



Blockchain for 5G: Opportunities and Challenges

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Outline

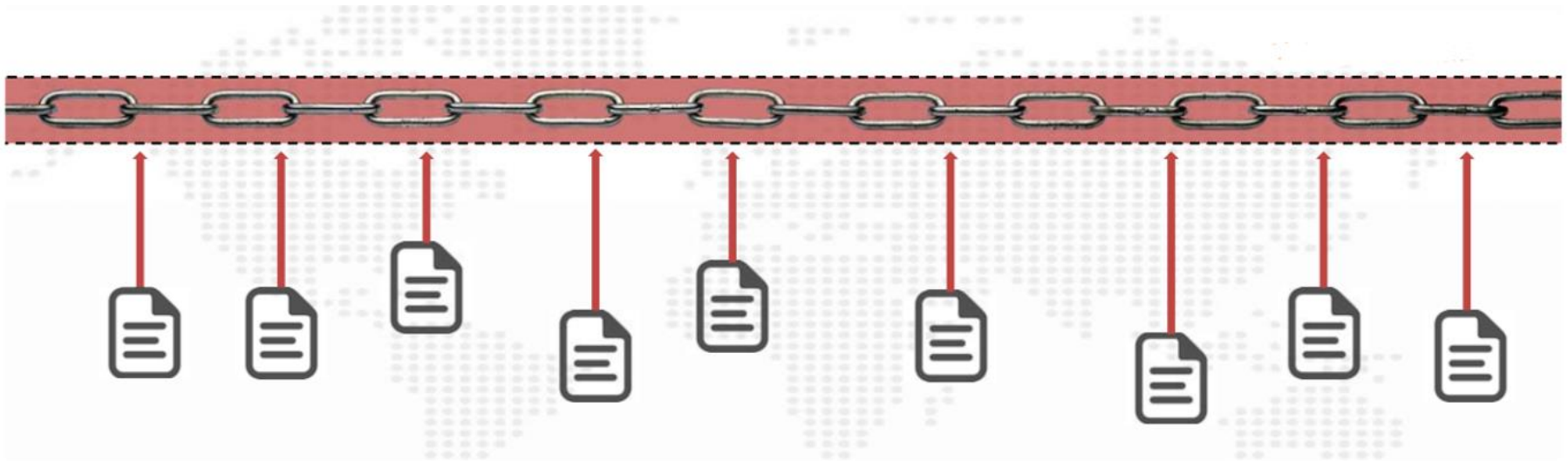
- ❑ Main Contributions
- ❑ Background
- ❑ Opportunities
- ❑ Key Challenges
- ❑ Conclusion



Main Contributions

- ❑ Provide a background on blockchain technology and its key enabling features and components including smart contracts, decentralized storage, decentralized applications, and trusted oracles.
- ❑ Highlight potential and novel opportunities and use cases that arise from integrating blockchain with 5G networks.
- ❑ Provide technical details in the form of system integration architecture and sequence diagrams to show how blockchain along with supporting decentralized technologies can be leveraged for 5G.
- ❑ Identify and discuss key open research challenges to fully leverage the benefits of blockchain for 5G networks and services.

Blockchain-based approach



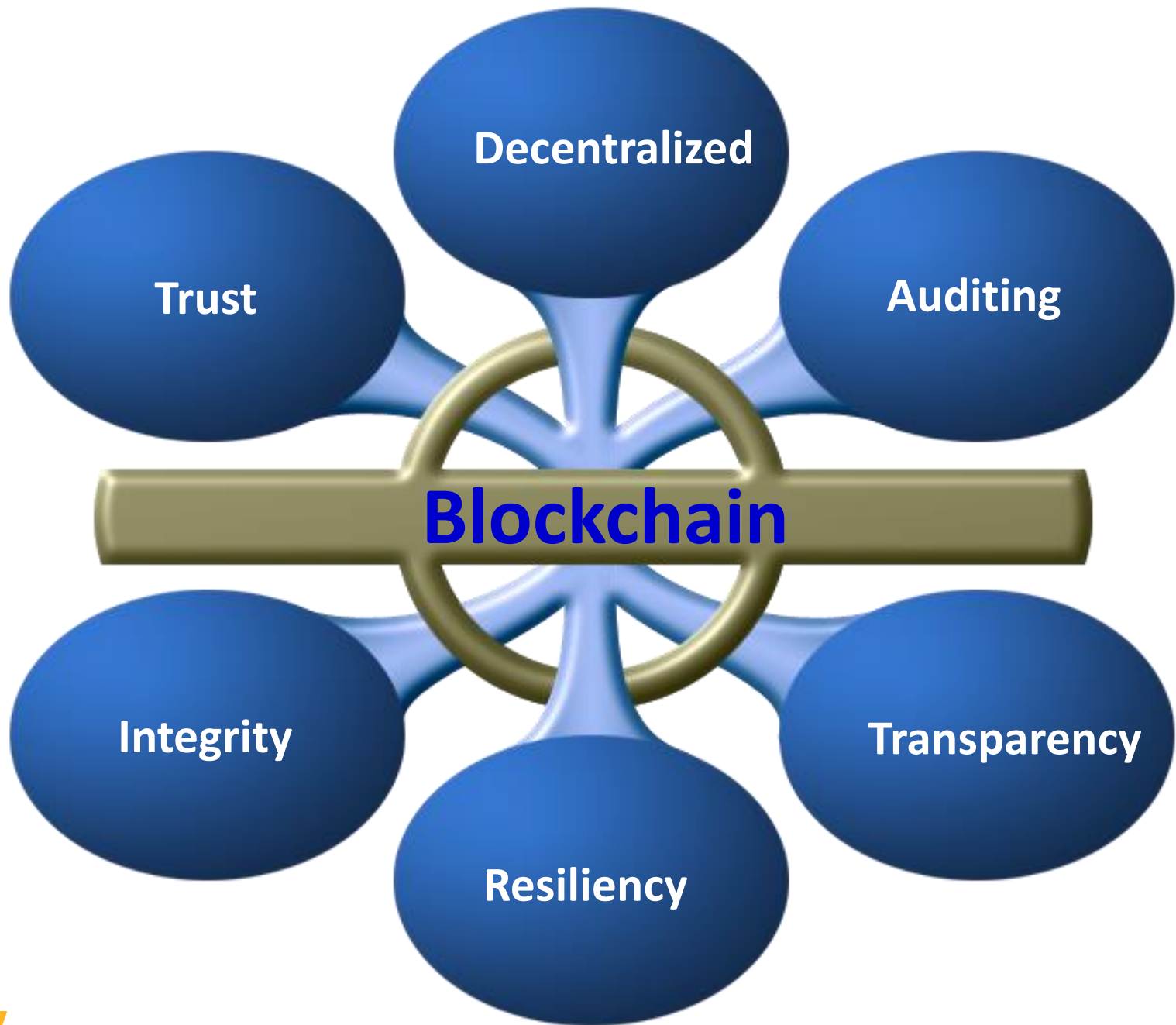
Shared
Ledger

Cryptography

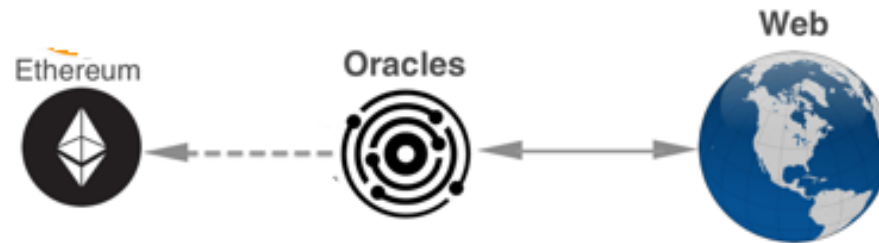
Blockchain

Consensus

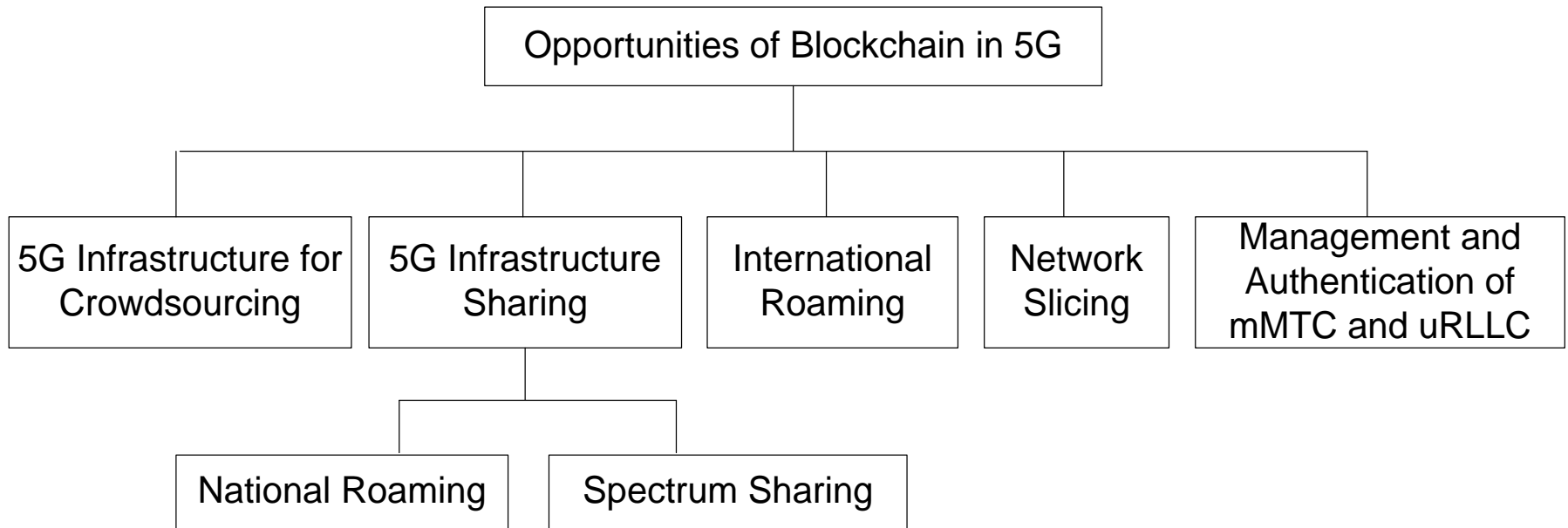
Smart
Contracts



Smart Contracts & trusted oracles & IPFS



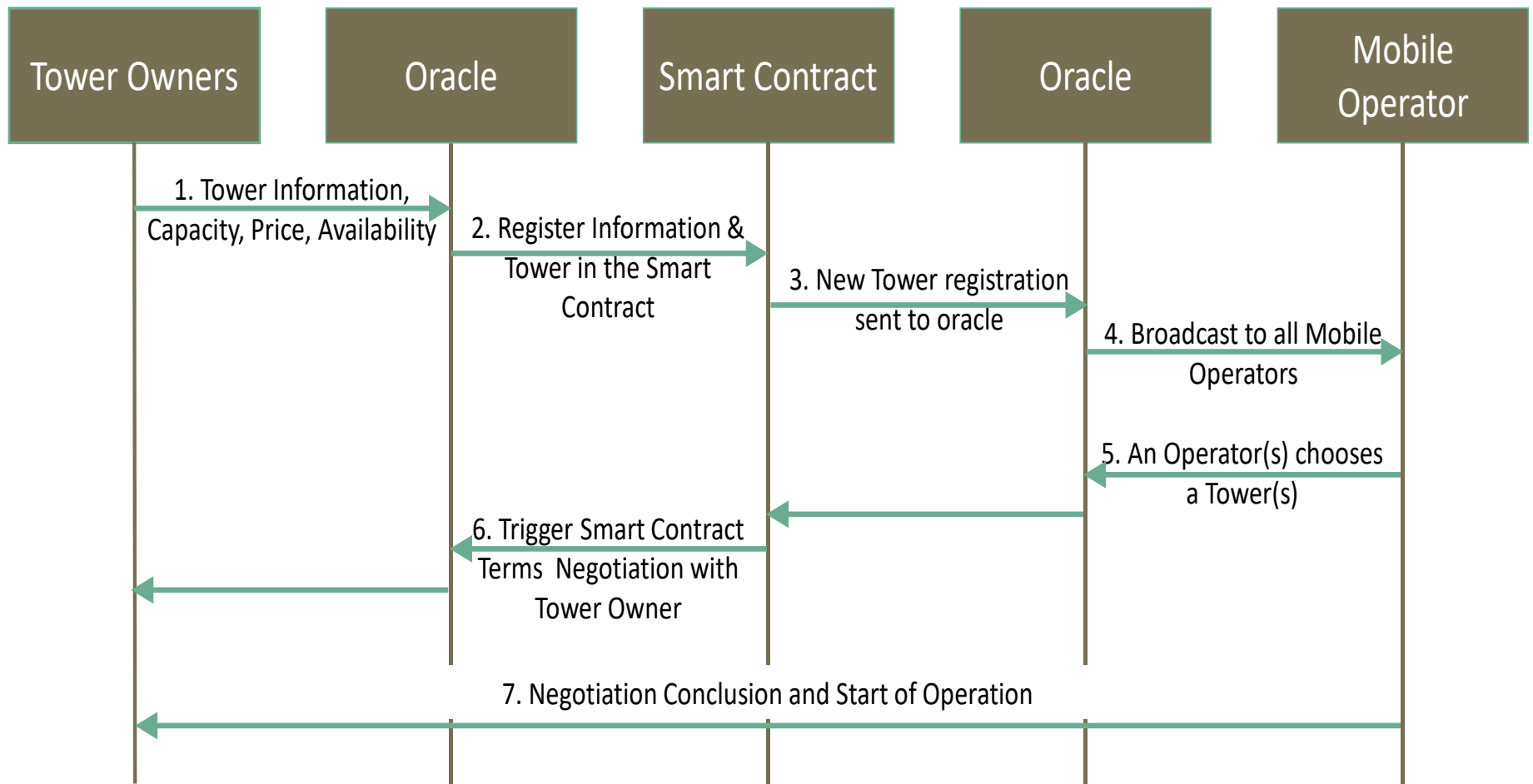
BC for 5G – Opportunities



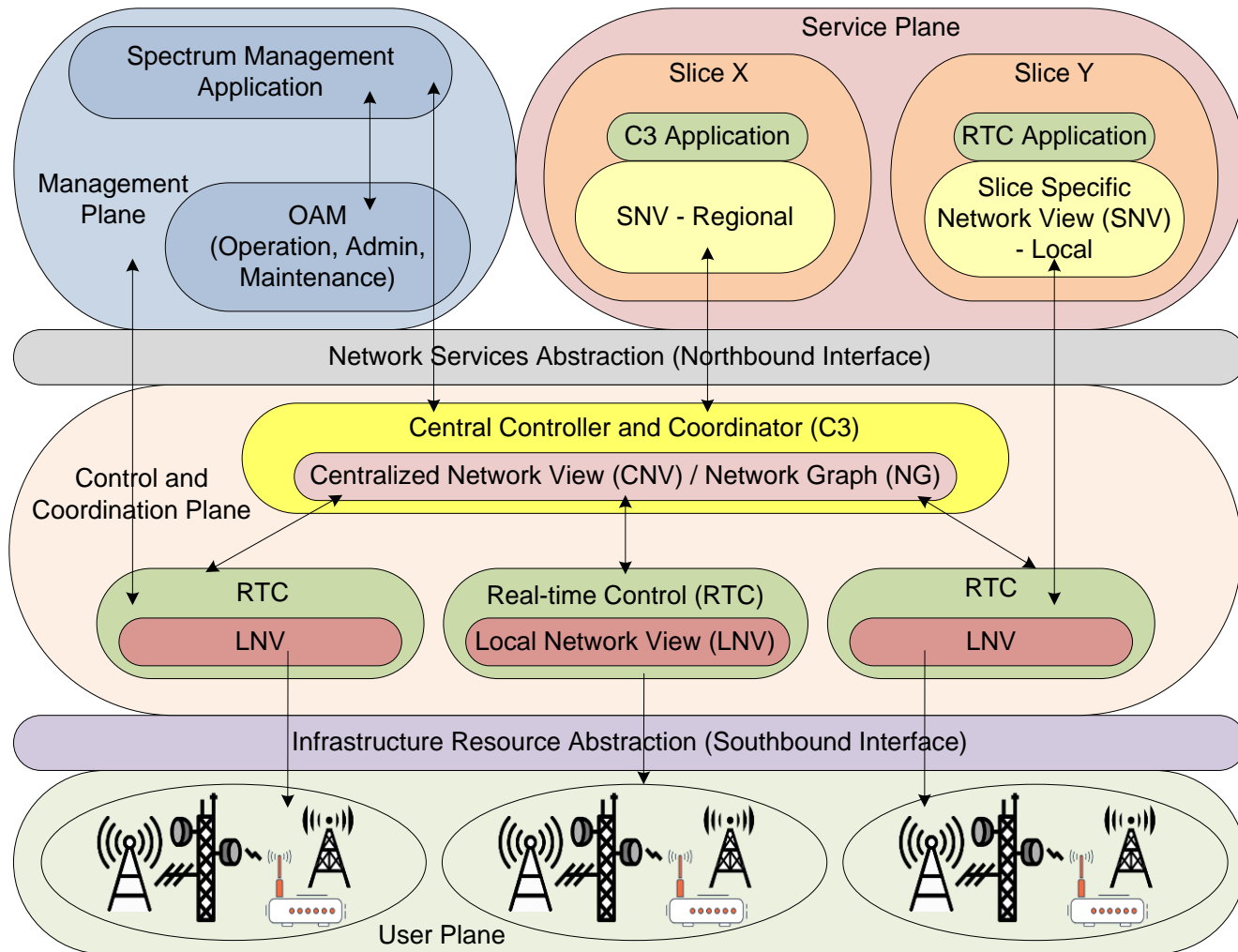
5G Infrastructure Crowdsourcing and Sharing (1/2)

- ❑ Blockchain, SC, Oracles can offer
 - ❖ **registering towers**
 - ❖ **managing and monitoring used resources and SLA**
 - ❖ **automatic charges, billing, and payment in crypto tokens**
- ❑ All in a decentralized trusted manner, while ensuring traceability and transparency.
- ❑ Penalties and incentives can be used to enforce honest behaviors

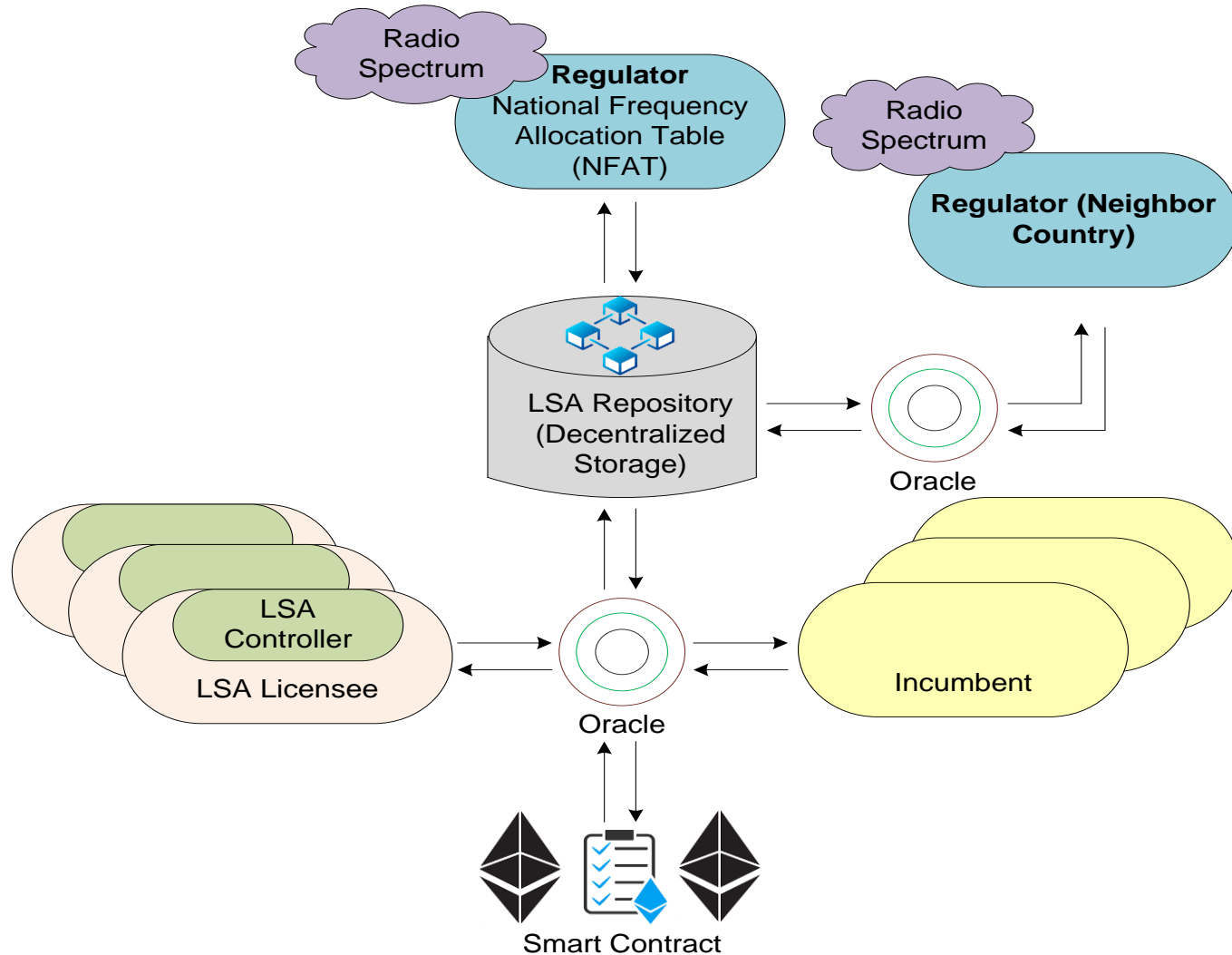
5G Infrastructure Crowdsourcing and Sharing (2/2)



5G Spectrum Sharing and Network Slicing



LSA Sharing



Other opportunities

❑ Autonomous Wireless Networks

- ❖ On-fly bidding and allocation for spectrum, slices, and resources
- ❖ Resource usage and tracking
- ❖ DSA with mobility

❑ Identity, KYC, and authentication of users and millions of devices



Open Challenges

- ❑ Scalability
- ❑ Smart Contracts
- ❑ Standardization and Regulations
- ❑ Privacy
- ❑ Interoperability
- ❑ Naming, Registration, and Reputation
- ❑ Buy-in by all



Conclusion

- ❑ We presented an overview of blockchain along with its key features and supporting elements to support decentralized 5G applications, services, and ecosystems
- ❑ We outlined various opportunities and use cases for blockchain in 5G
- ❑ We identified several open research challenges



Thank you !

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