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# Blockchain Enabled Distributed Data Management
# A Vision

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# Motivation

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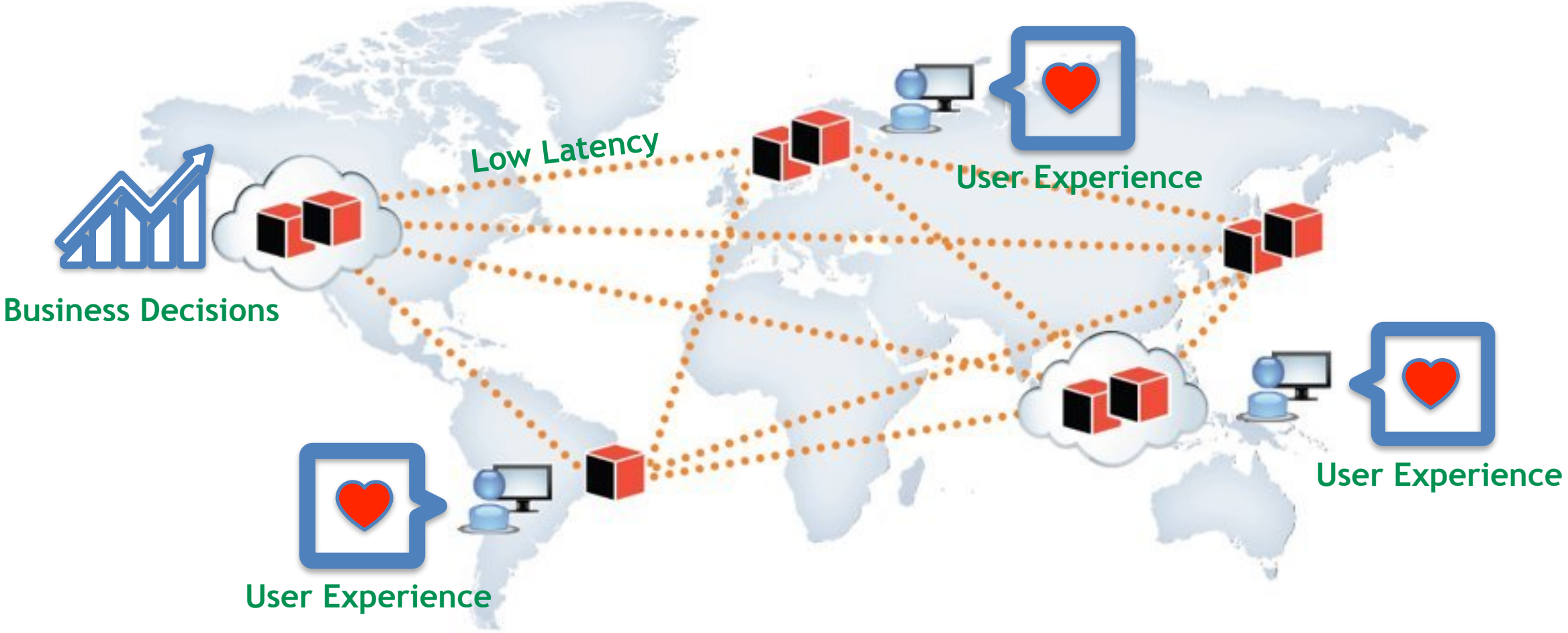


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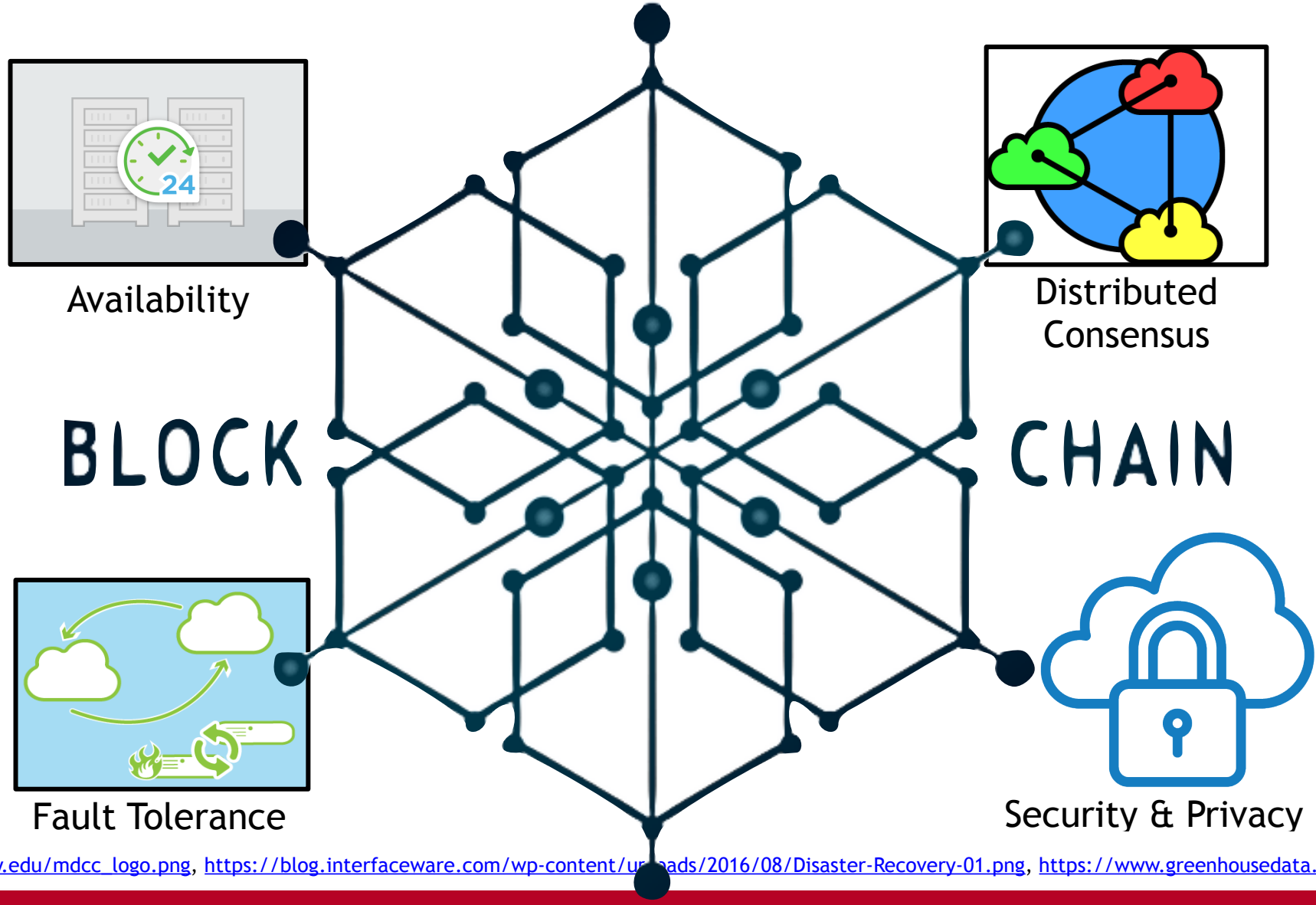
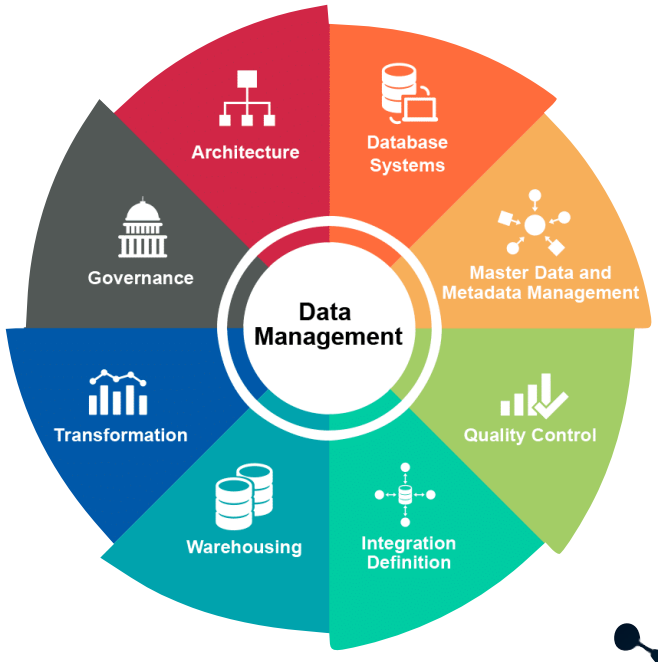
# Motivation




http://mdcc.cs.berkeley.edu/mdcc_logo.png, https://blog.interfaceware.com/wp-content/uploads/2016/08/Disaster-Recovery-01.png, https://www.greenhousedata.com/uploads/images/blog/HA-DR.png

# Agenda

- Blockchain + Distributed Transaction & Data Management
- Recent Trends
- Distributed Transaction Management
- Blockchain Transaction Management
- Heterogeneous Consistent Data Store



- https://www.blastam.com/wp-content/uploads/data_management_chart.png

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# RECENT TRENDS

# Blockchain Data Management: Existing Works

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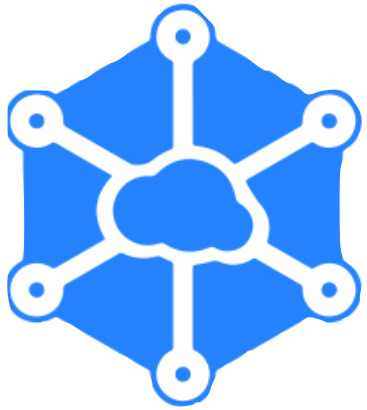

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BIGCHAIN DB

# Blockchain Data Management: Existing Works

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- Different takes on integrating/utilizing blockchain for data management
- Acknowledge that they are designed for multiple different purposes
- Limited support for Data or Transaction management

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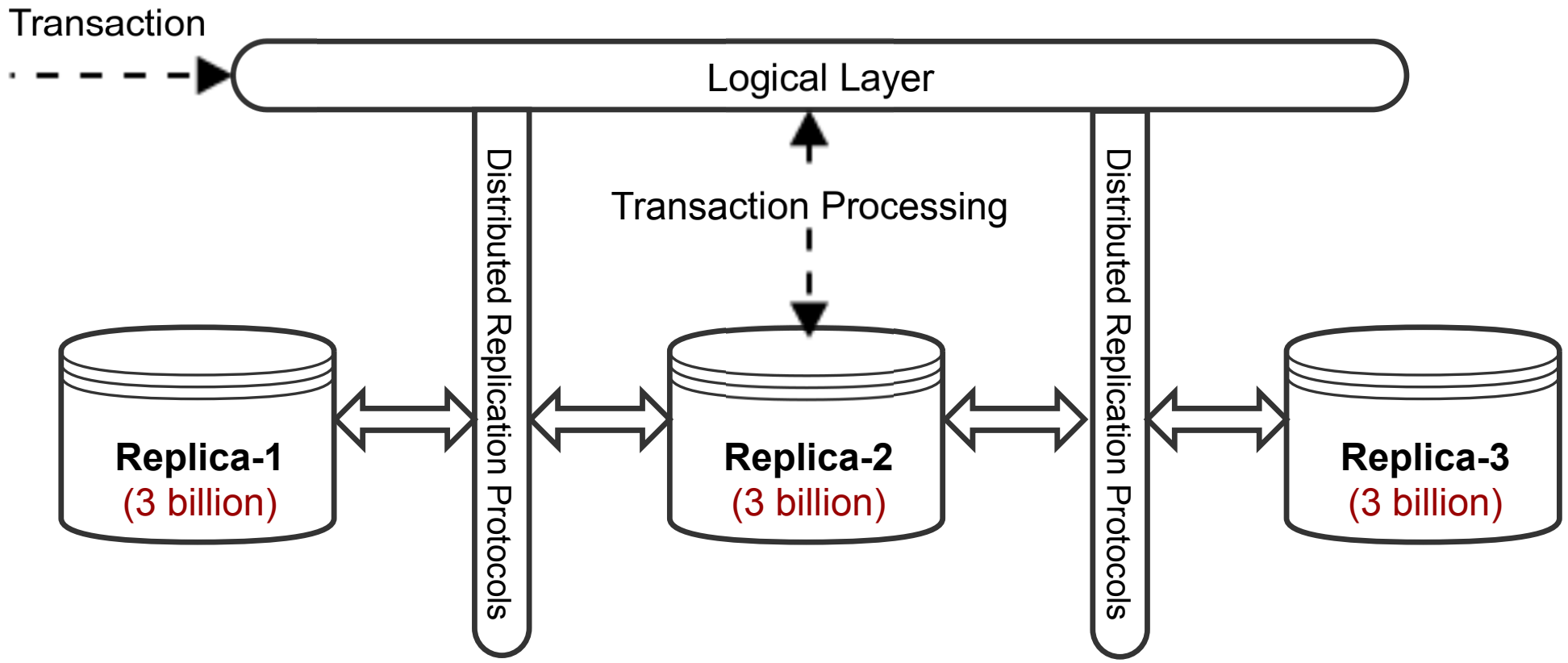
# DISTRIBUTED TRANSACTION MANAGEMENT

# State Machine Replication



# Blockchain Based Replication

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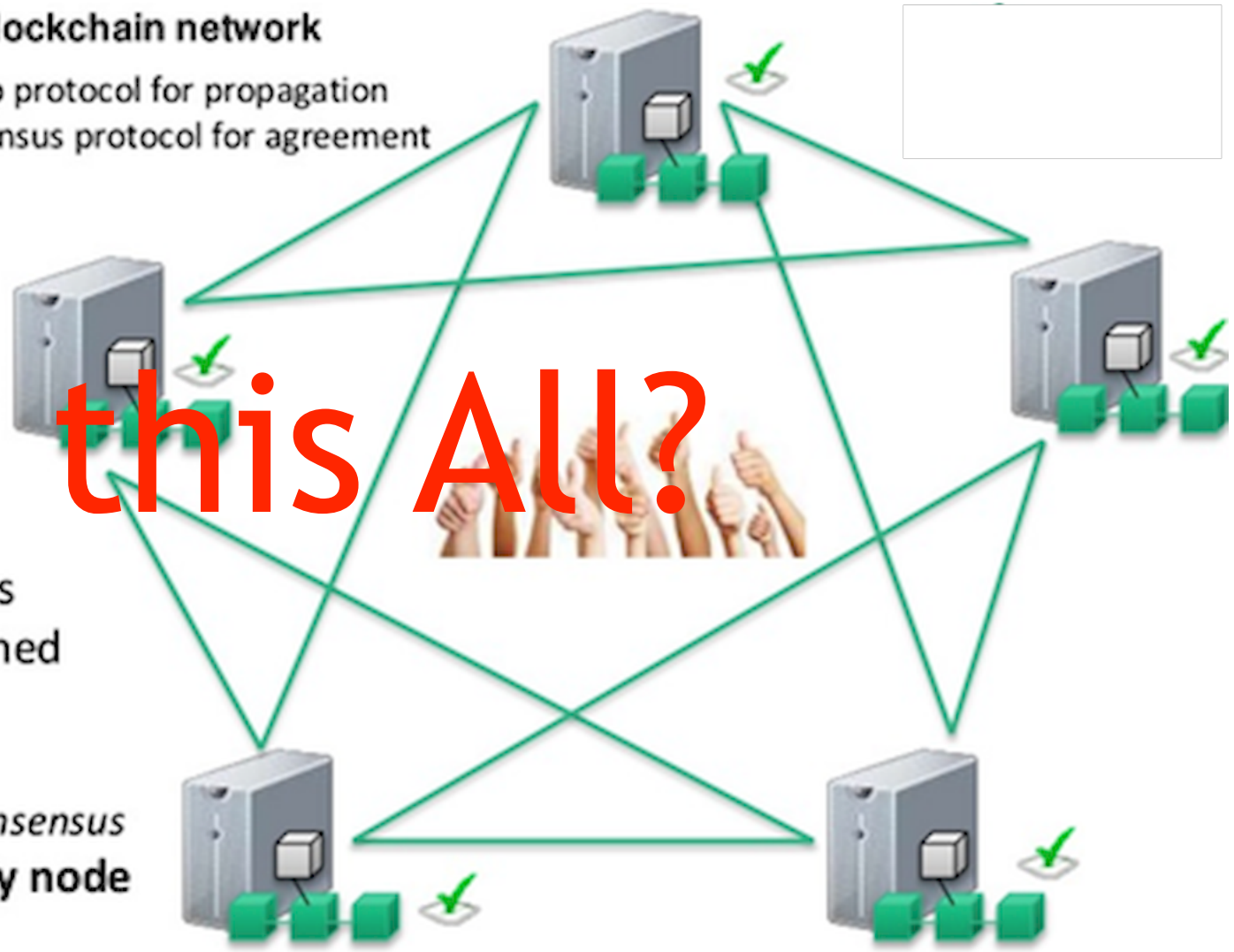
**Blockchain network**

- Gossip protocol for propagation
- Consensus protocol for agreement



Is this All?

- **Immutable public ledger**
  - Timestamped transactions
  - Audit trail of what happened
- **Every node hosts a replica**
  - Distributed consensus
    - *No central owner of consensus*
- **Transaction is verified by every node**

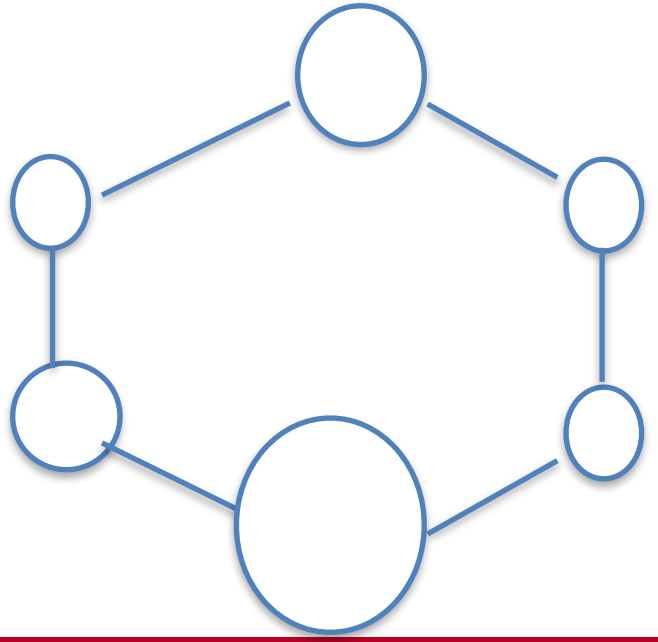
https://www.finyear.com/photo/art/default/9539722-15321439.jpg?v=1464096943

# BLOCKCHAIN TRANSACTION MANAGEMENT

# Blockchain + Data/Transaction Management Features

- Databases/Data stores generally operate inside trusted environments
  - Security no longer primary concern
  - State Machine Replication is much more efficient

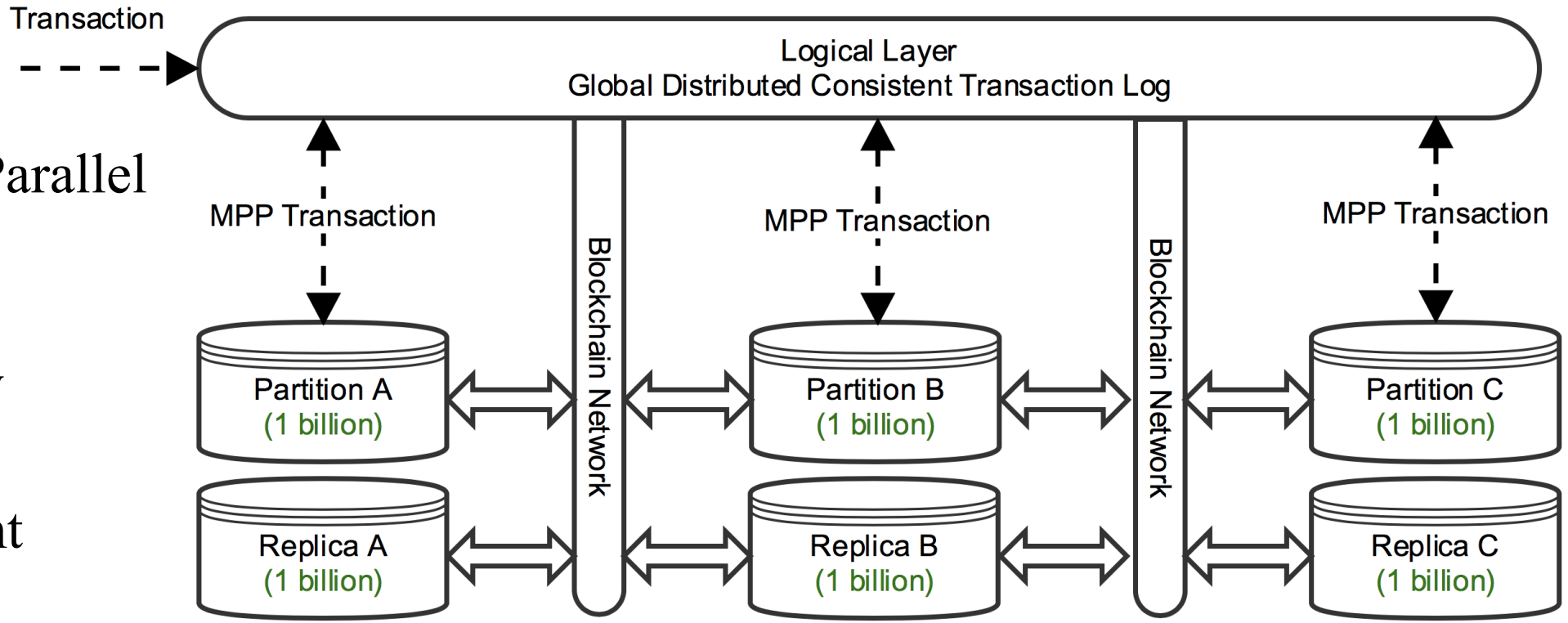
- Blockchain can handle unequal participants
  - Can support partitions



https://blog.nxp.com/wp-content/uploads/2014/10/Smarttouch.jpg

# Distributed Transactions

- Massively Parallel Processing
- Distributed Consistency
- Uncertainty Management



# Unified Heterogeneous Data Store

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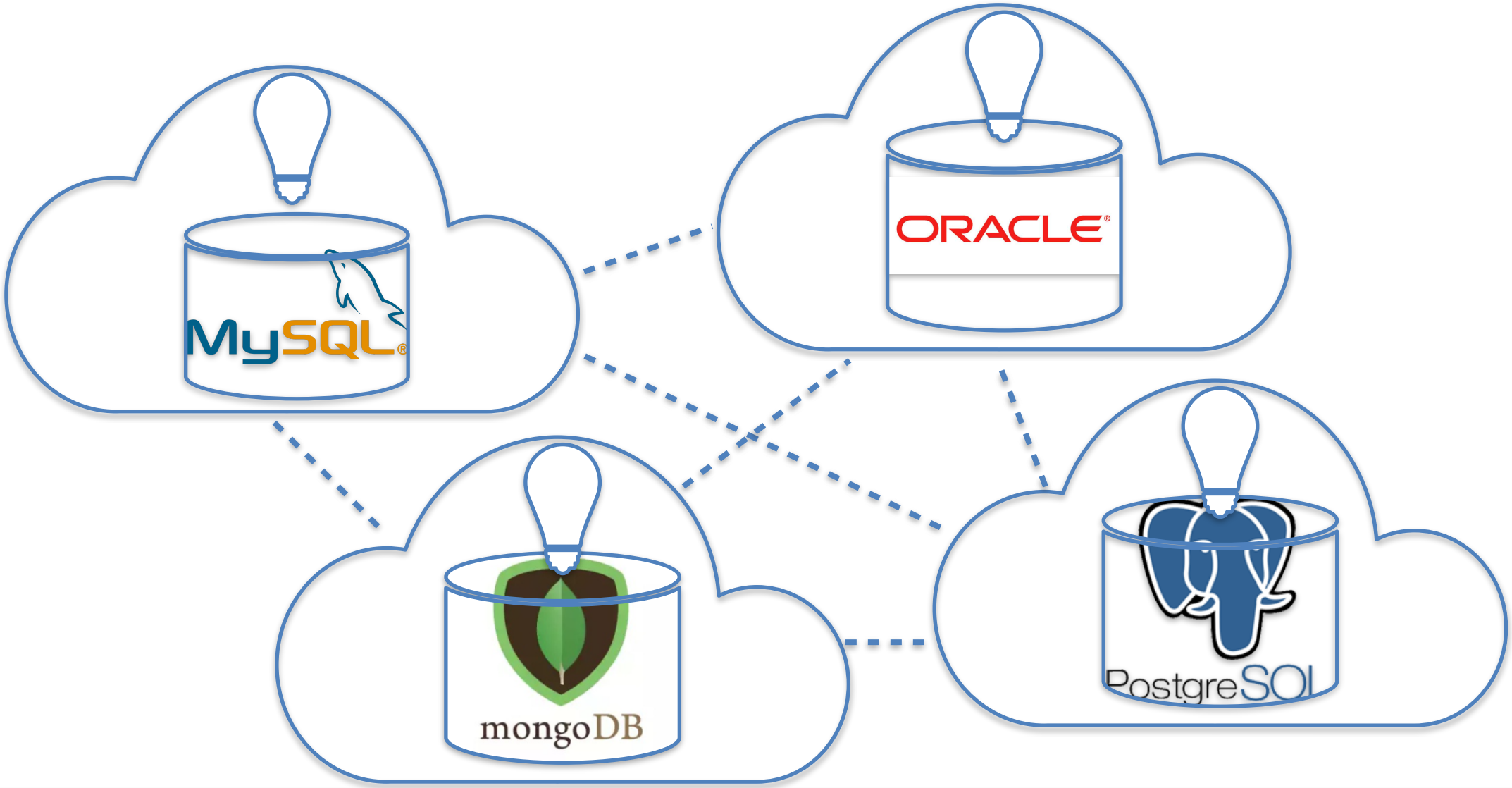

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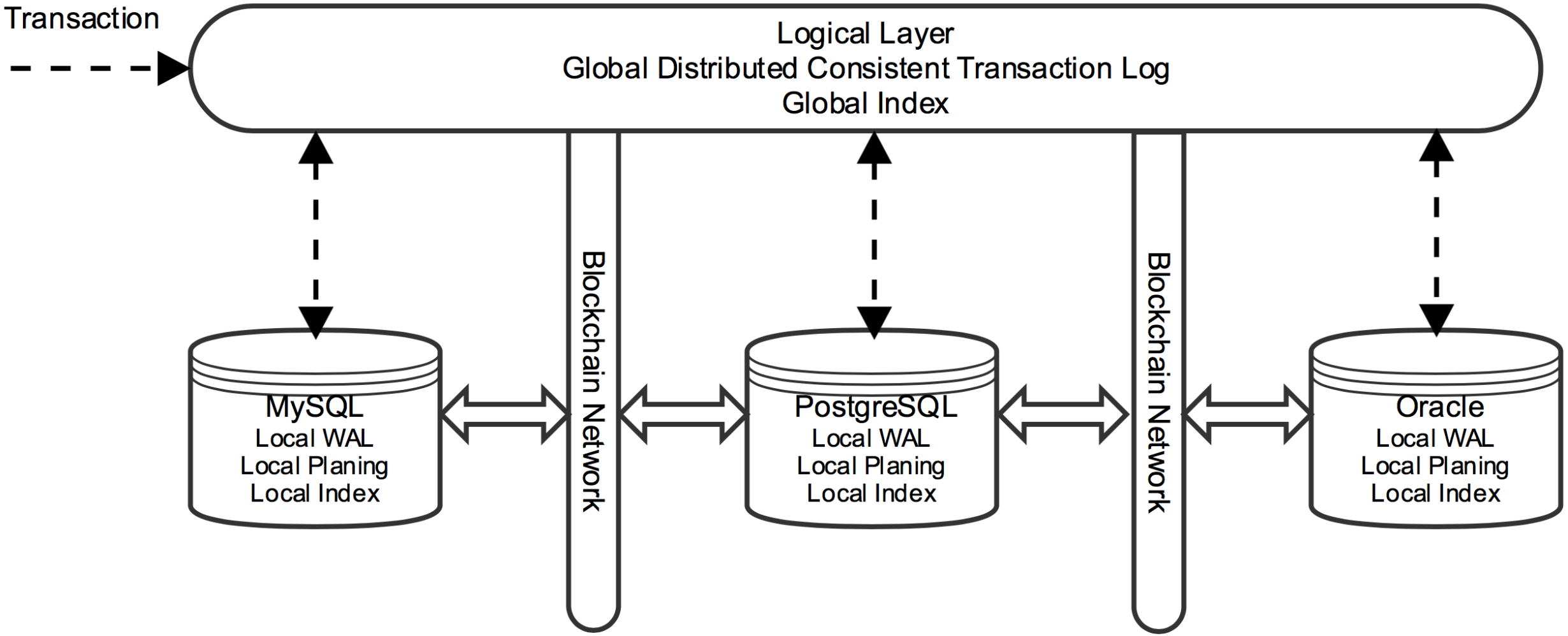

# Summary

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- Geographically distributed data stores are becoming important
- Blockchain - suitable for distributed data and transaction management?
- Distributed Transaction Management - State Machine Replication
- Blockchain Transaction Management - More than State Machine Replication
- Unified Heterogeneous Data Store

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# Thank You

# Any Questions?