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LEGALLY BINDING APPLICATIONS WILL DEFINE FUTURE BLOCKCHAINS

DLT Reg

Prof. Dr.-Ing. Volker Skwarek
30.05.2018

TWO ASPECTS OF BLOCKCHAINS AND LAW WE SHOULD TALK ABOUT

a) blockchain → world:

How can blockchains **support legal workflows** in the physical world (= **smart contracts**)?

b) world → blockchain:

How do blockchains **legally fit** into the real world (= **legal compliance**)?

c) world ↔ blockchain:

The future of the world with and of blockchains!

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WHY DO WE TALK ABOUT CONTRACTS ON BLOCKCHAINS

„NICK SZABO“

Usual quotation of Nick Szabo („Idea of Smart Contracts“, 1997, paragraph 2 center):

“A canonical real-life example, which we might consider to be the primitive ancestor of smart contracts, is the humble **vending machine**. Within a limited amount of potential loss (the amount in the till should be less than the cost of breaching the mechanism), the **machine takes in coins, and via a simple mechanism**, which makes a freshman computer science problem in design with finite automata, **dispense change and product** according to the displayed price.

[...]

Smart contracts go beyond the vending machine in proposing to embed contracts in all sorts of property that is valuable and controlled by digital means.”

OFTEN MISSING CONTEXT FROM NICK SZABO

Same quotation from Nick Szabo („Idea of Smart Contracts“, 1997, paragraph 2, Beginning):

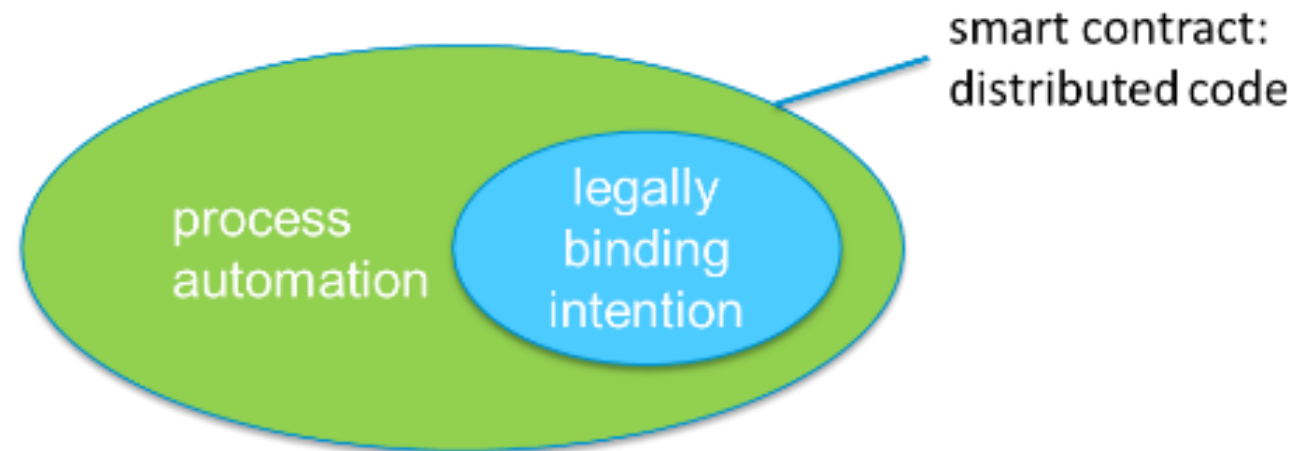
“Many kinds of **contractual clauses** (such as collateral, bonding, delineation of property rights, etc.) can be embedded in the hardware and software [...]”

important addition: Nick Szabo talks about **contractual clauses = contractual elements, not necessarily only about contracts**

A CONTRACT AS A SUM OF ITS ELEMENTS

different views on smart contracts

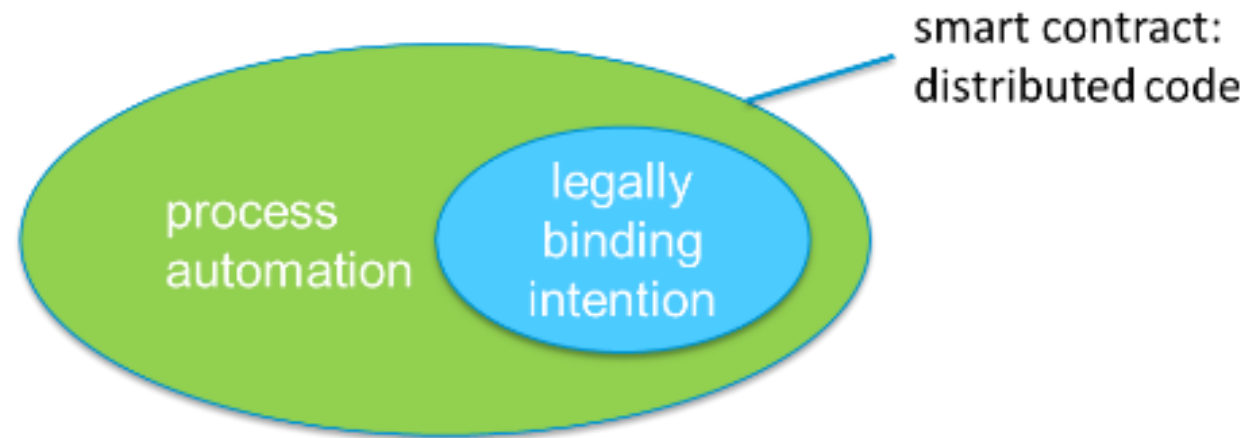
- **technically:** Smart Contracts are **distributed applications**, also used for automated execution of contract clauses
- **legally:** whether or not a distributed application named smart contract has a legally binding intention, **decides a court.**
- **consensus:** If a smart contract is defined and designed for a legal intention, the smart contract has to be legal.



(PRELIMINARY) ISO-DEFINITION VON SMART CONTRACTS

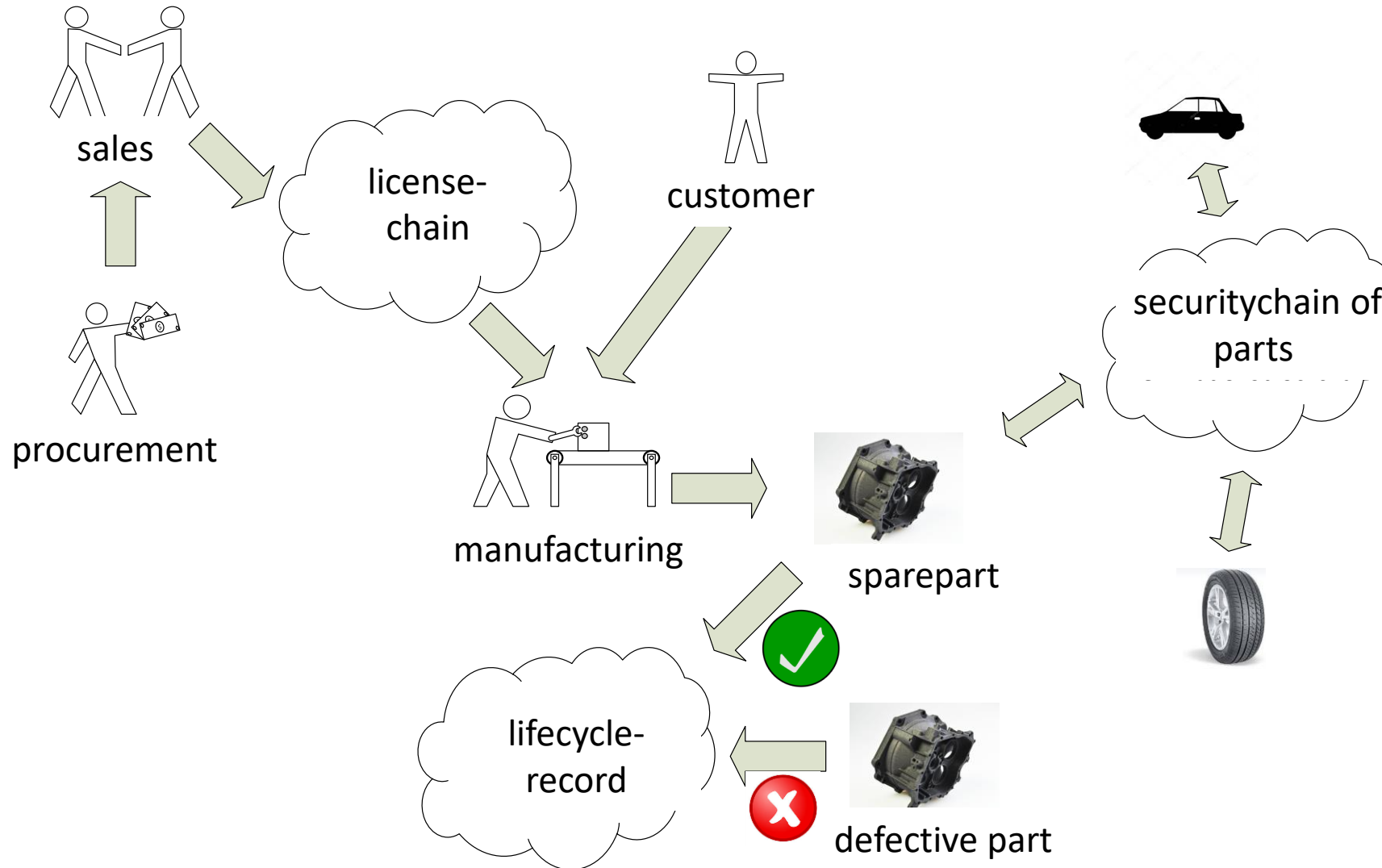
- **distributed code** representing a process automation
- executed on a blockchain or distributed ledger which,
- once validated and confirmed,
- results in an outcome
- that is agreed upon by participants in a transaction.

Note to entry: **The outcome of a smart contract may or may not primarily intended to be legally binding.**



AUTOMATION OF COMPLEX LEGAL PROCESSES USING SMART CONTRACTS

BRAVE NEW WORLD...



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A CONTRACT AS A SUM OF ITS ELEMENTS

No, it's more than the sum of its elements! - every contract is embedded **into a legal framework**.

i.e. Article 2, Paragraph 1 (Basic Law for the Federal Republic of Germany = German Constitution) allows the freedom of contracting in general – but not in any kind:

„Every person shall have the right to **free development of his personality** insofar as he **does not violate the rights** of others or **offend against the constitutional order or the moral law.**”

A defined frame **defines** (and **partly restricts**) the freedom of

- contractual parties (e.g. above age of 14, 16, 18 years)
- content (no legal violation, no immoral contracts)
- form (free form agreement, written form required)

consequence
1

Not everything possible is allowed. Or: an automated smart contract may be automating more than it should do!
A lawyer usually has this in mind – but does a software developer even know this?

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WHAT ARE CONTRACTS LIKE?

A BIT OF LEGAL THEORY

abstract validity check of contracts in 3 steps:

<p>I. claim arose</p> <ul style="list-style-type: none">• Conclusion of the contract: Agreement of the parties <p>Validity of the contract:</p> <ul style="list-style-type: none">• Legal capacity,• Defect of form,• Violation of the Prohibition Act,• Immorality,• Condition precedent• ...	<p>II. Claim not lost</p> <ul style="list-style-type: none">• Rescission (fraudulent deception, unlawful threat or error)• Condition subsequent• Impossibility,• Termination,• Withdrawal,• Revocation,• Offsetting,• ...	<p>III. claim enforceable</p> <ul style="list-style-type: none">• Plea of statute of limitations,• Misuse of rights,• Right of retention, <p>„an <i>objection</i> is a subjective right that gives the beneficiary the possibility to prevent the enforcement of a claim of the creditor without destroying it. This is a negative design right.”</p>
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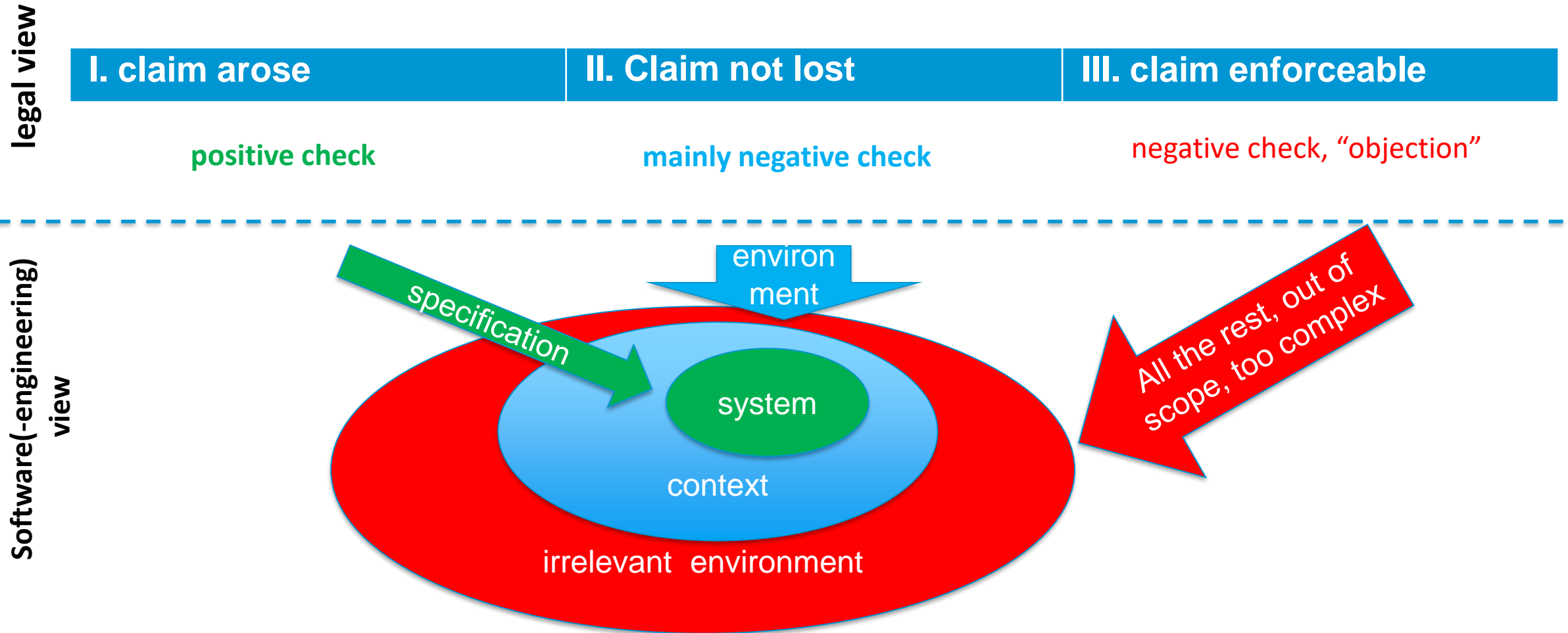
↑
positive check

↑
mainly negative check

↑
negative check, “objection”

C. Busch, Identification of legal concepts relevant for the smart contracts, Uni Osnabrück

TRANSFERABILITY CONTRACTUAL CHECKS \leftrightarrow SOFTWARE DEVELOPMENT



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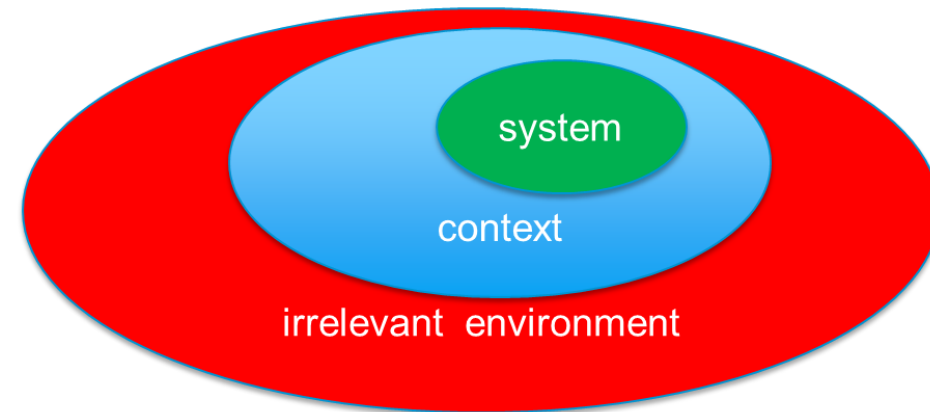
CONSEQUENCES ON SOFTWAREDESIGN

1. Software development is based on specifications that model a target state
2. Certain negative states from the system context can be researched and actively queried by positive checks. But not all!
3. Interactions with the non-relevant environment from a specification point of view are negative tests in an infinite range of alternatives. In some cases there is even freedom of a single party to choose (objection). This cannot be modeled in advance as a collection of individual specifications.

consequence 2

- Legal frameworks offer a variety beyond the specification modeling of contract clauses in the context of software.
- Legal frameworks offer possibilities that cannot be modeled by active positive checks in a software.

software view



Consequence 3

From the point of view of software development, it is **not possible to consider all positive cases** and **certainly not all negative exclusions**.

Therefore for an autonomous, fully automated smart contract, **implementing legal statements**, the **possibility of human interaction** needs to be implemented in **case of unforeseen situations or systematic errors**.

LEGAL ASPECTS MAKING IMPLEMENTATIONS ON BLOCKCHAINS EVEN MORE DIFFICULTY

- **Selfexecuting copies** of contracts are **arbitrarily distributed** among an **unknown number** of **unknown people**.
- Those **unknown entities assess** the contract for you, **judge und execute** it.
- Some of these entities are **located in foreign jurisdictions**.
- These entities initiate a transaction between the parties.
- This transaction **cannot be eliminated ex tunc** (= condition as if the legal transaction had never existed), but **can only be reversed** in a comprehensible manner.
- Nobody will give you a **statement about the execution** time –
 - or whether it will ever be executed at all –
 - or whether it stops during execution because it runs out of gas.
- **Real-time-statements are complicated** at all. Means: You may **claim an interrogation in time**, but it will simply **not be processed in time** and there is nobody to complain about.

MINIMUM REQUIREMENTS FOR SMART-CONTRACTS

In order to enable human interaction with self-sufficient electronic contracts, the following functions, among others, are useful

- **Pause function:** Responsiveness with inhibition of contract execution
- **Stop function:** Cancelability of a contract
- Real-time function: defined response times

and many more...

- such as "**fuzzyness**": intentionally blurred wording of clauses in order to be able to subsequently evaluate as many situations as possible and integrate them into the contract?

or what about

- **the right for self-execution:** A contract establishes a claim (= right of fulfillment, claim) but not the right to independent performance (= execution)

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WHAT IS BLOCKCHAIN REALLY?

A DIFFERENT PERSPECTIVE MAY HELP

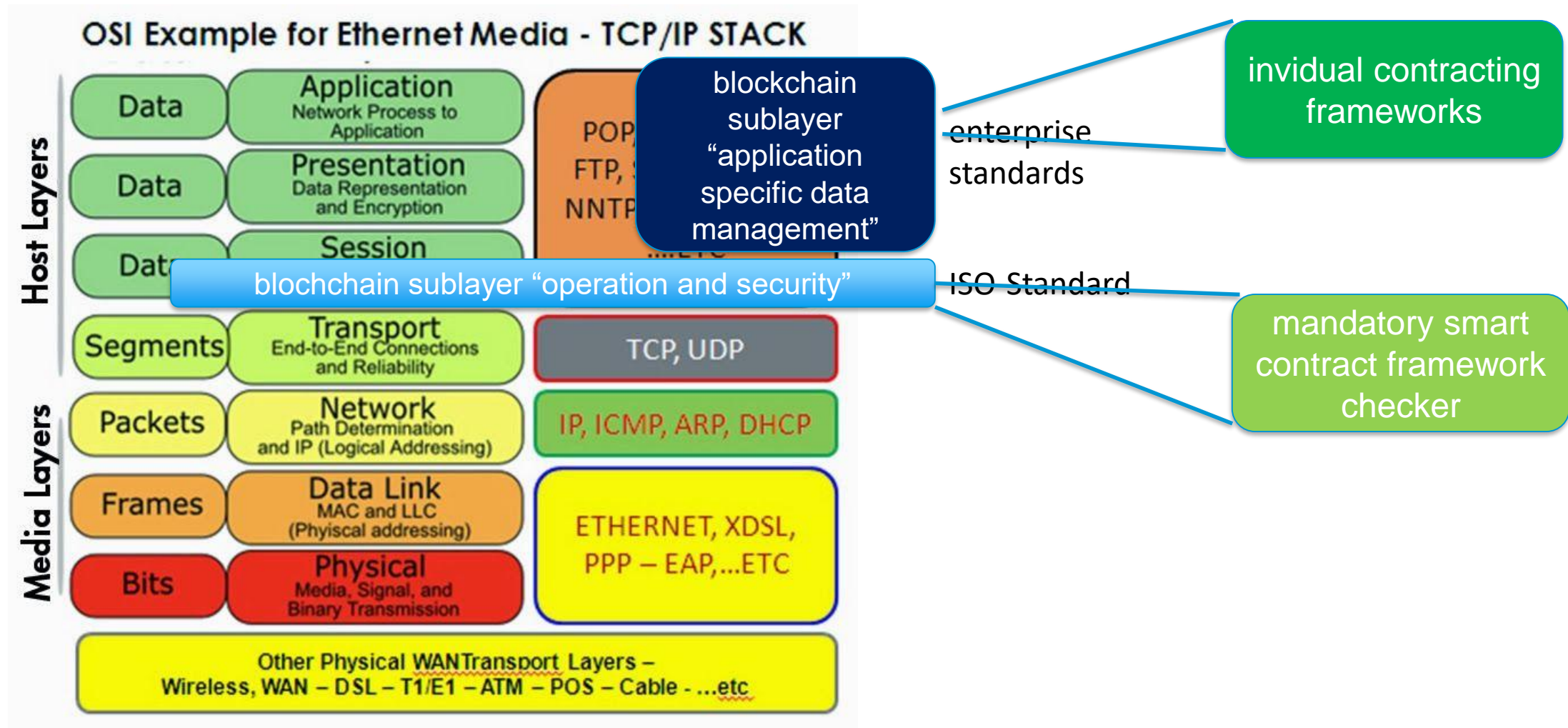
Our world is full of contradictions

- **contractual freedom vs. regulatory rules**
- **full automation vs. human interaction**
- **applicable law vs. programmable logic**

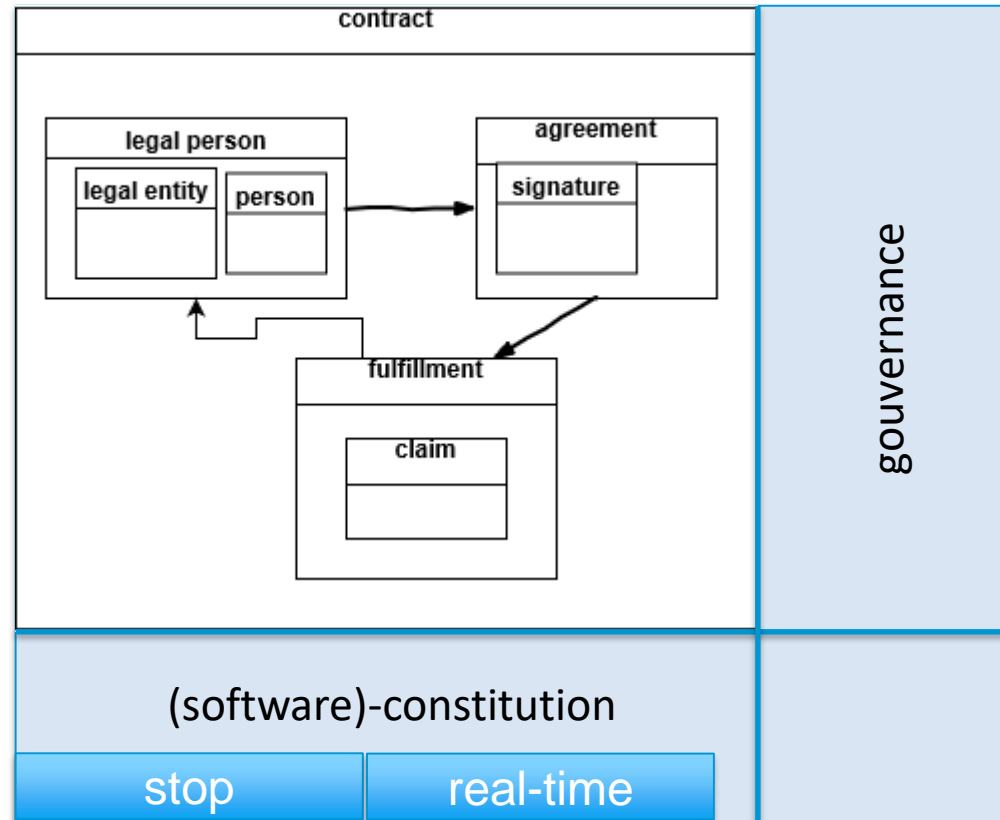
but they can be resolved with

- **a programmable legal framework**
- **some different decision processes**
- **and an (at least) 2-layer-architecture**

LAYERED FRAMEWORK FOR REGULATORY RULES AND CONTRACTUAL FREEDOM



SUPPORT SOFTWARE DEVELOPERS WITH MODELS AND FRAMEWORKS NOT TO REINVENT LAW!



TECHNO-LEGAL PERSPECTIVE ON SMART CONTRACTS

SUMMARY

Legal perspective

- Smart contracts represent (few automatable) contract elements (= clauses) rather than entire contracts.
- Legal contract frameworks can probably be mapped in Smart Contracts, but not simply "just like that"...

Technical Perspective

- "Code is Law" cannot be legally represented by few lines of code. It requires a process and a complex framework.
- Aspects that make the blockchain attractive (immutability, unstoppable, decentralization...) are not legally attractive in terms of contract execution at all.

Common Perspective

- Blockchains enable meaningful applications for automated contract processing
- Contracts on block chains require special legal regulation as common law-books are mainly "asset-based".
- Smart contracts require a software-framework, operating system stacks and standardization, to connect the technical and the legal world to a techno-legal world.

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THANK YOU FOR YOUR ATTENTION.

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