BallotBR
A Blockchain-Based Architecture for Enterprise Ballot

Presenter:

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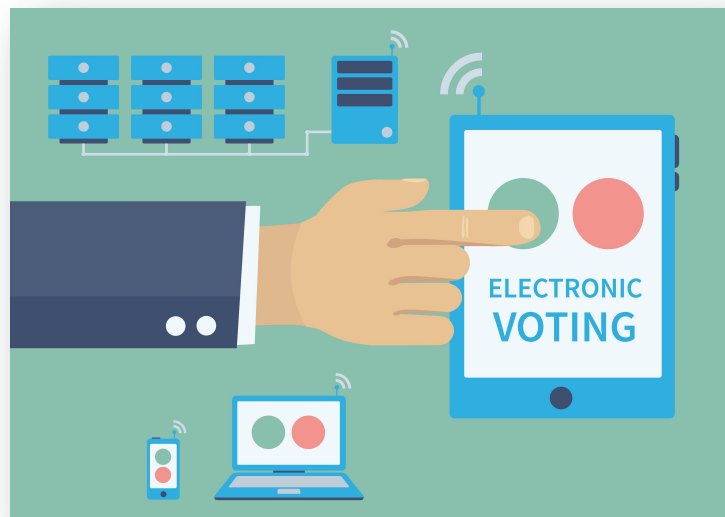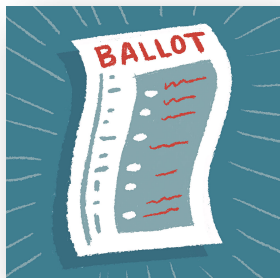Laboratory of Software Engineering @ PUC-Rio

Co-Authors:

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Summary

- Introduction

- Background

- Related Work

- Requirement Analysis

- BallotBR: An Enterprise Ballot System

- Conclusions and Future Work

Introduction

Introduction

| Requirements	E-Voting Systems	Enterprise Ballot
Correctness and verifiability	Yes	Yes
End-to-end verifiability	Yes	Yes
Ballot secrecy	Yes	Yes
Secret ballot	No	Yes
Voting groups	No	Yes
Group companies	No	Yes
Voting sections	No	Yes

Table 1. General requirements in e-voting systems and enterprise ballots.

Background

Source: André Ribeiro / Petrobras Image Database

Background
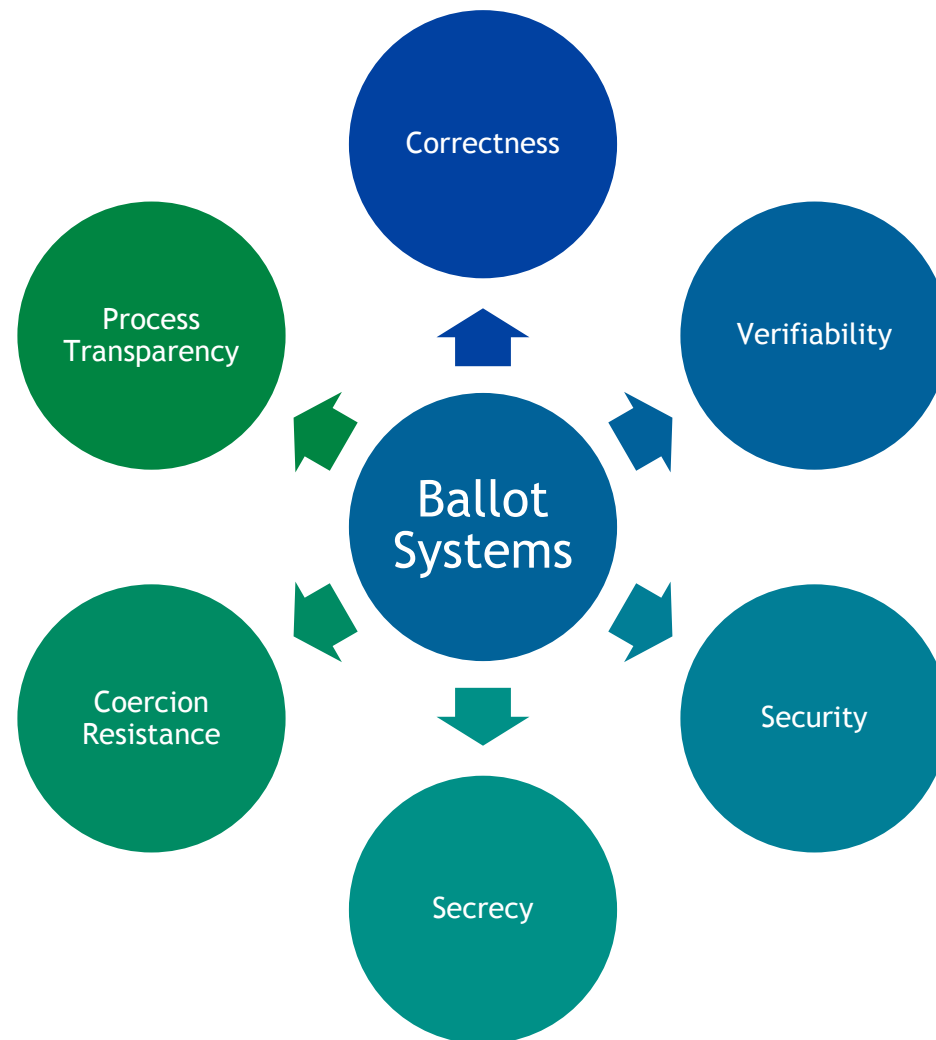
Related Work

E-voting Systems

- E-voting with blockchain: An e-voting protocol with decentralisation and voter privacy. Hardwick, F. S., Gioulis, A., Akram, R. N., and Markantonakis, K. (2018);

- Broncovote: Secure voting. Dagher, G., Marella, P., Milojkovic, M., and Mohler, J. (2018).

- Measuring ethereum network peers. Kim, S. K., Ma, Z., Murali, S., Mason, J., Miller, A., and Bailey, M. (2018).

- Blockchain-based e-voting system. Hj´almarsson, F., Hreiarsson, G. K., Hamdaqa, M., and Hj´almt`ysson, G. (2018).

Related Work

E-voting Systems

- The ballot is busted before the blockchain: A security analysis of voatz, the first internet voting application used in us federal elections. Specter, M. A., Koppel, J., and Weitzner, D. (2020).

- E-voting system evaluation based on the council of europe recommendations: Helios voting. Alonso, L. P., Gasco, M., del Blanco, D. Y. M., Alonso, J. A. H., Barrat, J., and Moreton, H. A. (2018).

- Civitas: Toward a secure voting system. Clarkson, M. R., Chong, S., and Myers, A. C. (2008).

Requirements Analysis

System roles and permissions:
- staff;
- representative/alternate;
- assistant;
- Viewer/assistant;
- partner staff;

Other Requirements:
- Configuration of voting options (agree, disagree, abstention or any other) with justification;
- Vote tallying;
- Abstention rule;
- Partial and final results can be viewed in real time.

Systems Comparison

Feature	BallotBR	Helios	Civitas	BroncoVote
[F01] Account management	Yes	Partially	Yes	Yes
[F02]Committee management	Yes	No	No	No
[F03] Resolution management	Yes	Yes	Yes	Partially
[F04] E-mail notification	Yes	Yes	No	N/A
[F05] Dashboard of on-going resolutions	Yes	No	No	No
[F06] Resolution due date extension	Yes	Yes	N/A	No
[F07] Suspension of resolution	Yes	Yes	N/A	No
[F08] Withdraw resolution	Yes	No	Yes	No
[F09] Removal of participant in-progress Resolution	Yes	No	N/A	No
[F10] Approval rate configuration	Yes	Partially	No	No
[F11] Abstention Vote Behavior Configuration	Yes	Partially	No	No
[F12] Multiple Voting Options Configuration	Yes	Yes	Yes	Yes
[F13] Send notice	Yes	No	No	No
[F14] Resolution questions and answers	Yes	No	No	No
[F15] Notice questions and answers	Yes	No	No	No
[F16] Search questions and answers	Yes	No	No	No
[F17] Real time visualization of partial and final result	Yes	No	No	No
[F18] Export resolution result to PDF	Yes	No	No	No
[F19] Search attachments	Yes	No	No	No
[F20] Implemented in blockchain	Yes	No	No	Yes

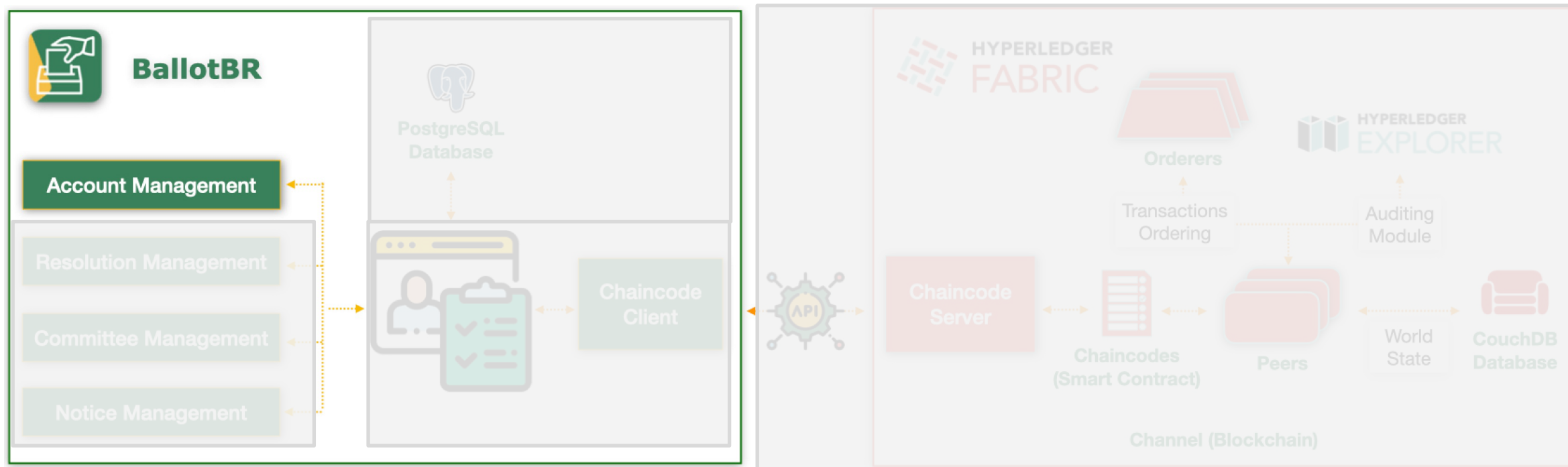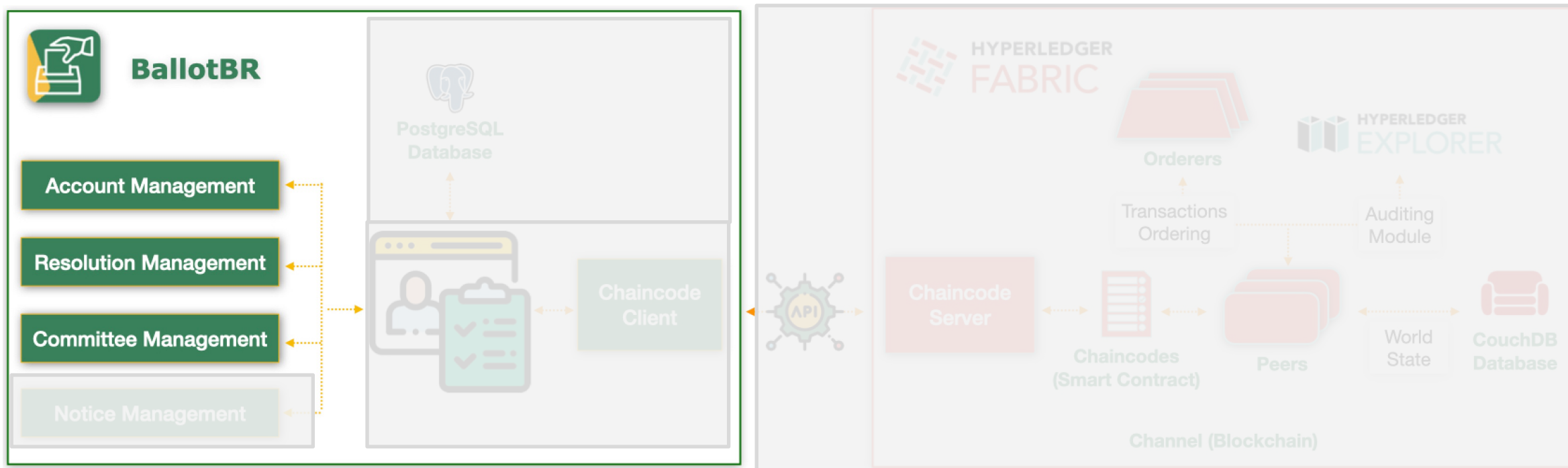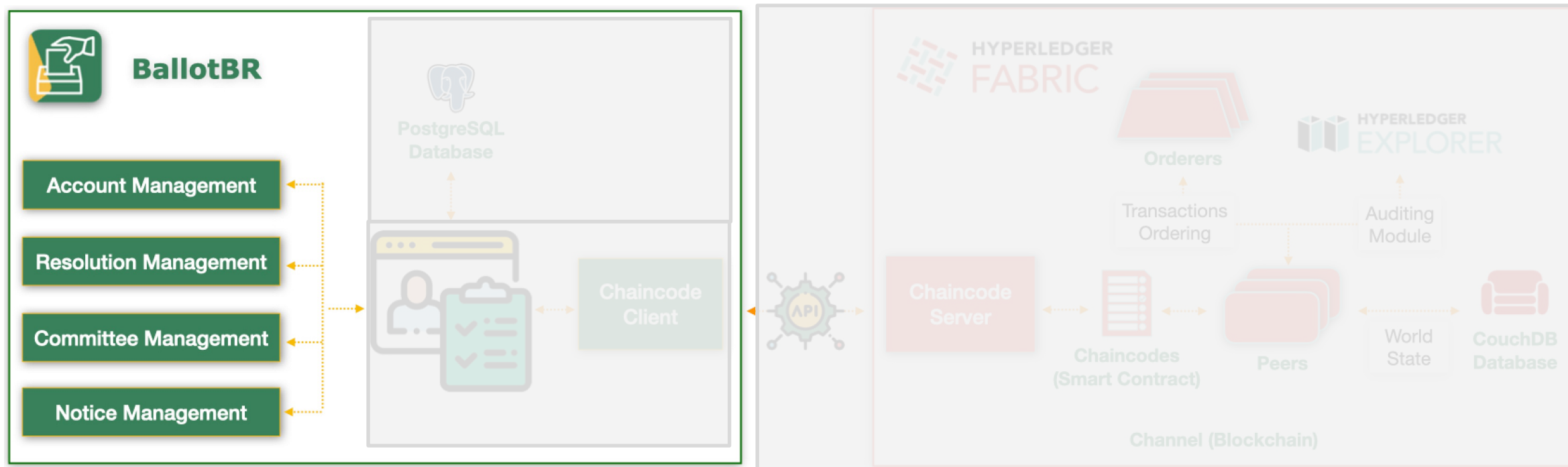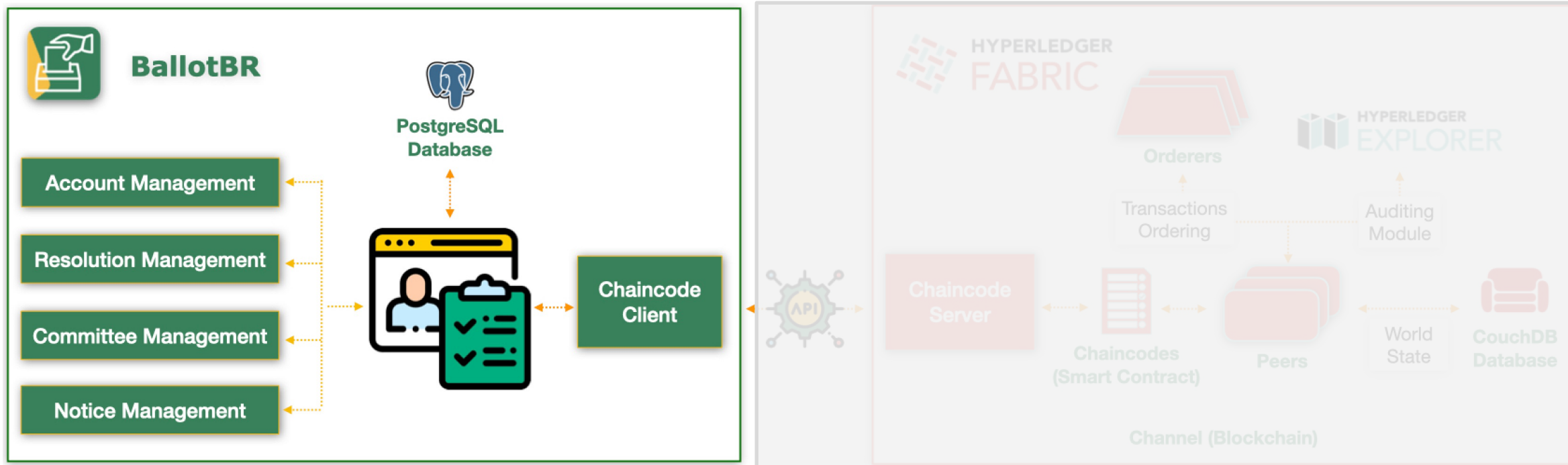Table 2. Systems comparison.

Proposed Solution
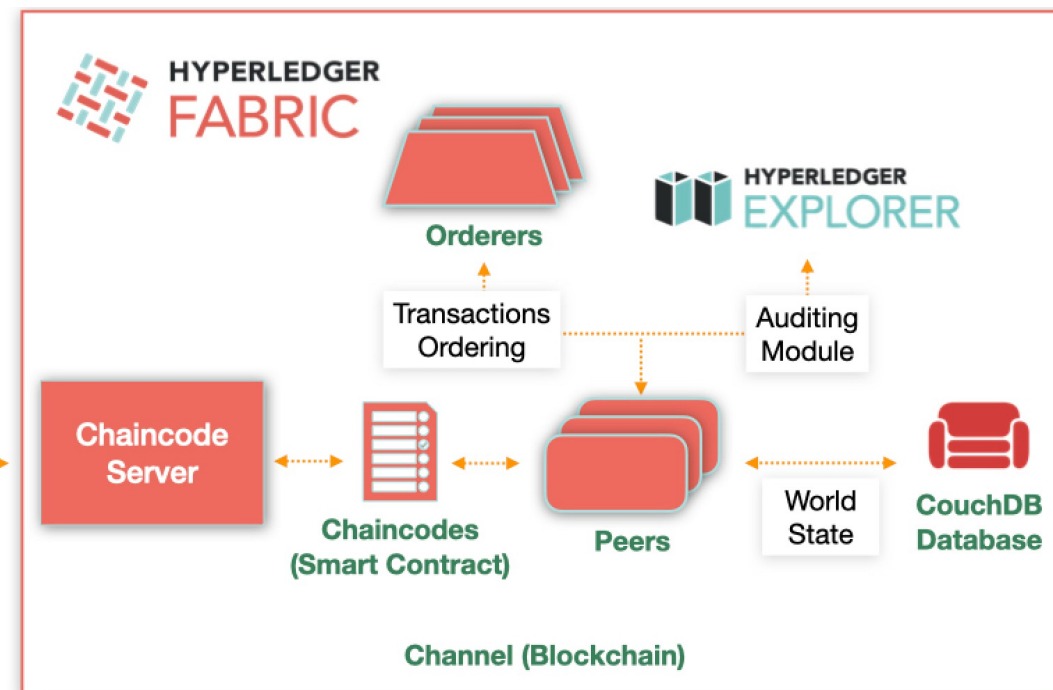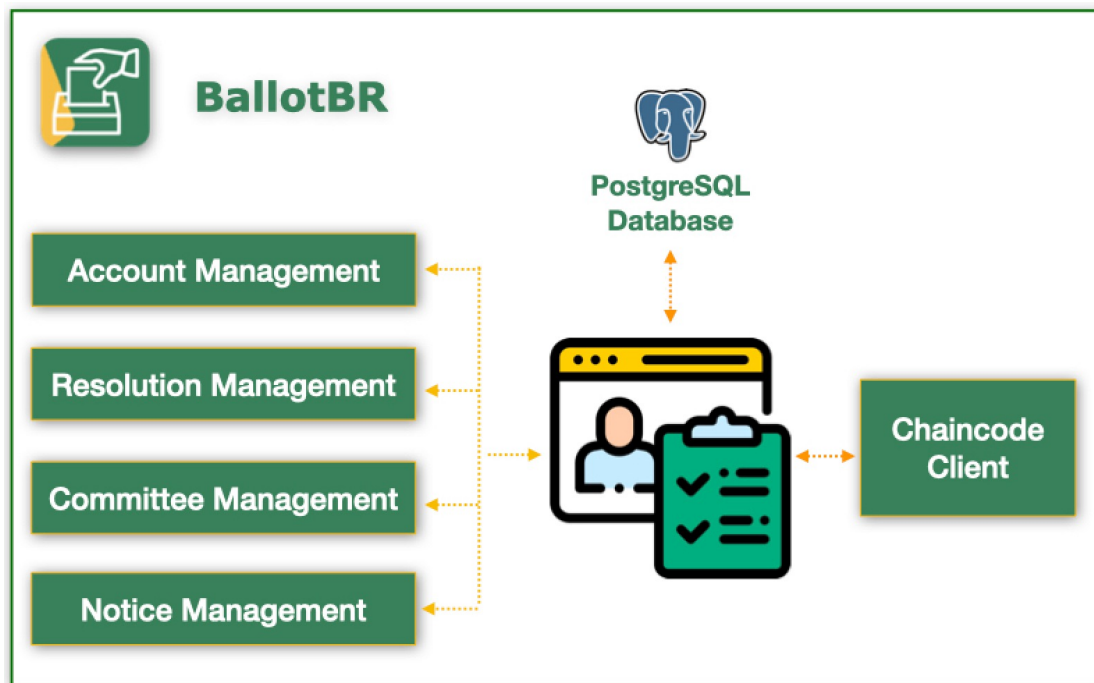
A Blockchain-Based Architecture for Enterprise Ballot

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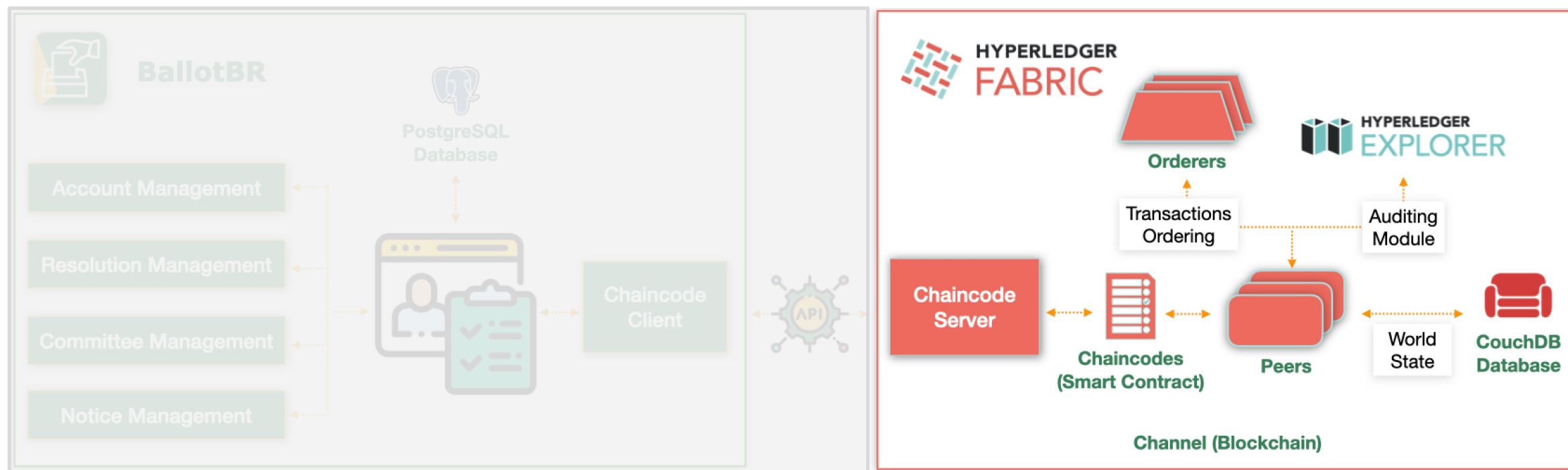## A Blockchain-Based Architecture for Enterprise Ballot
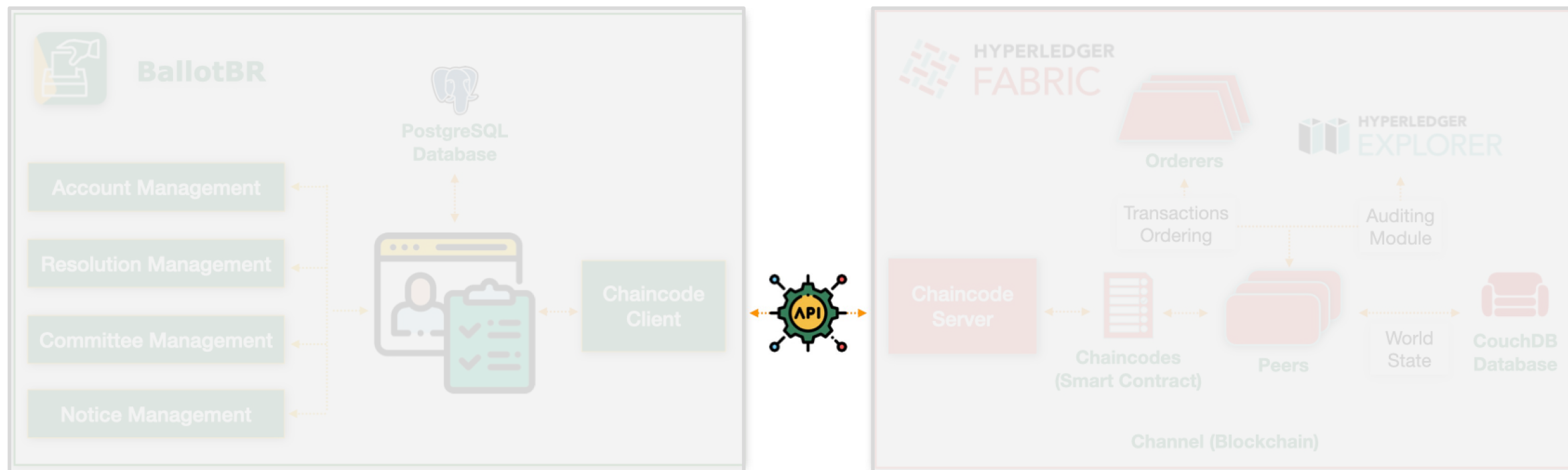
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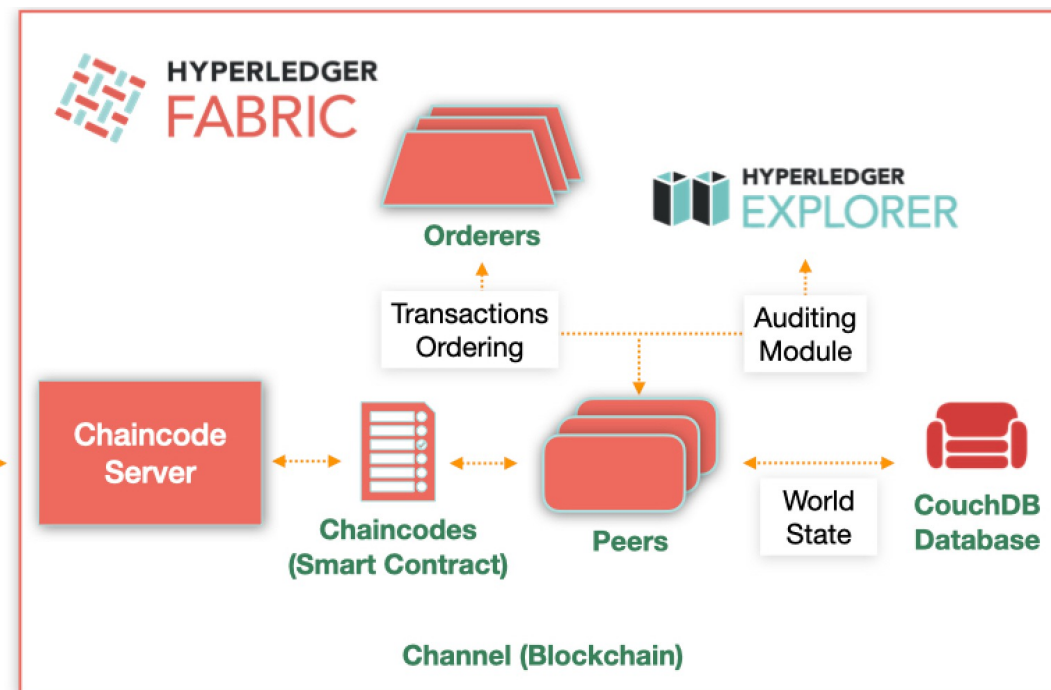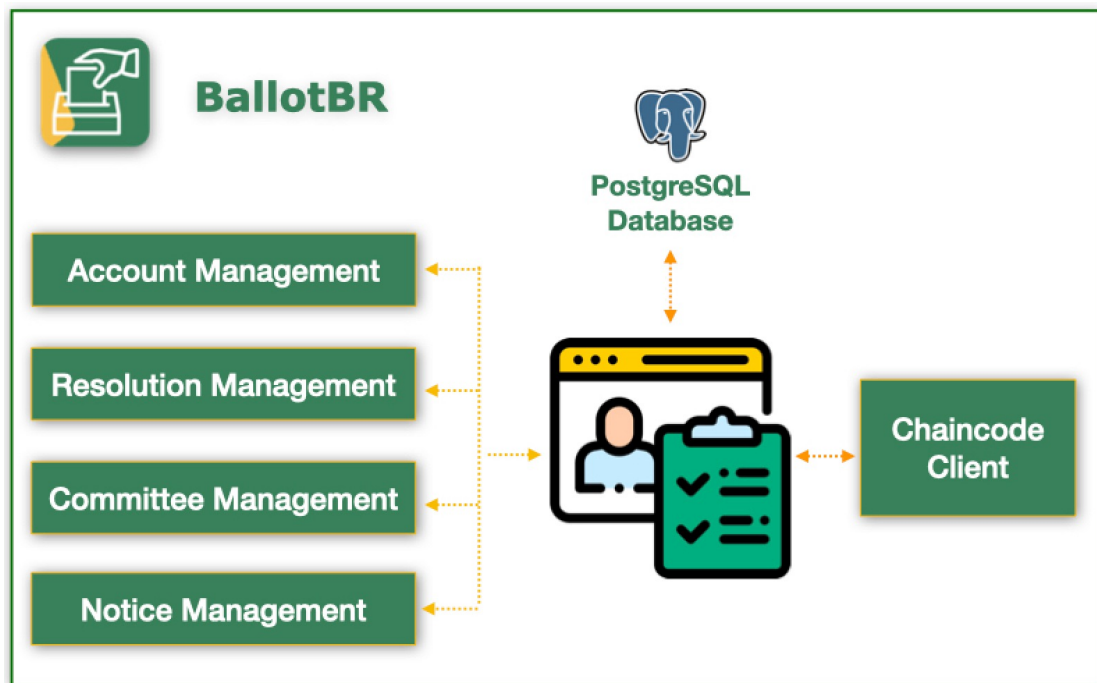
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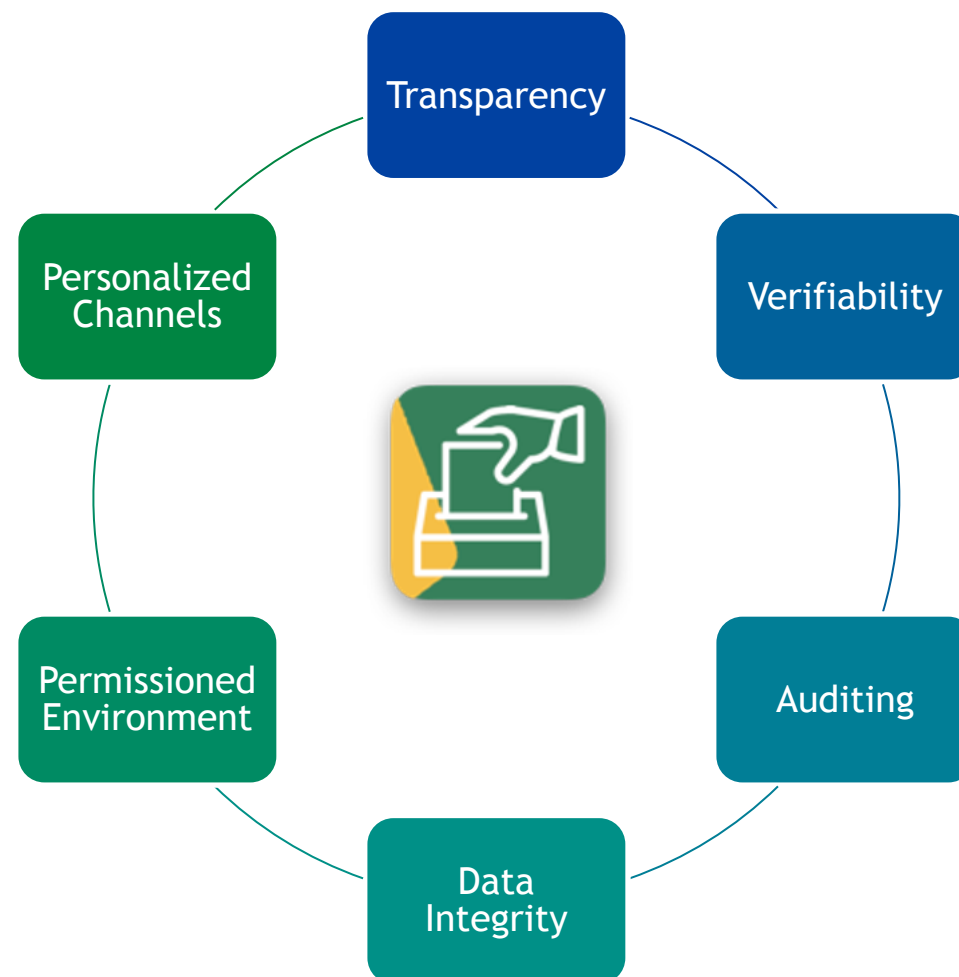
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Main takeaways

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- Transparency
- Verifiability
- Auditing
- Data Integrity
- Permissioned Environment
- Personalized Channels

Conclusions and Future Work

Contributions:

- Requirements elicitation for enterprise ballots

- Systems comparison

- Blockchain architecture for enterprise ballots

Conclusions and Future Work

Future Work:

- Expand the scope;

- Consider vote anonymization;

- Evaluate the coercion issues;

- Evaluate interoperability issues that may arise in the future through the use of different blockchain platforms (e.g., Corda, Ethereum), and

- Execute performance tests.

Thank you

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