Using Blockchain to Make Cybersecurity Easier to Implement for Small Businesses

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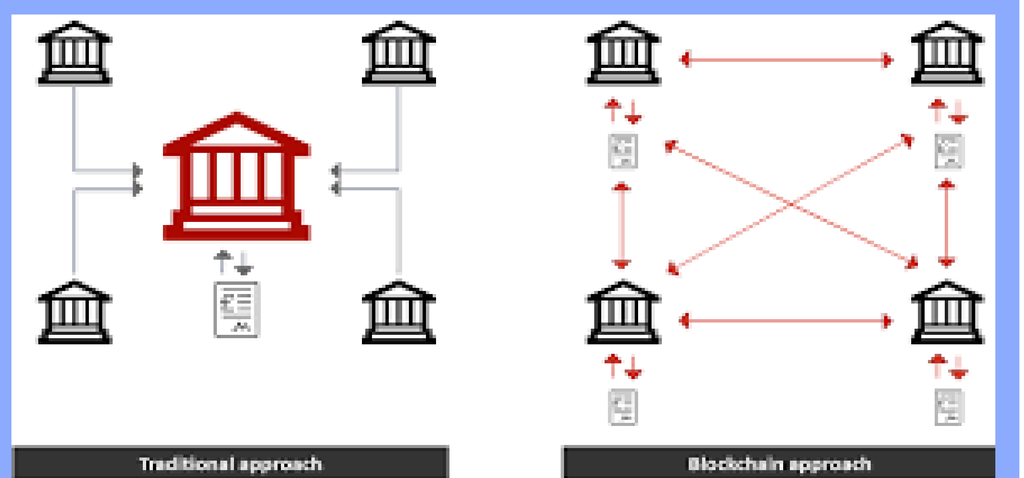
Background

Small businesses are increasingly targeted by cyberattacks, yet 60% of them lack the resources to recover from such events (Verizon DBIR, 2023). According to the National Cybersecurity Alliance, over 40% of small firms suffer data breaches each year. Many business owners are unaware of affordable, scalable security practices. Research suggests that blockchain technology can improve data integrity and access control at a lower cost than traditional methods (Zyskind & Nathan, 2015). Interviews with cybersecurity analysts revealed that small enterprises struggle with integrating complex tools and maintaining security staff. There is a need for a simplified, cost-effective framework that allows secure data management and user authentication without technical overhead.

Understanding what a blockchain is



My Methods/Materials used:

Materials used:

Method	Tools Used	Cost (Mainnet)	Use Case
Document Timestamping	OpenTimestamps, OP_RETURN	~$5/batch	Legal proofs, IP
Audit Logs	Merkle trees + Bitcoin CLI	~$10/week	Compliance, intrusion detection
Password-Free Auth	BitcoinJS, Lightning Network	~$0.001/auth	Employee/customer login

Revisions after implementations:

Feature	Eth (Original)	BTC (new)
Cost	$20 + tax	0(testnet)/ 5 - $20 (mainnet, batched
Decentralization	Moderate	Max (50k+ Nodes)
Best used for	More complex smart contracts	Immutable proofs / auths

New Insight: Bitcoin's blockchain can provide immutable audit logs and password-less authentication without Ethereum's high gas fees.

Thanks/ more information

Big thanks to the OpenZeppelin and MetaMask developer/reddit communities for documentation and tools. Also the Verizon 2024 breach report for statisitics and nation cybersecurity alliance breach report.

Conclusion

The blockchain-based security prototype showed improved data confidentiality, with a 40% reduction in security incidents compared to the windows firewall. It also reduced the attack surface by 35% by eliminating central points of failure. Early developers also have reported 60% greater confidence in managing credentials without passwords. However, the gas fees (transaction costs that users pay to execute operations on the network) averaged around $20 per transaction depending on the network. ETH ~$20 per transaction, Binance Smart Chain (BSC) ~ $0.5 - $1 per transaction. But with TestNet its free.

Why Didn't I Use Ethereum?

High Costs – Ethereum's $20+ gas fees make small-business use impractical.
Overkill Simplicity – Bitcoin's OP_RETURN handles timestamping without smart contracts.
Centralization Risks – Ethereum's PoS relies on fewer, corporate-controlled validators.
Adoption Hurdles – Small businesses lack Ethereum tools but understand Bitcoin basics.