

Carriers Strike Back: Programmable Networks, Edge Computing & Blockchains

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About Palindrome

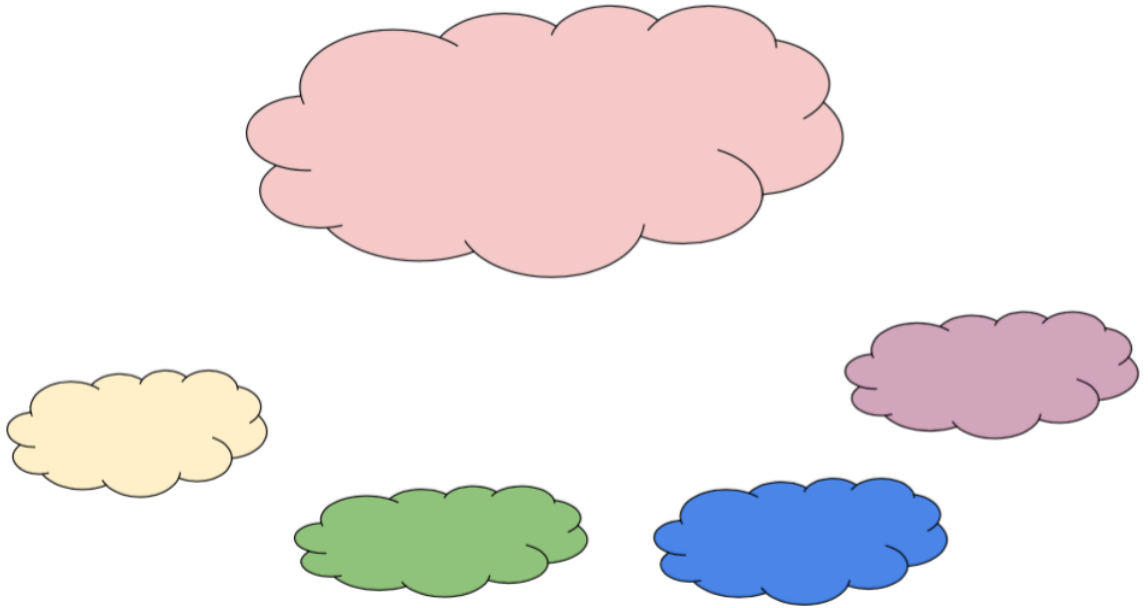
- Applied research lab, New Jersey
- Emerging technologies
 - Software-defined Infrastructure–5G/eUICC/Mesh HetNets
 - IoT - Security, Data storage
 - Blockchains
 - Machine intelligence - Content security
- Collaborative research projects*



Agenda

- Edge Computing
 - What / Why / Where
- Blockchains
 - What / Why / Where
- Edge Computing + Blockchains
- Research Areas





Edge Computing

Location-aware Cloud



Edge – What ?

- Compute close to source
- Move code rather than data
- Drivers
 - Network automation
 - Seamless code mobility
 - Data storage cost
 - Energy cost - storage / Smart grid
- “Network is the computer” – John Gage



Edge – Why ?

- Low latency
- No data transit cost
- New revenue stream
- “Every carrier will become an Edge Cloud provider”



Edge – Where ?

- IoT applications
 - Context-based computation
- Real-time Location-based Services
 - Autonomous Transportation





Blockchains

Internet 2.0

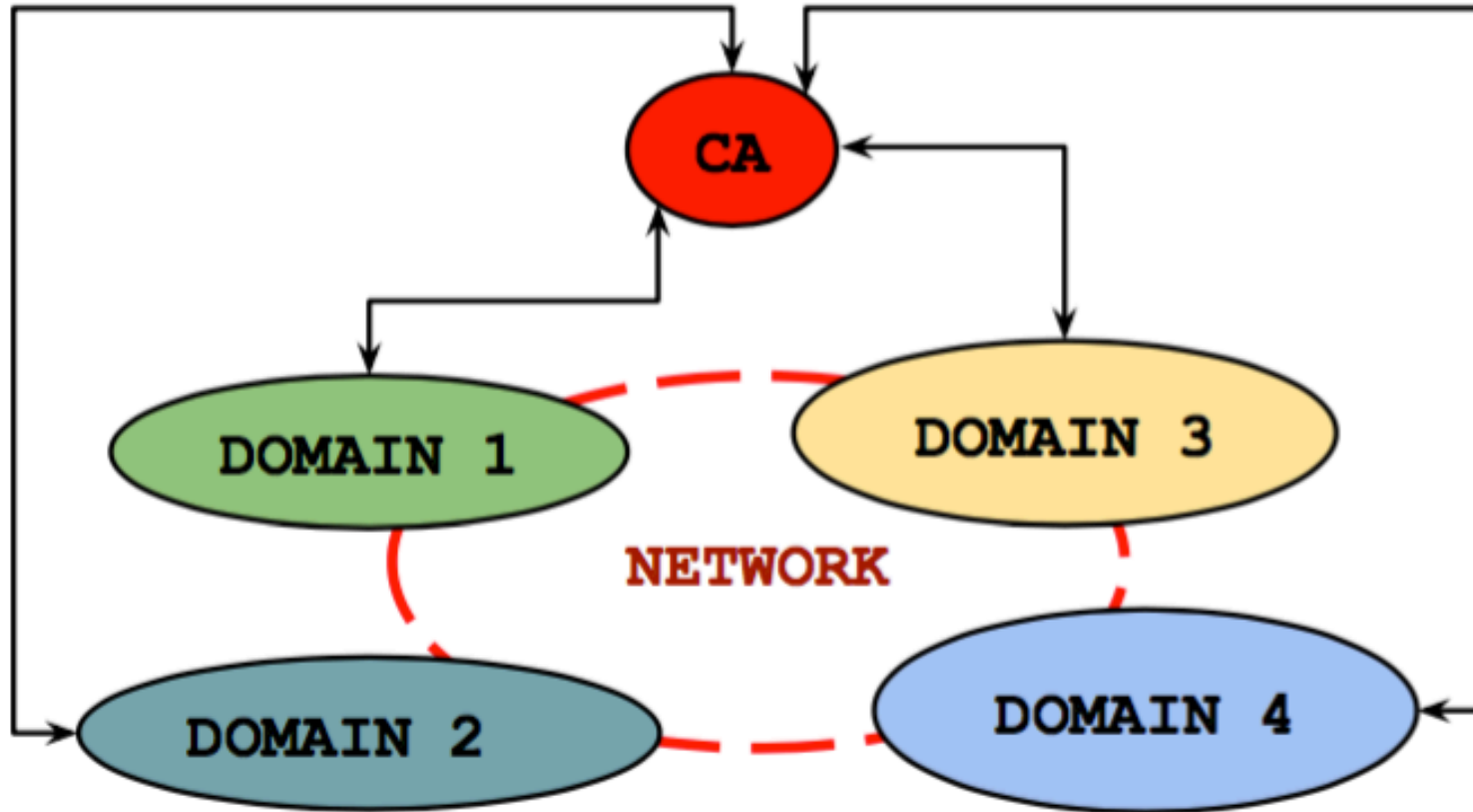


Blockchain – What ?

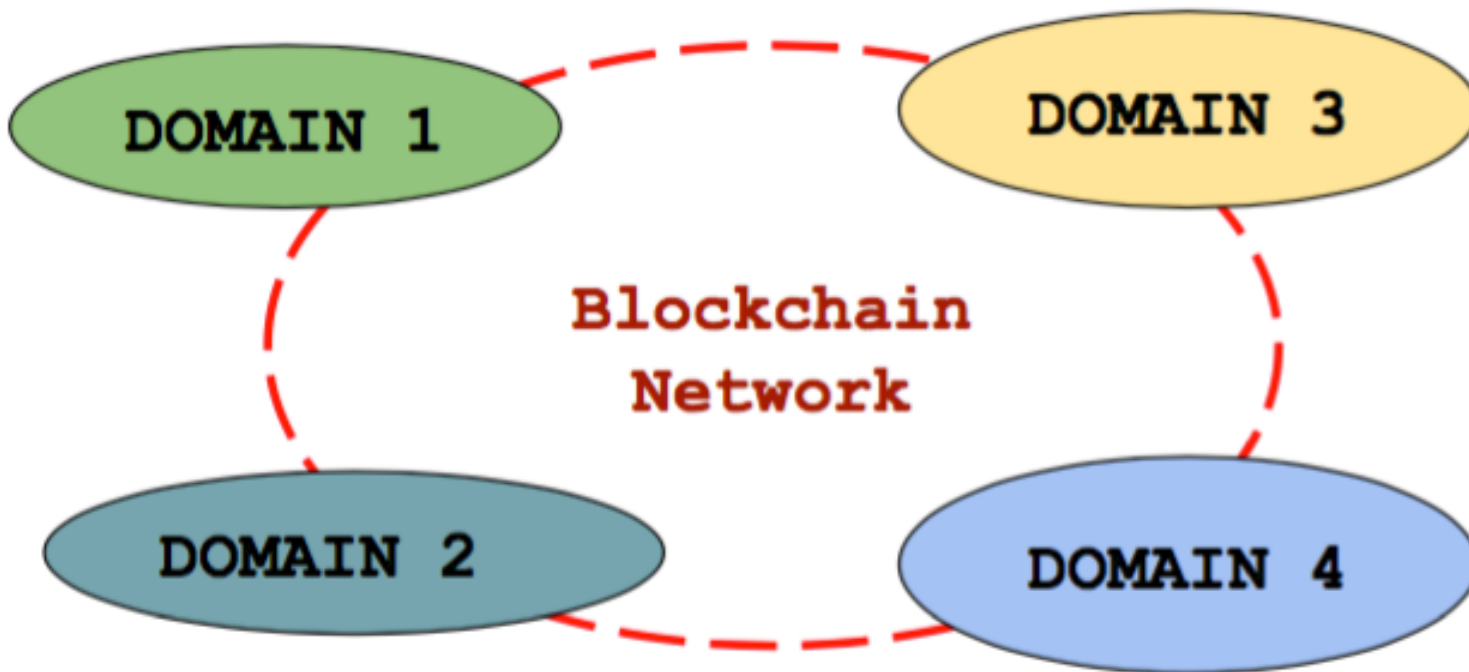
- Distributed ledger / database
 - Identity
 - Ownership
 - Verification
- Immutable Distributed State Machine
 - Transactions
 - Consensus*
- Public vs Private



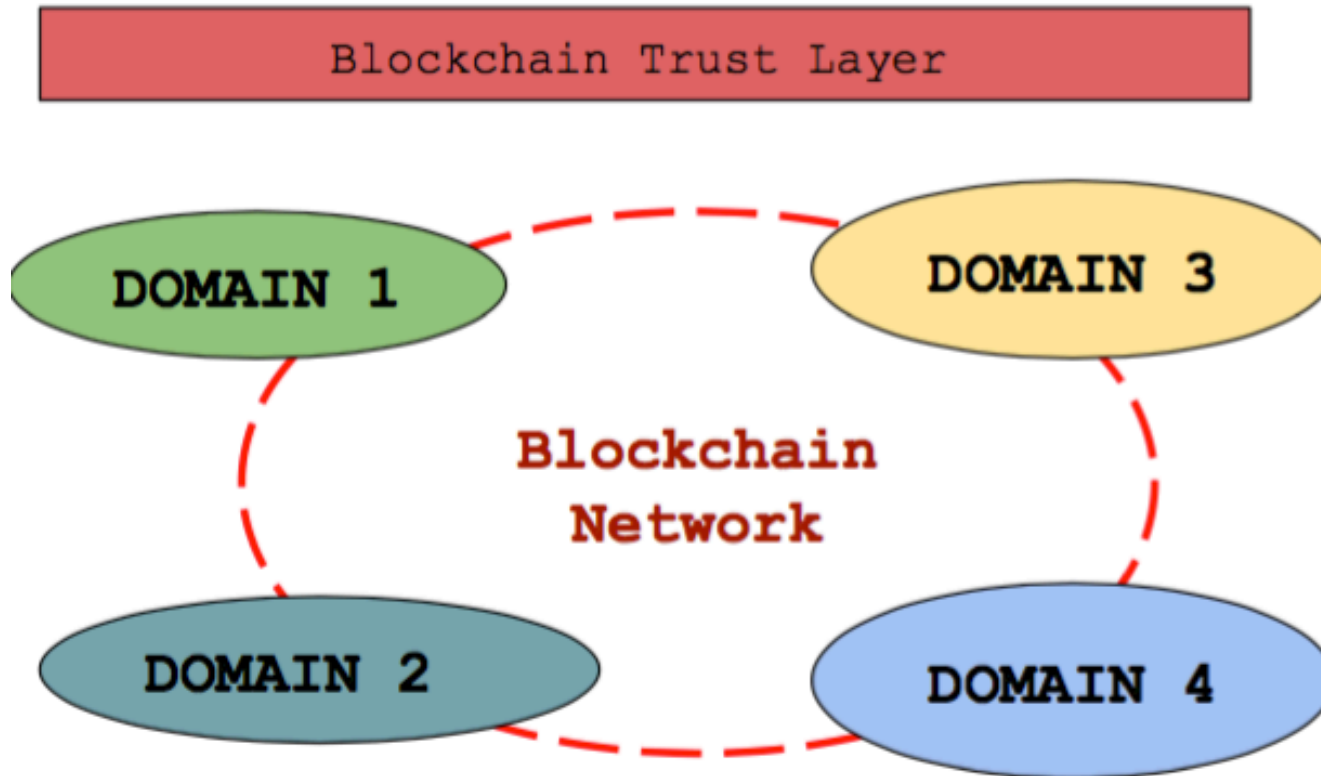
Internet 1.0



Internet 2.0

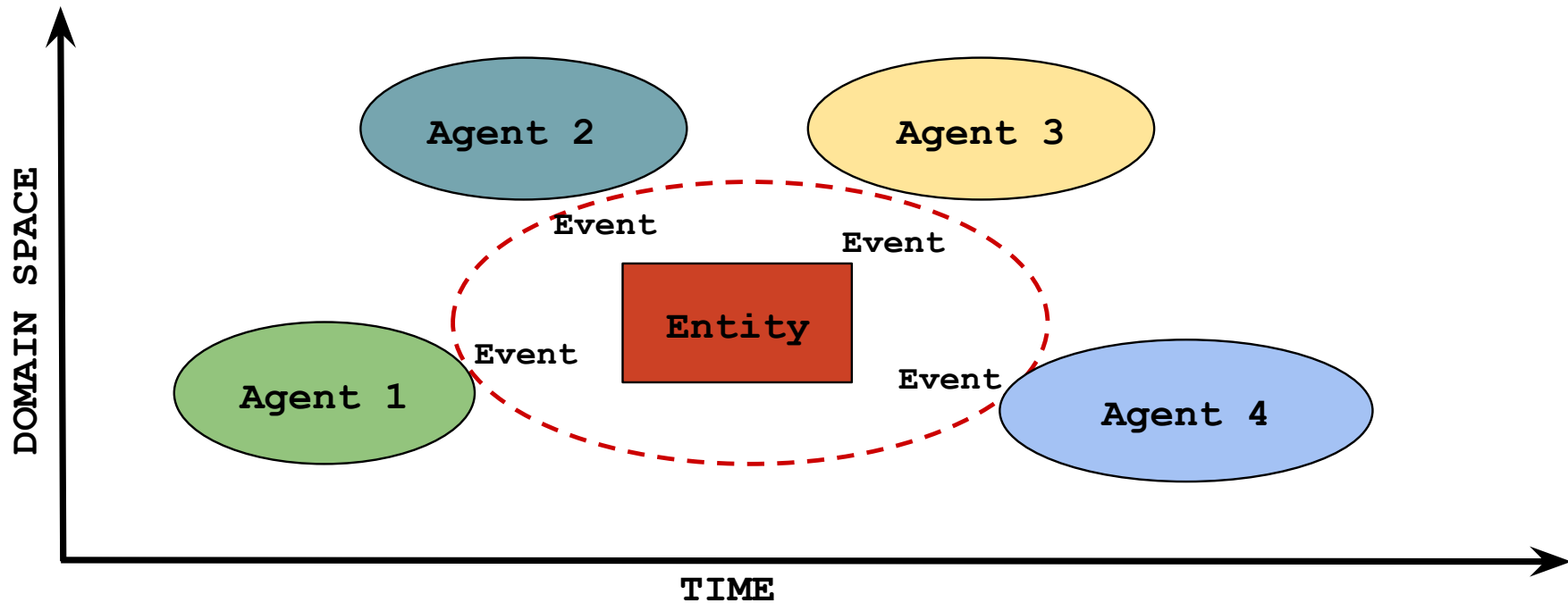


Internet Trust Layer



System Model

■ Entity, Agents and Events



Blockchain – Why ?

- Transparency
- Immutability
- Identity Management
- Codification of Rules
- Trust automation
- User-centric data management*



Blockchain – Where ?

- Life Cycle Tracking
 - Biological
 - Digital
 - Physical
- Process Observability
 - Optimization
 - Incentives
 - Accountability
- Producers and Consumers



Blockchain Networks

Identity

Gig Economy

Insurance

Finance

Healthcare

Education

Agriculture

Transportation

Real Estate

Non-Profits

Travel

Code





Edge + Blockchains

Location-aware Blockchains

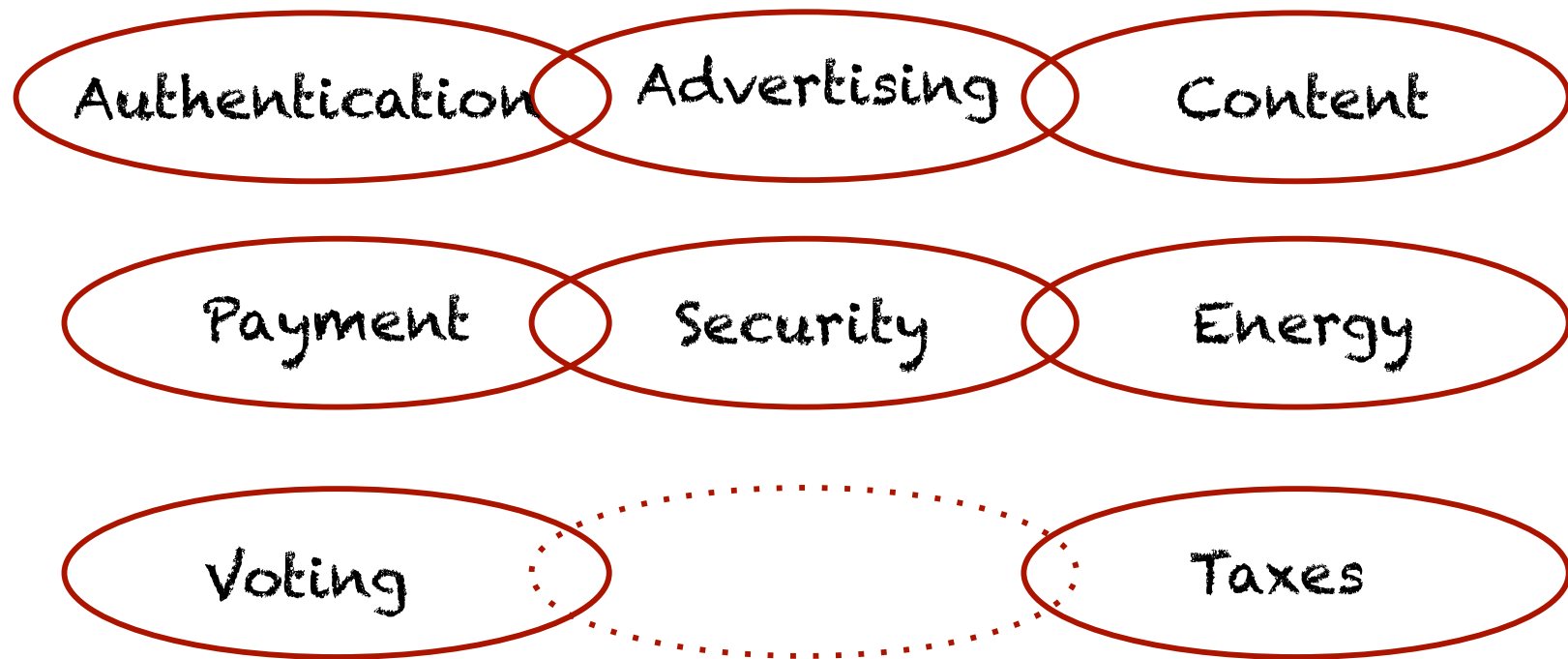


What Changed ?

- Network can capture physical event location*
- Map events in physical space & time
- Another layer of assurance in the system



Edge-aware Blockchains



Research Areas

- Scalability*
- Inter-Ledger transactions
- Privacy
- Web-integration
- Software⁺

***On Blockchain Models and Scalability**

Joint work with

- SnT Center, University of Luxembourg
- IRT Lab, Columbia University



Questions?

