Distributed ledgers and smart contracts for enterprise use

Presentation to the ECB

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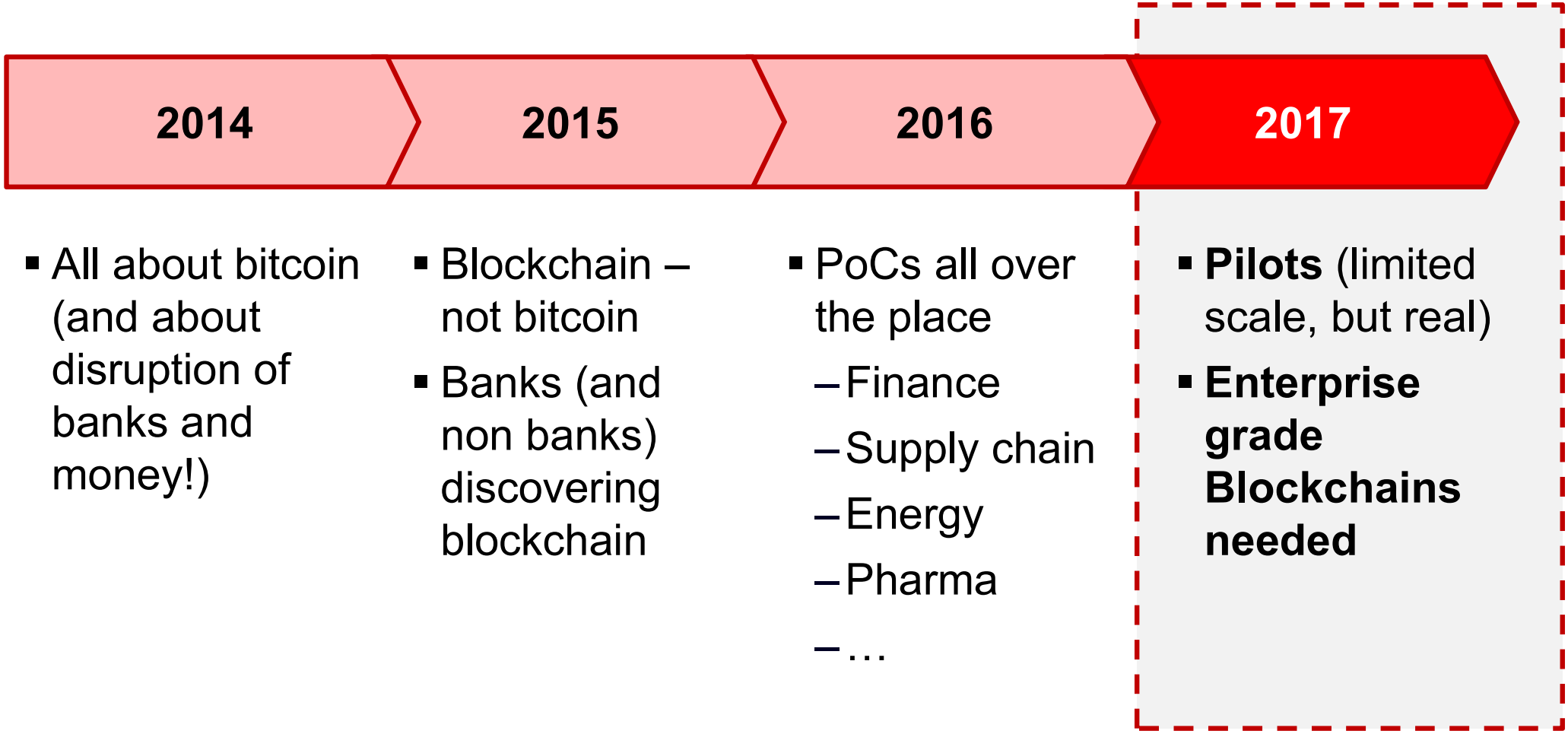
Santander

Historical context



Recap: key aspects of blockchain

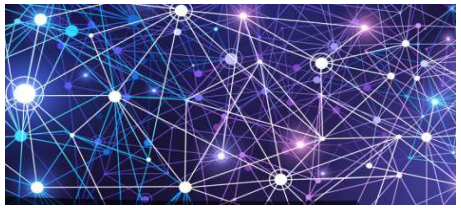
What is a ledger

- A database with financial commitments between parties
- (Paper) contracts describing the rules that govern these commitments
- A set of programs to reflect these contracts

The problem

- Ledgers maintained by trusted entities
- Multiple ledgers => need reconciliations
- Rules / contracts not automated, and subject to interpretation

The solution: a distributed ledger



- Common ledger, including
  - Common database
  - Common programs (“smart contracts”)
- Non-dependent on single sources of trust => maintained by the community
- Impossible to tamper with due to cryptography and hyper-replication – but not trust

What makes it strategic

Core banking systems today

- Expensive
- Isolated
- Proprietary
- Inflexible
- Local

… so they are ultra-secure, immutable, and compliant

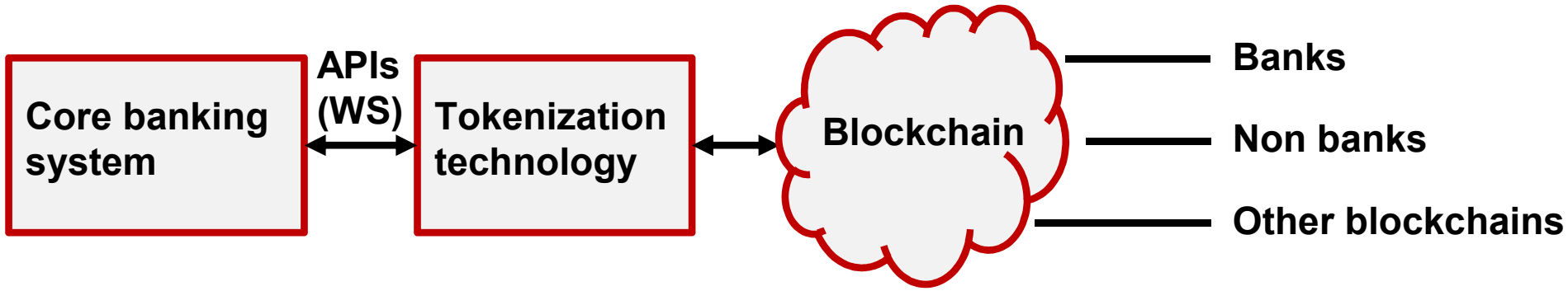
Blockchain

- Cheap
- Open
- Hyper-connected
- Universal
- Flexible
- Global

… yet as secure and immutable as a traditional one (actually more!)

Key enabler for i) efficiency and ii) innovation

A new innovation paradigm based on digital (cryptographic) money



- No touching the core banking systems – or at little as possible
- Build solid tokenization technology and interact through existing APIs => represent (fiat) assets on Blockchains and smart contracts (cash, bonds, shares, etc.)
- Money is then digital, and segregation of (digital) funds is done on smart contracts
- Use this digital money to i) implement existing services at a fraction of the cost, and ii) innovate new services enabled by blockchain

=> Blockchain as an extension of the bank's ledger
=> Integration with existing core banking systems is utterly cheap and simple
=> Money is digital, programmatic and interactive
=> Innovating using this digital money, instead of core systems

Why an Enterprise Ethereum Alliance

- Opportunity / need to use blockchain in enterprise settings
- Ethereum as the “de facto” standard (technology ready, large developer community, versatile technology)
- Multiple, disjoint efforts from corporations to add
  - ✓ Scalability
  - ✓ Privacy
  - ✓ Resiliency
  - ✓ Easiness to use

EEA launched in Feb 2017 as a collective effort to:

– Set standards

– Create reference implementations

– Share practices

… but not a consortium!
… and no commercial interest!

Guiding principles

At will: member led, no top down decisions

Standards, not products

Compatible: with public Ethereum and existing standards

Inclusive & collaborative, not competitive: *“co-opetition”*

Inspired in the Ethereum philosophy / governance
… but at enterprise level

Who launched the EEA

Initial board:

- **Santander** (Julio Faura, chair)
- **JP Morgan**
- **BoNY** (Alex Batlin, chair technical SC)
- **CME** (Sandra Ro, treasurer)
- **Microsoft**
- **Intel**
- **Accenture** (David Trait, vice-chair)
- **Consensys**
- **Nuco**
- **BlockApps**
- **The Institutes**

Progress to date

- ✓ Established structure and initial operations
- ✓ Created, organized and launched working groups:
  - Technical (including standards, benchmarking and ops)
  - Banking, Identity, Supply Chain
  - Coming soon: Pharma, Mobile, Energy, IoT
- ✓ On-boarded 100+ new members (and many more coming)
- ✓ Enterprise blockchain projects proliferating everywhere!

Technical roadmap: key priorities

- ✓ **Privacy**: private contracts, zero knowledge / shared secrets
- ✓ **Permissioned networks**: pluggable consensus (w no single point of failure)
- ✓ **Performance and scalability**: 1000's of transactions per second, mills of transactions stored
- ✓ **Easiness to use**: easy set up, monitoring, recovery

… while maintaning compatibility with standard Ethereum and benefiting from its progress (ZK, sharding, PoS, etc.)

Quorum as an intial example / de facto reference implementation

The Lyra Network in Spain

- Aim: to create a semi-private, enterprise-centric ethereum blockchain network among leading corporates and public institutions in Spain
- Led by a reduced set of initial members during launch, but open to everyone
- Permissioned ethereum network being deployed (Quorum and Parity testnets)
- Governance mechanisms under construction
- First priority is building a legally binding, digital identity mechanism for individuals and corporates
- Public notaries and lawyers associations leading from the beginning – as opposed to technicians

Launch members (May 30, 2017)

Sabadell, Santander, Bankia, BBVA, BME, Caja Rural, cajamar Caja Rural, Cepsa, Correos, Ejaso Estudio Jurídico, ETL Global, endesa, everis attitude makes the difference, Garrigues Abogados y Asesores Tributarios, gasNatural fenosa, Grant Thornton, Iberdrola, Universidad Pontificia ICAI ICADE Comillas Madrid, MásMóvil, momo pocket, Roca Junyent, Scytl Innovating Democracy

Conclusions

- Significant interst by corporates worldwide to use blockchain in private, enterprise-grade settings
- Technology increasingly ready for enterprise grade use, but not quite there yet
- Ethereum as the most advanced candidate, improving quickly supported by a huge community of developers, and fostered by hundreds of interested corporations
- EEA as a catalyst of all this, where leading corporates “co-opete” to accelerate readiness of Ethereum technology for production use, providing resources, requirements, guidance and governance
- Quorum as a first, reasonably viable alternative. Parity very close to enterprise grade
- Enterprises and public institutions starting to collaborate in real pilots everywhere. Spain’s Lyra network is a first