Blockchain Fundamentals Explored

A Technical Deep-Dive on Hyperledger Fabric

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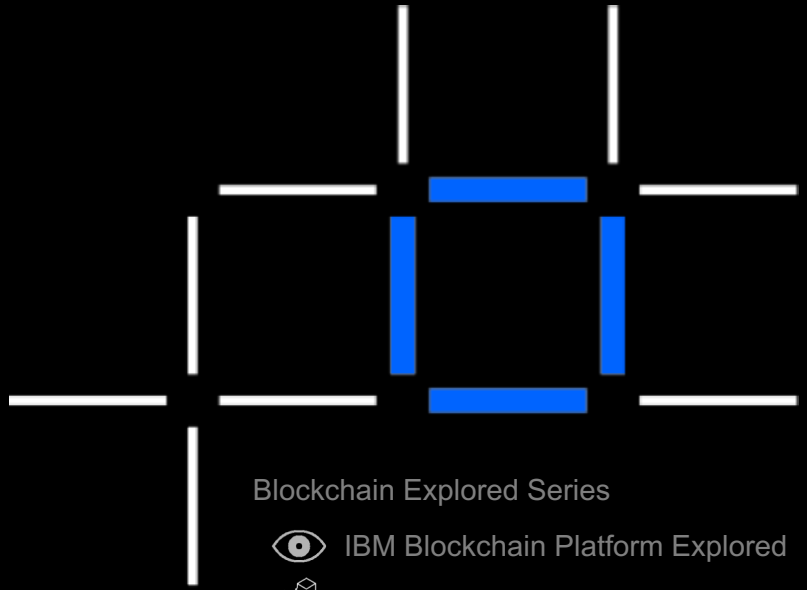

Blockchain Explored Series

- IBM Blockchain Platform Explored
- Modeling Applications
- Architectures Explored
- **Blockchain fundamental concepts**
- What's New in Tech

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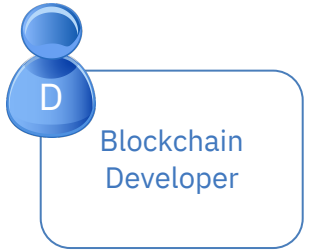
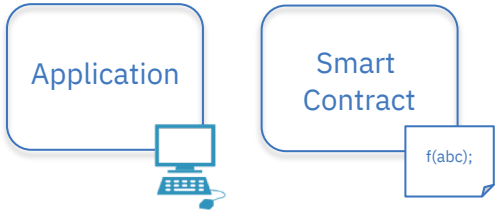
IBM **Blockchain**

IBM

The blockchain developer



Blockchain developers' primary interests are...

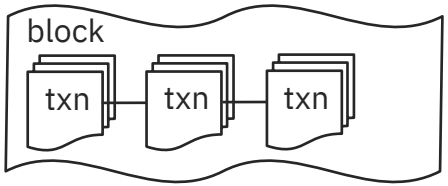


...and how they interact with the ledger and other systems of record:

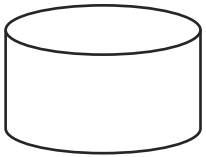
They should NOT have to care about operational concerns, such as:

X Peers Consensus Security

A ledger often consists of two data structures



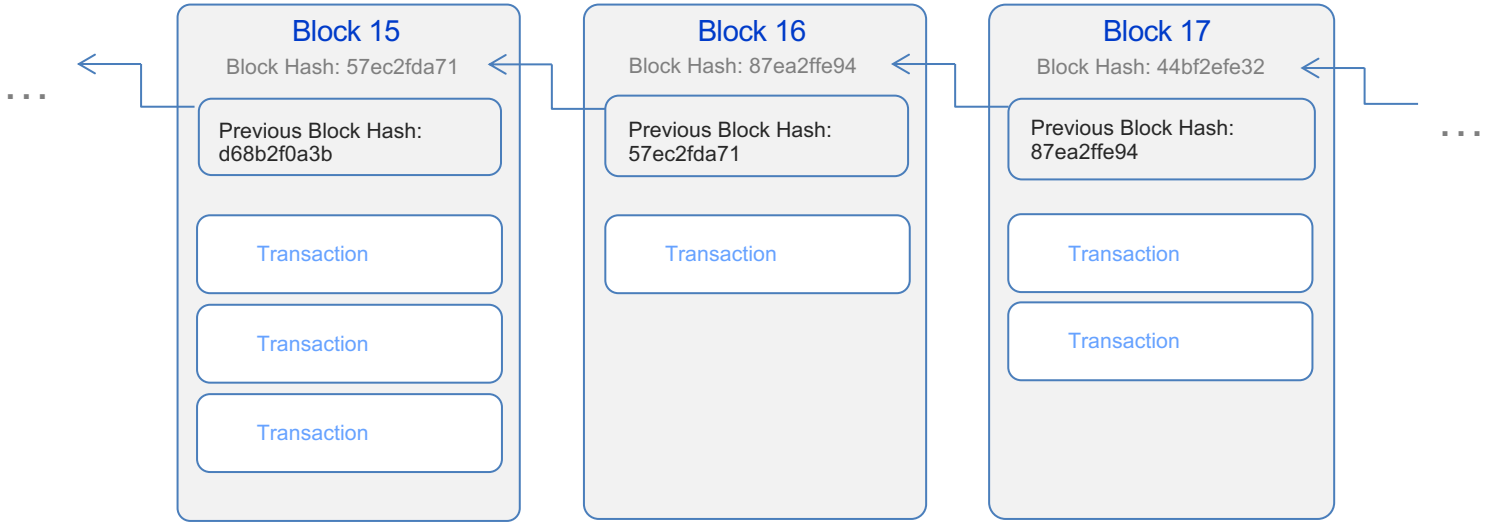
Blockchain


World state

- Blockchain
  - A linked list of blocks
  - Each block describes a set of transactions (e.g. the inputs to a smart contract invocation)
  - Immutable – blocks cannot be tampered

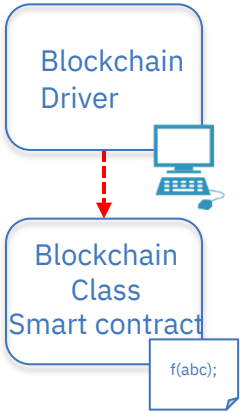
- World State
  - An ordinary database (e.g. key/value store)
  - Stores the combined outputs of all transactions
  - Not usually immutable

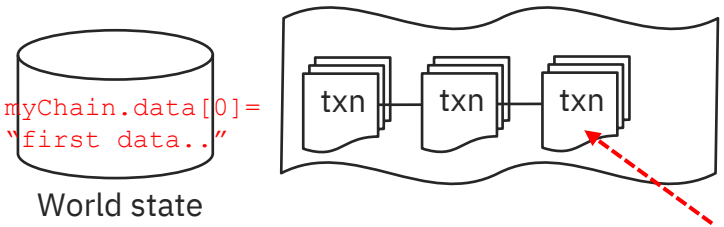
Block detail (simplified)



- A blockchain is made up of a series of blocks with new blocks always added to the end
- Each block contains zero or more transactions and some additional metadata
- Blocks achieve immutability by including the result of a hash function of the previous block
- The first block is known as the “genesis” block

Working with the ledger example: a change of transaction content





"Invoke, myChain[1] = "changed set"

Transaction input – new Blockchain instantiation

```
myChain = new Blockchain();
…
```

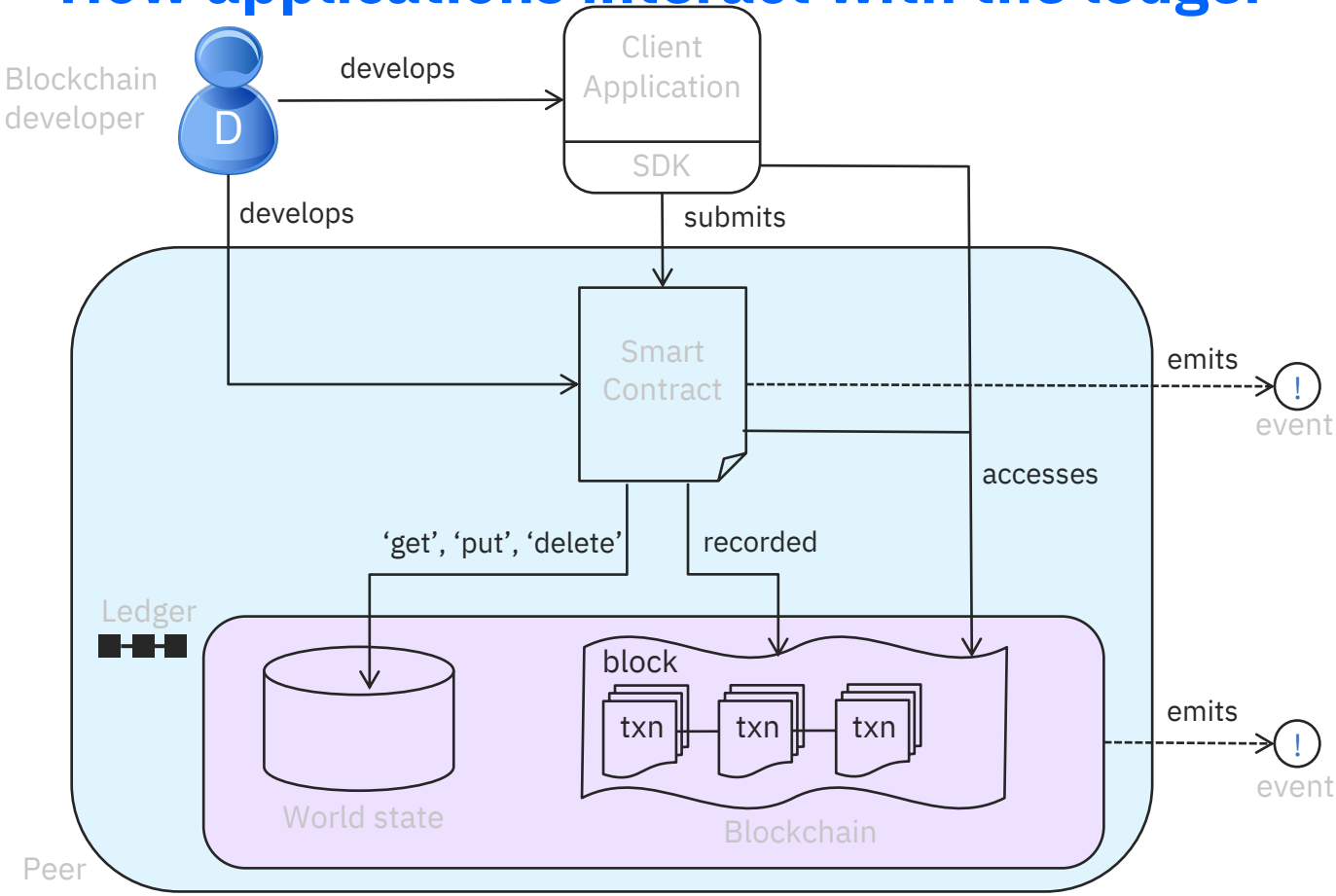
Blockchain implementation

```
myChain.createBlock("first set…");
myChain.createBlock("another set..");
```

World state: new contents

```
myChain.data[0] = "first set.."
myChain.data[1]= "another set.."
myChain.data[1] = "changed set.."
…
```

How applications interact with the ledger

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