

- **Build** Blockchain Industry and LoB Process Extensions for SAP and Non-SAP
- **Integrate** into existing Blockchain Ecosystem
- **Combine** Distributed Ledger with Internet of Things and Machine Learning capabilities on one platform
- Foundation for building transactional applications that establish trust and transparency while streamlining business processes across company boundaries.



Resources | Getting Started | Test Installations

[Intro](#) [Benefits](#) [Use Cases](#) [Software](#) [Co-Innovate Now](#)

Blockchain and Distributed Ledger Technology

Blockchain – aka “distributed ledger technology” – has the potential to transform how businesses transact in every industry. It’s near the top of Gartner’s Hype Cycle and it’s on all major lists of technology trends to watch. So, what is blockchain exactly? How does it work? And how is SAP approaching [blockchain for business?](#)

Blockchain explained from an enterprise perspective

Every business is based on transactions. But these transactions are often routed through third-party intermediaries like banks, lawyers, and brokers – which can make processing time-consuming and expensive. Blockchain technology has the potential to reduce the role of middlemen, dramatically speeding up multi-participant transactions and lowering costs, while ensuring all parties are protected. [Learn more](#) [SAP Business](#) [machines](#), and algorithms would be free to transact and communicate with one another in a [business](#) way. This is the promise of blockchain.

<https://sap.com/blockchain>

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- SAP TechEd live interviews
- Select lecture sessions

<http://sapteched.com/online>

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- Ask your questions
- Join conversations

sap.com/community

See all [SAP TechEd Blogposts](#)

The screenshot shows the SAP TechEd Online website. At the top, there is a navigation bar with the SAP TechEd logo, 'Online', and links for '2016 Videos' and 'Archive'. A dropdown menu is open, showing 'Social' and 'SAP TechEd' options, with sub-options for 'Join the Conversation' and 'Community Blogs'. Below the navigation, there is a hero section with a background image of a man looking at his phone. The text reads: 'Welcome to SAP TechEd Online', 'The online source for live broadcasts and session replays from the SAP TechEd conferences', and 'Visit our site to watch Replays from 2016 events'. Below this, there are two event announcements: 'SAP TechEd Las Vegas - September 25-29 Registration is Open' and 'SAP TechEd Barcelona - November 14-16 Registration is Open'. The 'Feature Blogs' section is below, featuring two blog posts. The first is 'Personas in SAP GUI It is possible! @ SAP TechEd' by Michelle Crapo, with a 'Go To Blog' button. The second is 'SAP TechEd welcome the developer community' with a 'Go To Blog' button.

Further information

Related SAP TechEd sessions

- CPL103 – Blockchain and SAP: Use Cases, Scenarios, and New Solutions
 - CPL102 – SCP Blockchain Service Introduction & Overview
 - CPL 200 – SAP S/4HANA and Blockchain Integration
 - CPL101 – Blockchain: Just Hype or Relevant Technology for Building New Business Apps
 - CPL116 – Blockchain in a Public Sector Scenario
 - CPL117 – Blockchain in Financial Service: Bonded Loans – a Commercial Lending POC
 - CPL118 – Blockchain in an Industry Scenario: Secure, Paperless Ocean Shipping
 - CPL135 – Innovating SAP S/4HANA with SAP Cloud Platform: Blockchain Integration
-
- CPL227 – Enterprise Blockchain Architecture with Hyperledger
 - CPL261 – How to Build Smart Contracts with Hyperledger: Deep Dive
-

SAP Public Web

- scn.sap.com
 - www.sap.com/blockchain
-

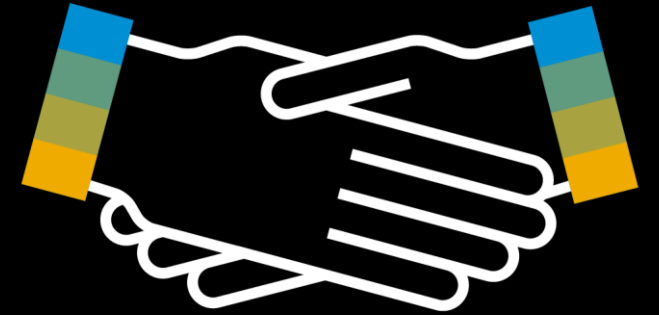
SAP Education and Certification Opportunities

- www.sap.com/education
-

Watch SAP TechEd Online

- www.sapteched.com/online

Thanks for attending this session.



Feedback

Please complete your session evaluation for **CPL200**.

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