

Blockchain-based Event Ticketing

by Mike Gysel

Thesis Advisor

Professor Bryan Ford

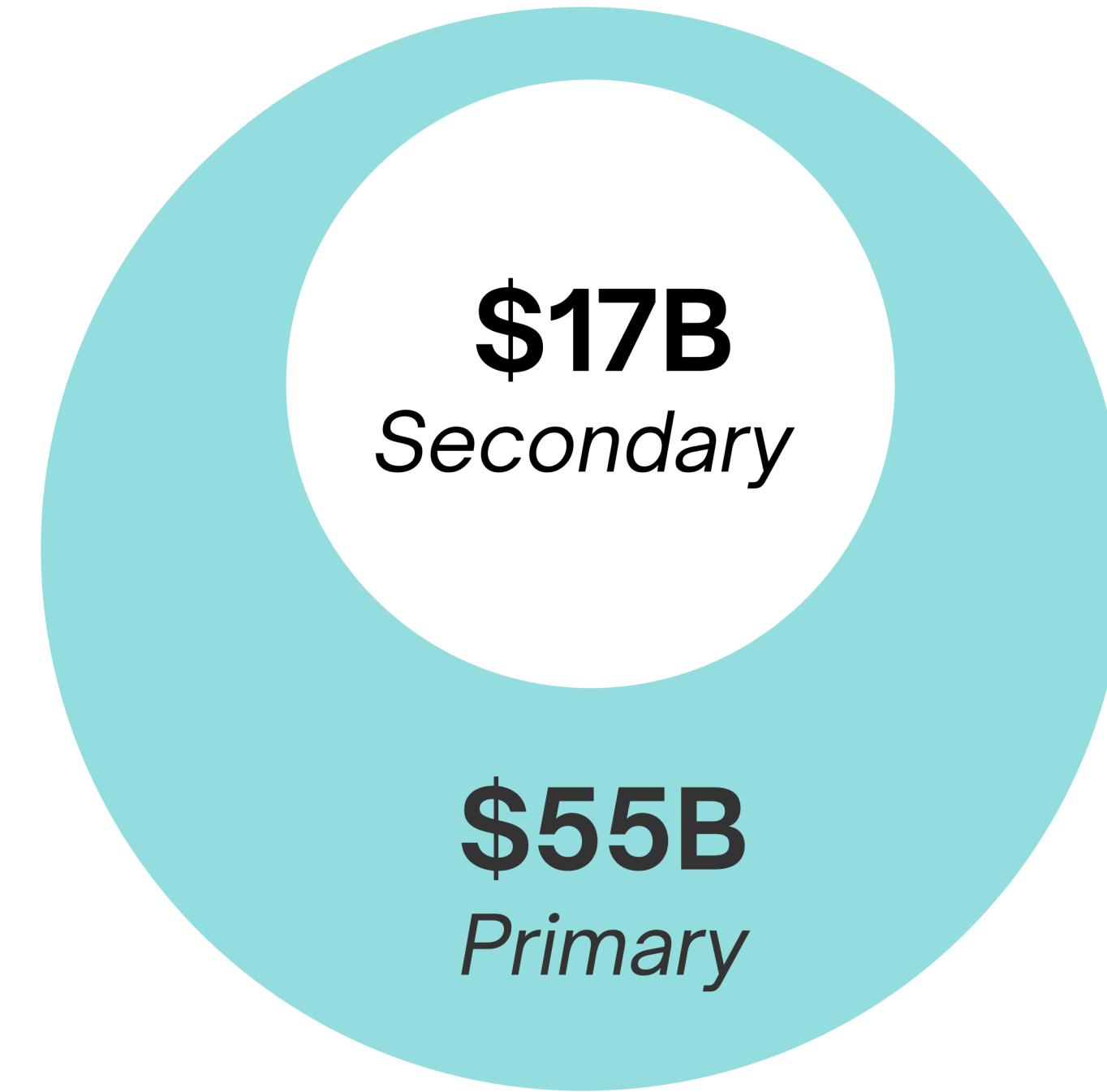
Thesis Supervisor

Louis-Henri Merino

Table of Contents

	Page
I Introduction	2
II Business Objectives	6
III Academic Objectives	28
IV Conclusion	98

A \$17B Problem



\$72B
Total

Secondary Ticket Market Issues

Event Organizers

No control over secondary ticket market

- 60% of tickets sold to major events purchased by bots, sold at higher prices
- No control over resale prices
- No resale value captured by event organizers

Attendees

High rates of ticket fraud

- 12% of adults in US have purchased fraudulent tickets
- Lack of trust in secondary ticket market

Table of Contents

	Page
I Introduction	2
II Business Objectives	6
III Academic Objectives	28
IV Conclusion	98

II. Business Objectives

		Page
A	Event Organizer Interviews	2
B	Benchmarking	11
C	Market Segmentation	14
D	Business Model	17
E	Prospective Customers	22
F	Conclusion	24

Event Organizer Interviews

Event Type

Technical

Music

Sports

EPFL
Mediacom Events

AMLD

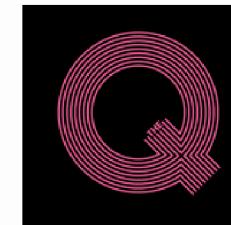
EPFL Pavilions
Amplifier for Art,
Science and Society

 **Crypto Valley**

 **ESN**
Erasmus Student Network




THE CROCODILE



NEUMOS


FR3N


Docks
LAUSANNE

**BLOCKCHAIN
CONFERENCE
HAMBURG**

EPFL
Sciences Outreach


LINDEN
LIVE LEARNING LABS


Paléo


OPUS ONE


**FESTIVAL
BALELEC**



500

1K

2K

4K

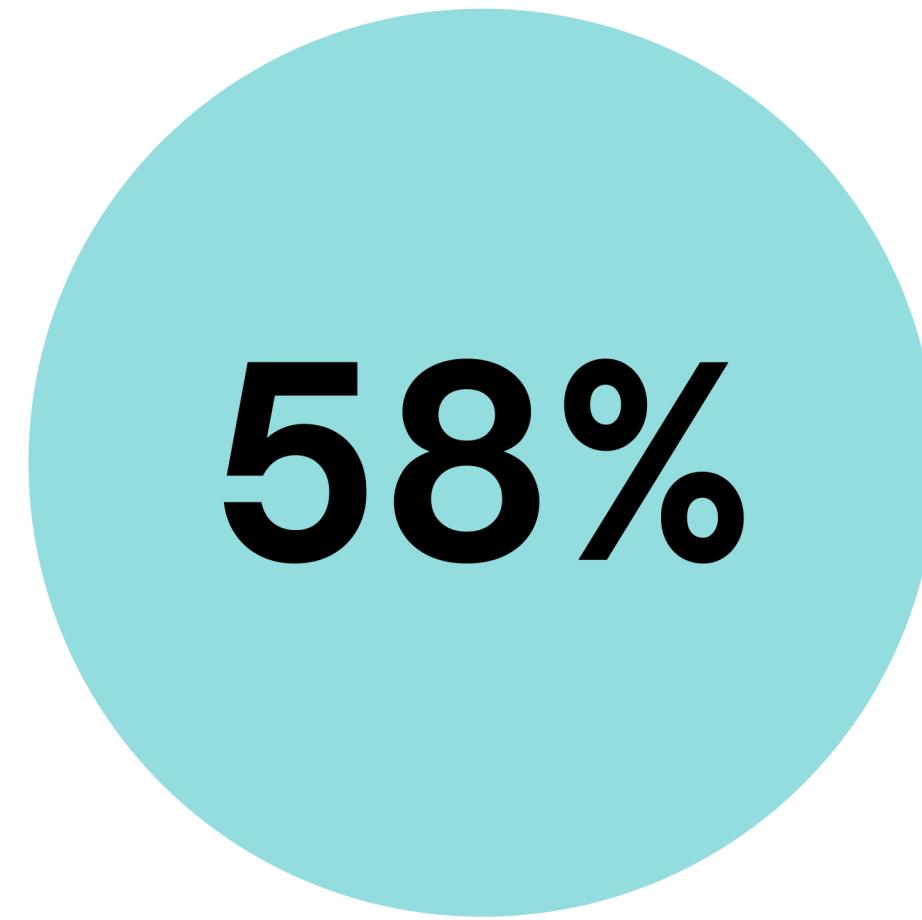
8K

16K

32K+

Event Size

Event Organizer Interview Key Findings



**Event Organizers willing
to check identification**



**Tickets sold are
digital**

Technical Event Organizer Interview Key Findings



**Event Organizers willing
to check identification**



**Tickets sold are
digital**

Event Organizer Interview Key Findings

Large-Sized Event Organizers

Most Significant Issues: Secondary market control, ticket fraud, scalability

Require significant resources to serve large-sized event organizers

Small and Medium-Sized Event Organizers

Most significant Issues: Expanding audience, high event ticketing fees, engaging audience after the event

II. Business Objectives

		Page
A	Event Organizer Interviews	2
B	Benchmarking	11
C	Market Segmentation	14
D	Business Model	17
E	Prospective Customers	22
F	Conclusion	24

Event Ticketing Competitors



Benchmarking Key Findings

Largest event ticketing companies focus on data analytics and marketing advantages

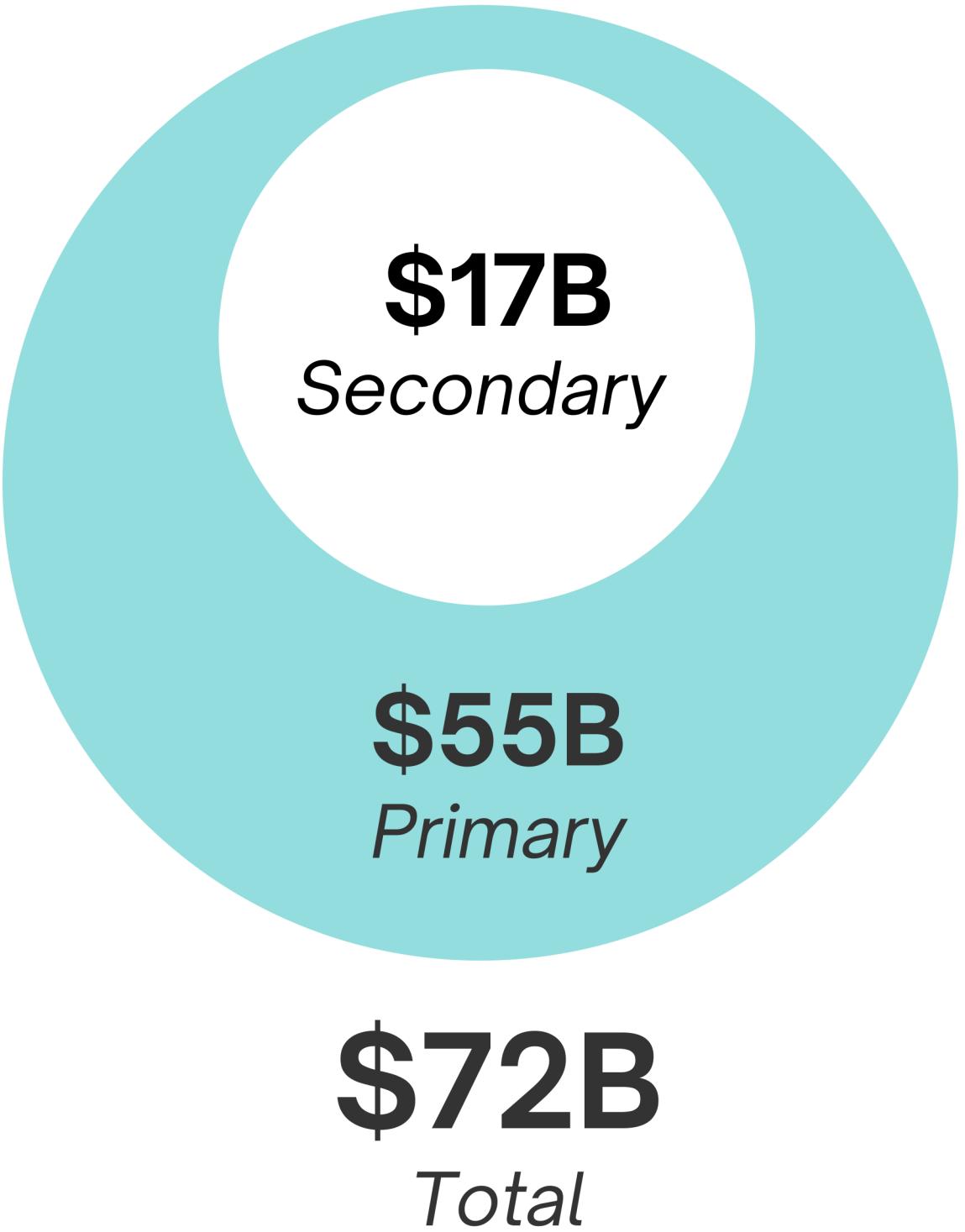
Blockchain-based event ticketing companies focus on secondary market, ticket fraud, engaging audiences

All event ticketing companies ignore technical events, focusing on sports, music, comedy, art, metaverse events

II. Business Objectives

		Page
A	Event Organizer Interviews	2
B	Benchmarking	11
C	Market Segmentation	14
D	Business Model	17
E	Prospective Customers	22
F	Conclusion	24

Event Ticketing Market



Market Segment	Size
Sports	\$22.2B
Music	\$17.4B
Cinema	\$14.0B
Technical	\$11.6B
Festivals	\$7.7B
Other	\$4.3B

Go-To-Market Strategy



SMALL TECHNICAL EVENTS

- Prove system on a small scale
- Organizers/attendees most amenable to blockchain-based event ticketing

TECHNICAL CONFERENCES

- Prove system on a larger scale
- Organizers/attendees most amenable to blockchain-based event ticketing

LARGE-SIZED EVENTS

- Highest paying customers
- Largest secondary ticket market issues
- Highest rates of ticket fraud

II. Business Objectives

		Page
A	Event Organizer Interviews	2
B	Benchmarking	11
C	Market Segmentation	14
D	Business Model	17
E	Prospective Customers	22
F	Conclusion	24

Value Proposition

Small and medium-sized Technical Events

- Expand audience with focus on technical events
- Lower fees than most major event ticketing company fees

Large-Sized Events

- Increase control over secondary ticket market
- Reduce ticket fraud

Revenue Projections

10% commission on all ticket sales and resales



→ \$5 → \$16.8M

Ticket Sales
0.02% market share

Avg. Fee
\$50 ticket price

Revenue
Projected by 2028

Cost Projections



Payroll
Technical and
Business Staff



Tech Stack
Web and database
hosting, smart
contracts



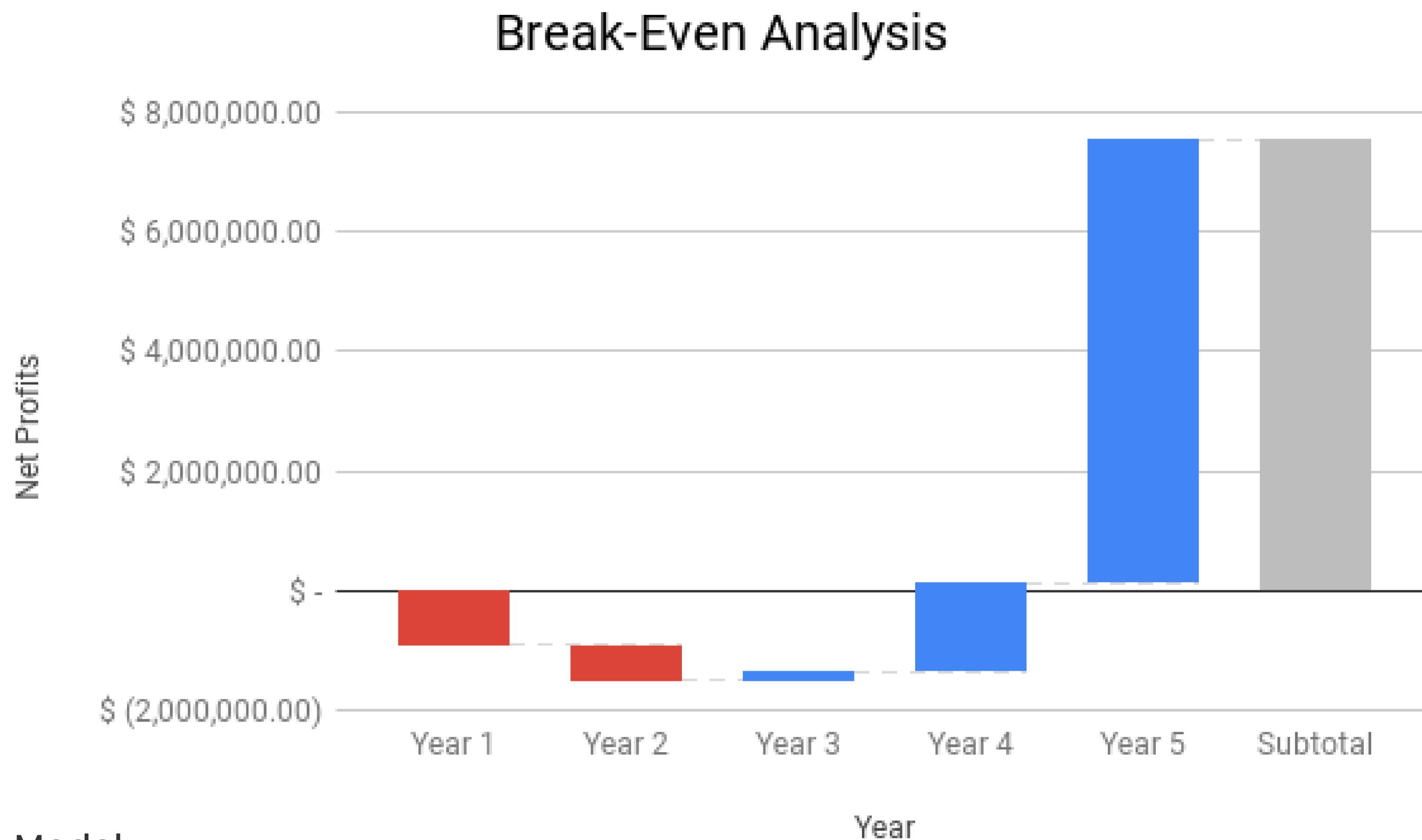
Marketing
Marketing events to
potential attendees



\$7.4M

Costs
Projected by 2028

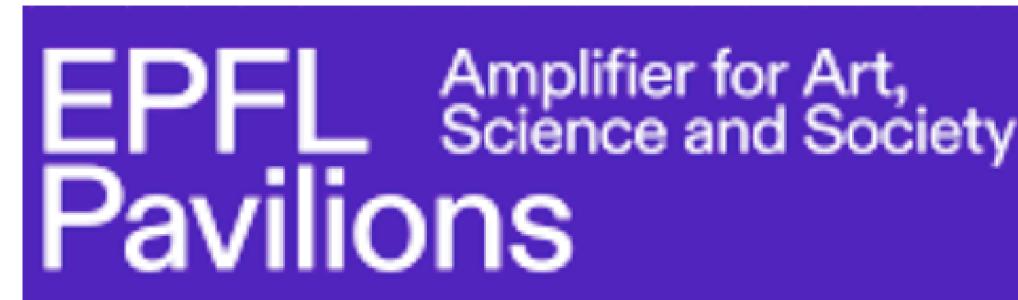
Break-Even Analysis



II. Business Objectives

		Page
A	Event Organizer Interviews	2
B	Benchmarking	11
C	Market Segmentation	14
D	Business Model	17
E	Prospective Customers	22
F	Conclusion	24

Prospective First Customers



- Hosts multiple exhibitions and symposiums.
- 100-400 attendees per event



- Annual cryptocurrency conference
- Annual event with 1,000 attendees



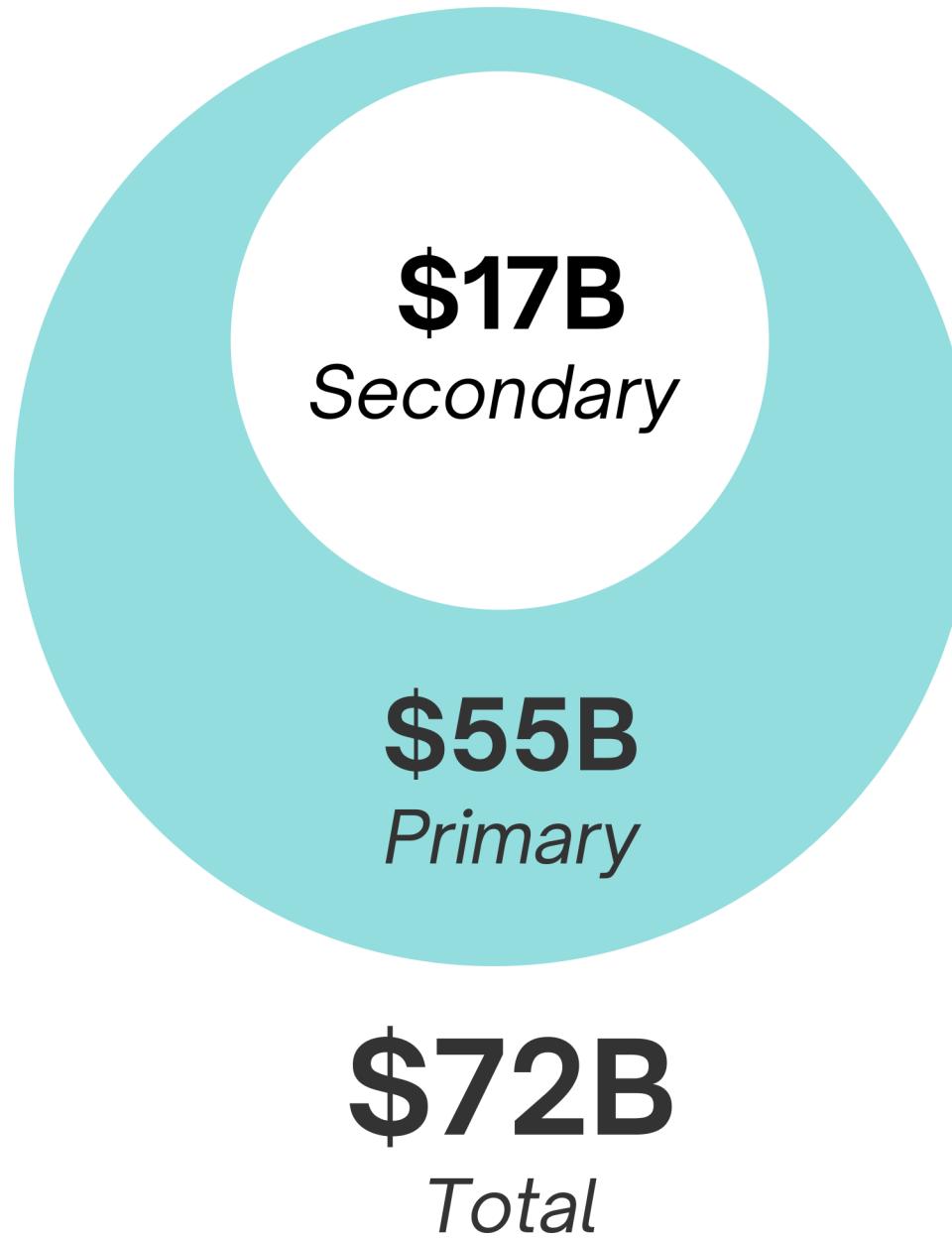
- Startup providing web3 services
- Provide event ticketing services on an on-going basis

II. Business Objectives

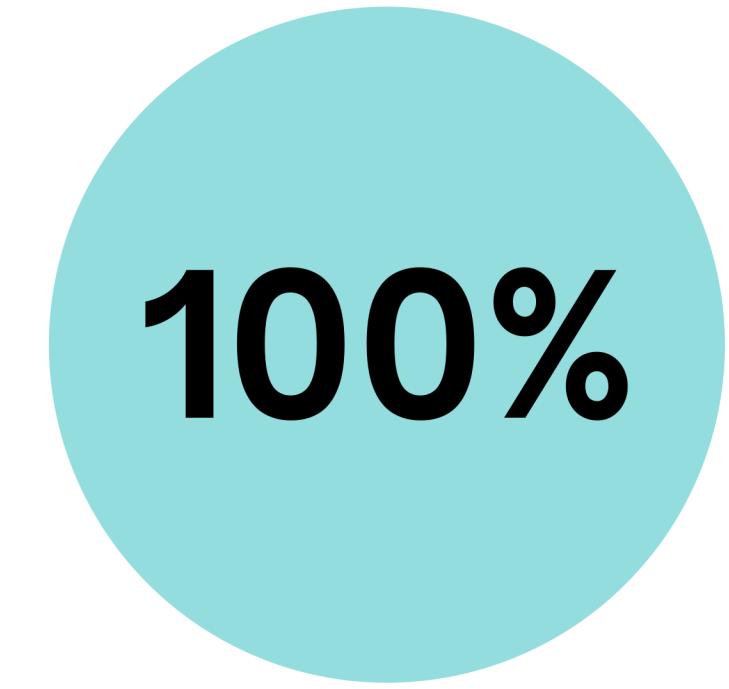
		Page
A	Event Organizer Interviews	2
B	Benchmarking	11
C	Market Segmentation	14
D	Business Model	17
E	Prospective Customers	22
F	Conclusion	24

Event Ticketing Industry Issues

Major Market

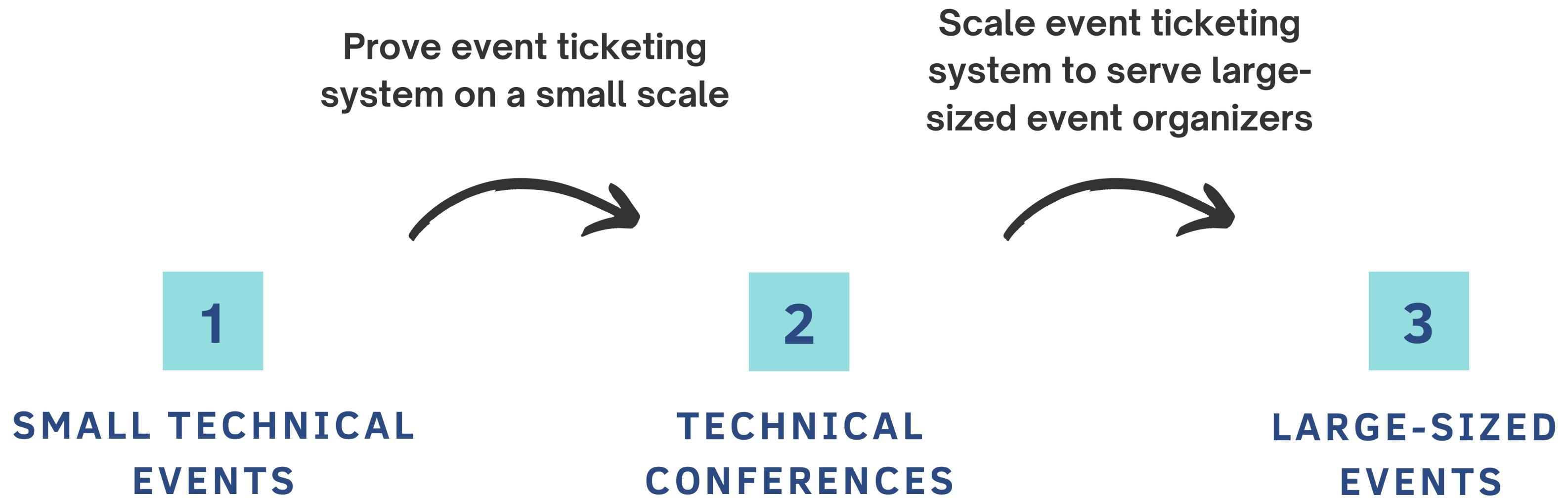


Major Issues

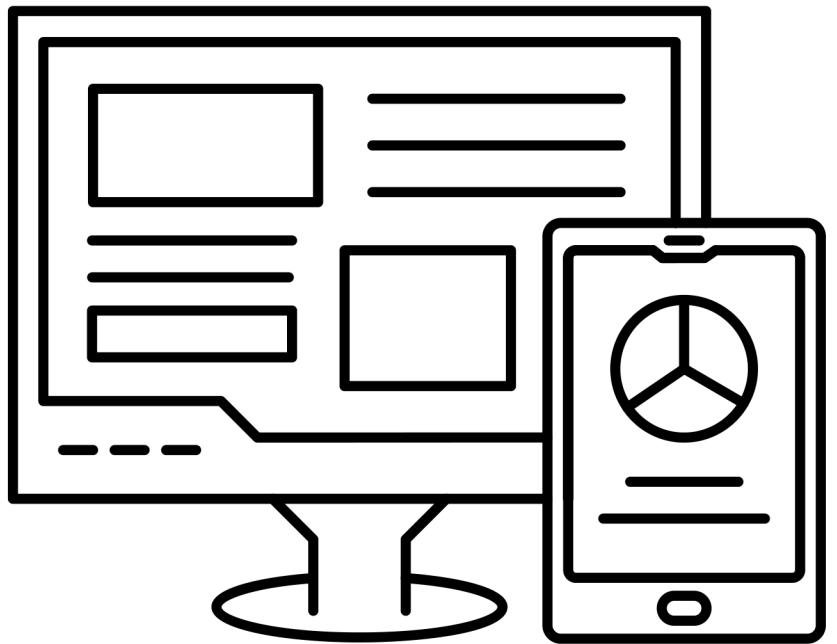


Large-sized event organizers stated secondary market control and ticket fraud are major issues

Event Ticketing Industry Issues



Next Steps



**Build a market ready
prototype to sell to
initial clients**



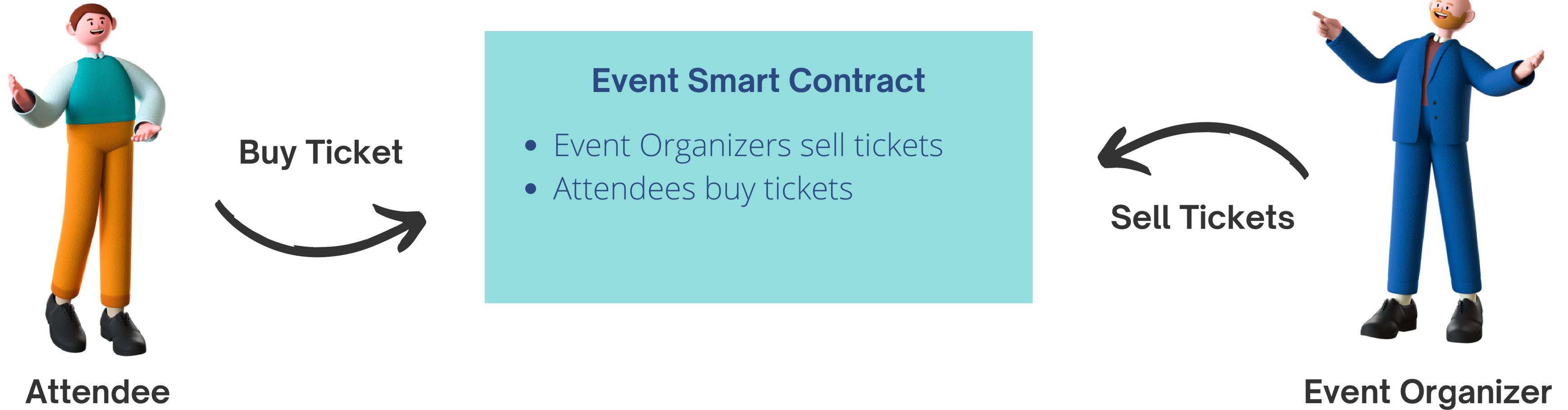
Table of Contents

		Page
I	Introduction	2
II	Business Objectives	6
III	Academic Objectives	28
IV	Conclusion	98

III. Academic Objectives

		Page
A	Past Research on Blockchain-based Event Ticketing	29
B	Research Goals	42
C	System Design	47
D	System Implementation	61
D	Evaluation	71
E	Threat Model	77
F	Demo	88
G	Conclusion	91

Strawman I:^{1,2} Primary Ticket Market

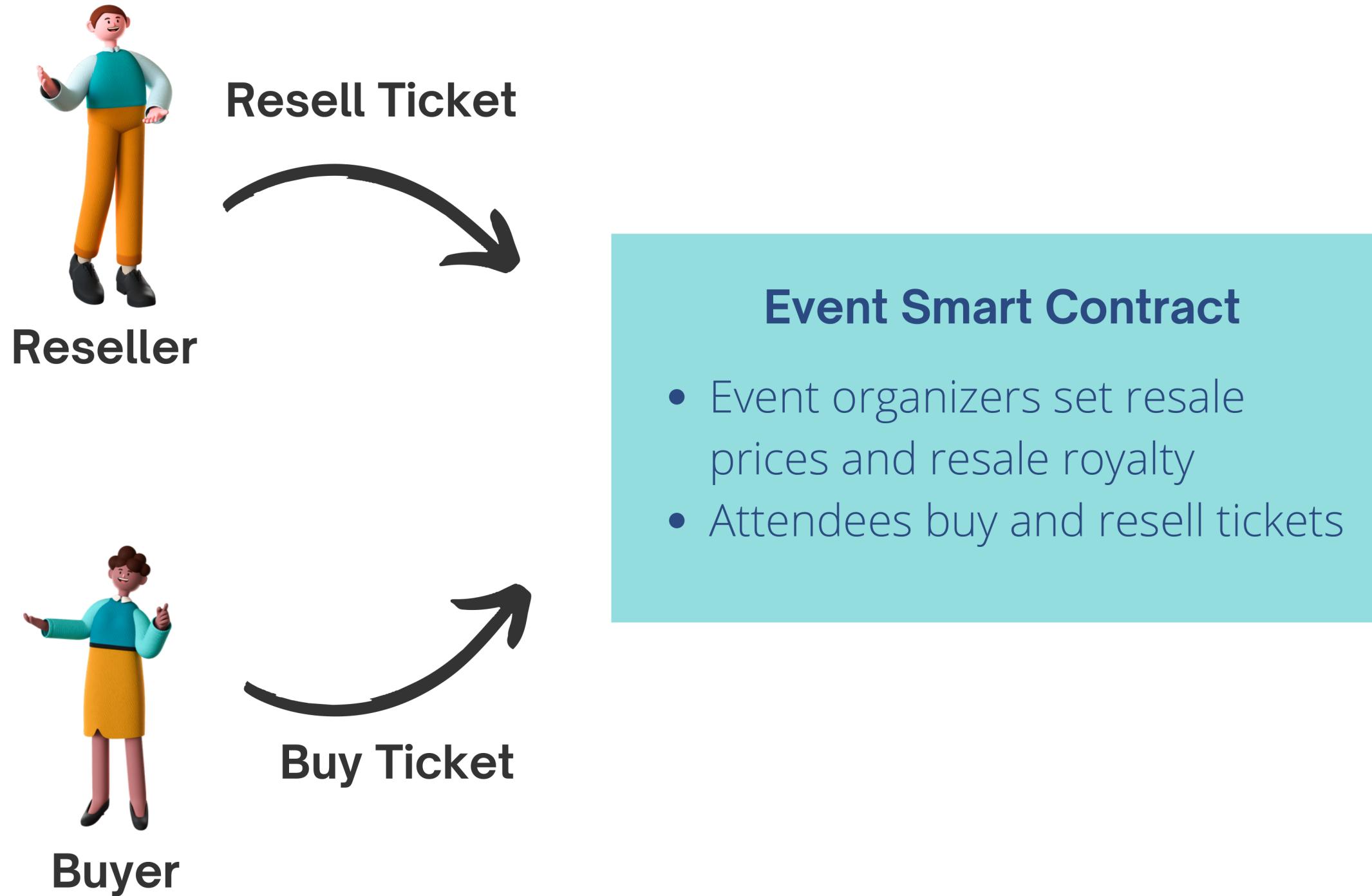


III.A Past Research on Blockchain-based Event Ticketing

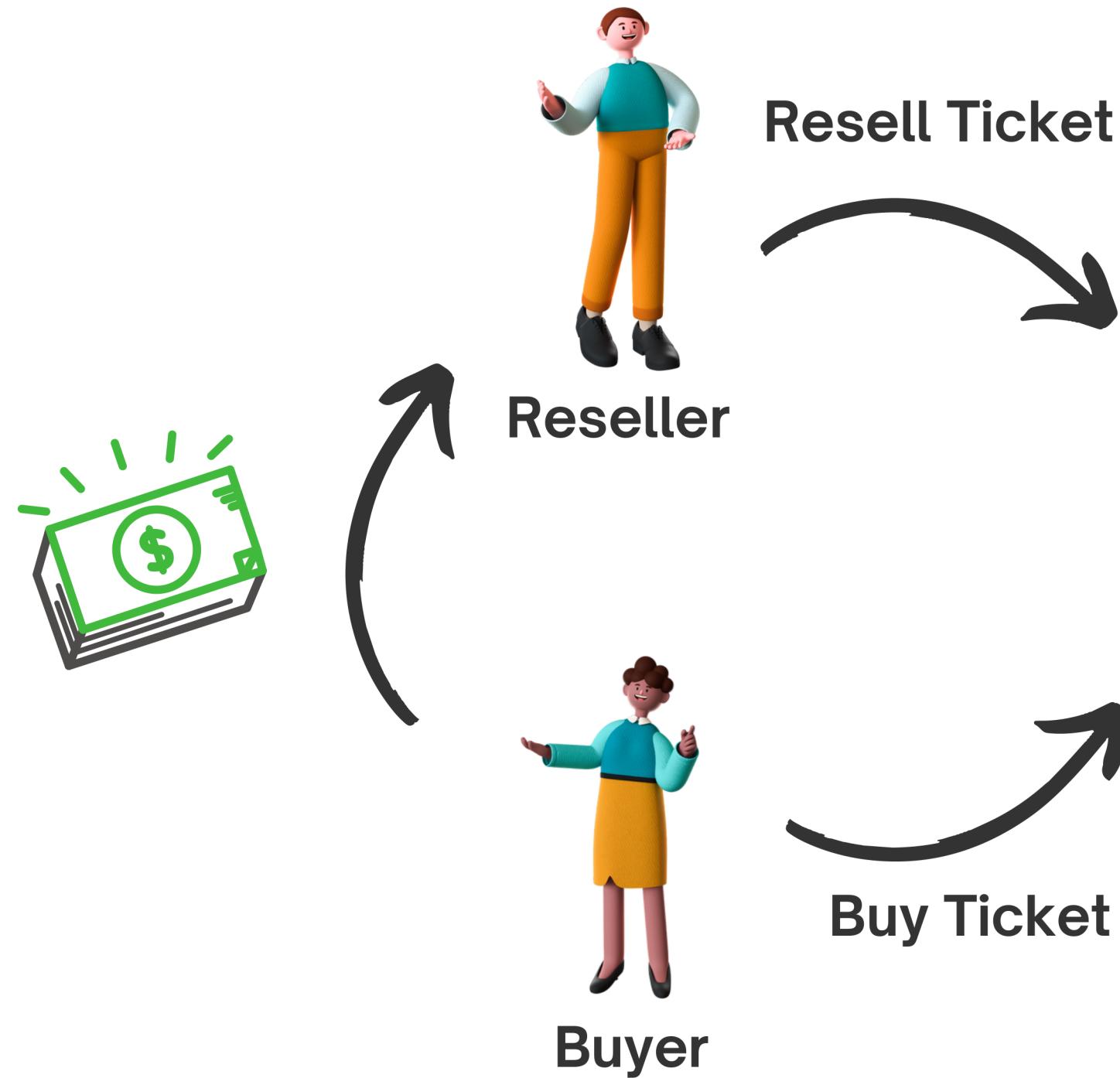
¹ Regner, Ferdinand, Nils Urbach, and André Schweizer. "NFTs in practice—non-fungible tokens as core component of a blockchain-based event ticketing application," (2019). [Online]. Available: <https://www.fim-rc.de/Paperbibliothek/Veroeffentlicht/1045/wi-1045.pdf>

² Tackmann, B. "Secure Event Tickets on a Blockchain," In: Data Privacy Management, Cryptocurrencies and Blockchain Technology. DPM CBT 2017. [Online]. Available: https://link.springer.com/chapter/10.1007/978-3-319-67816-0_26

Strawman I: Secondary Ticket Market



Strawman I Drawbacks

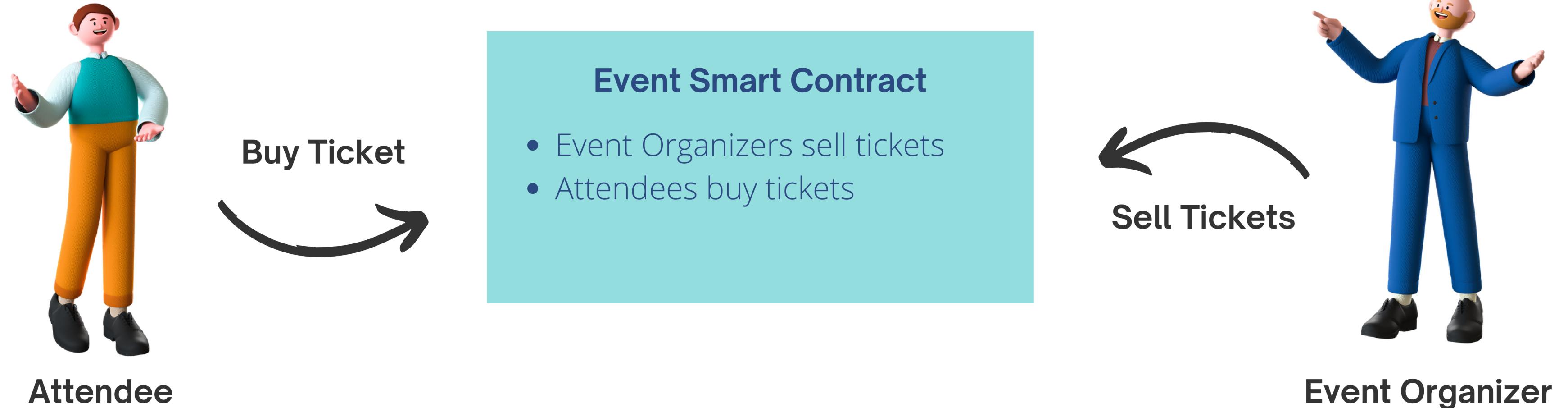


Event Smart Contract

- Event organizers set resale prices and resale royalty
- Attendees buy and resell tickets

Drawback: Does not prevent off-chain ticket sales

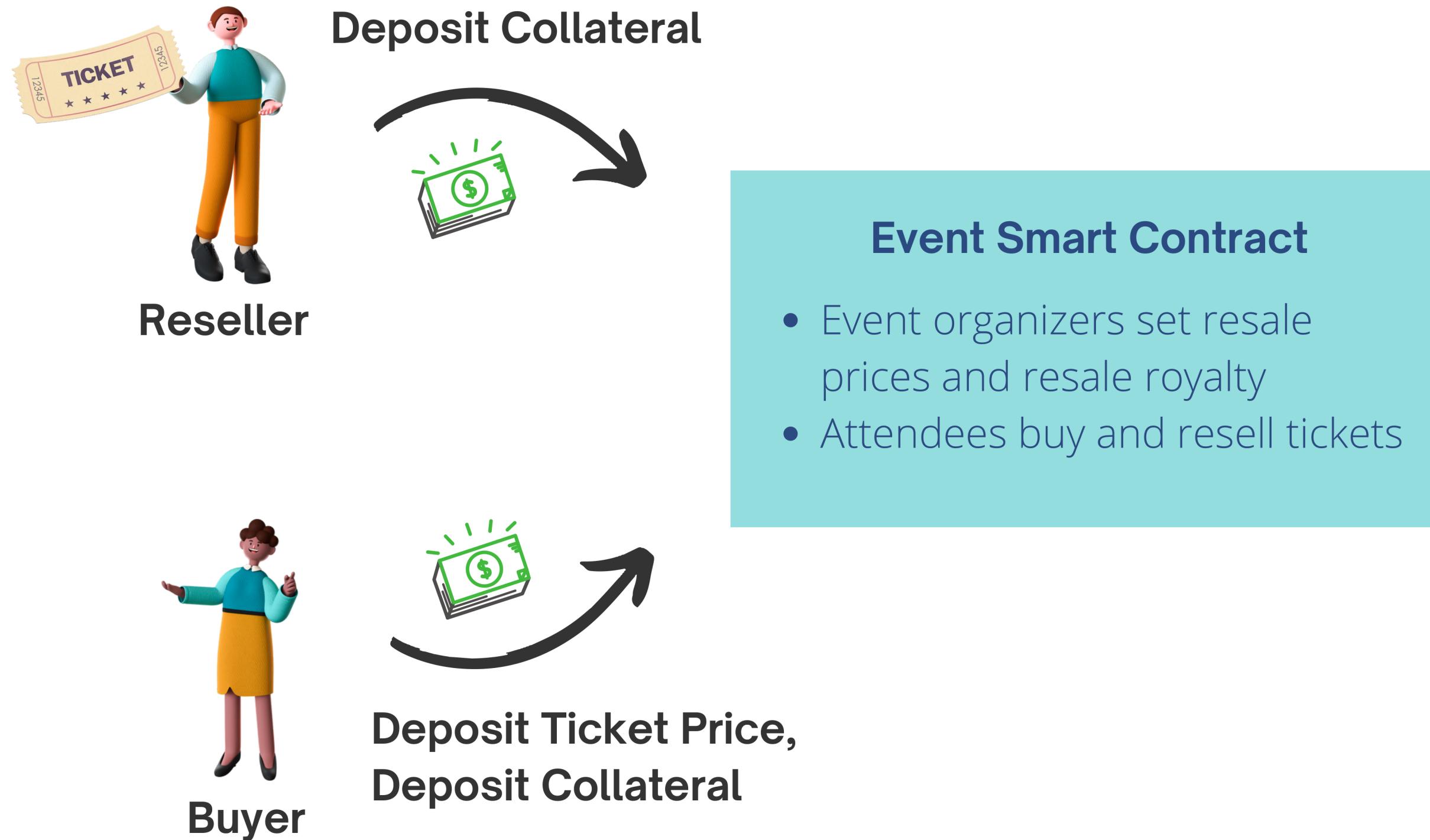
Strawman II:³ Primary Ticket Market



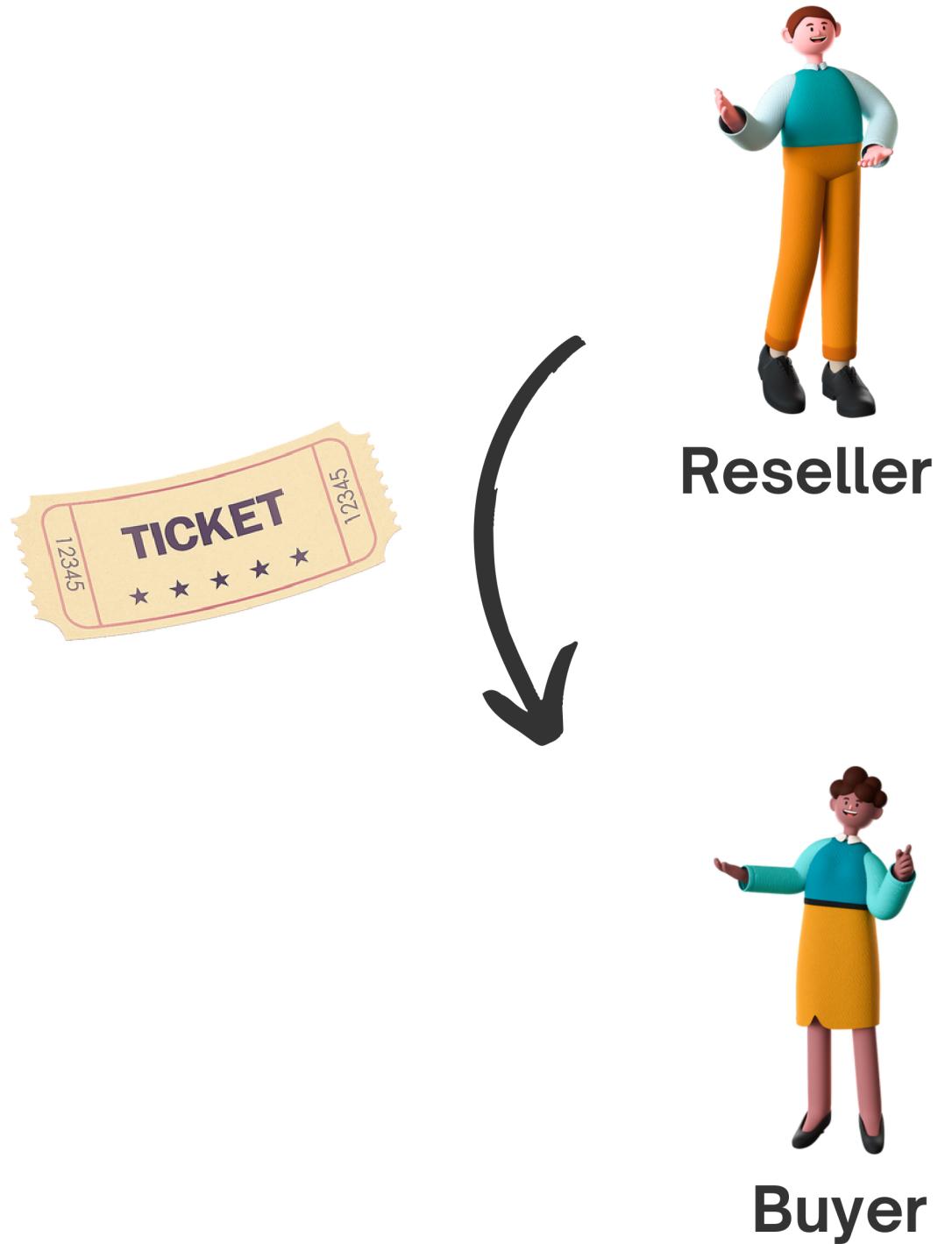
III.A Past Research on Blockchain-based Event Ticketing

³T. Le, Y. Kim and J. -Y. Jo, "Implementation of a Blockchain-Based Event Reselling System," 2019 6th International Conference on Computational Science/Intelligence and Applied Informatics (CSII), 2019. [Online]. Available: <https://ieeexplore.ieee.org/document/8916700>

Strawman II: Secondary Ticket Market



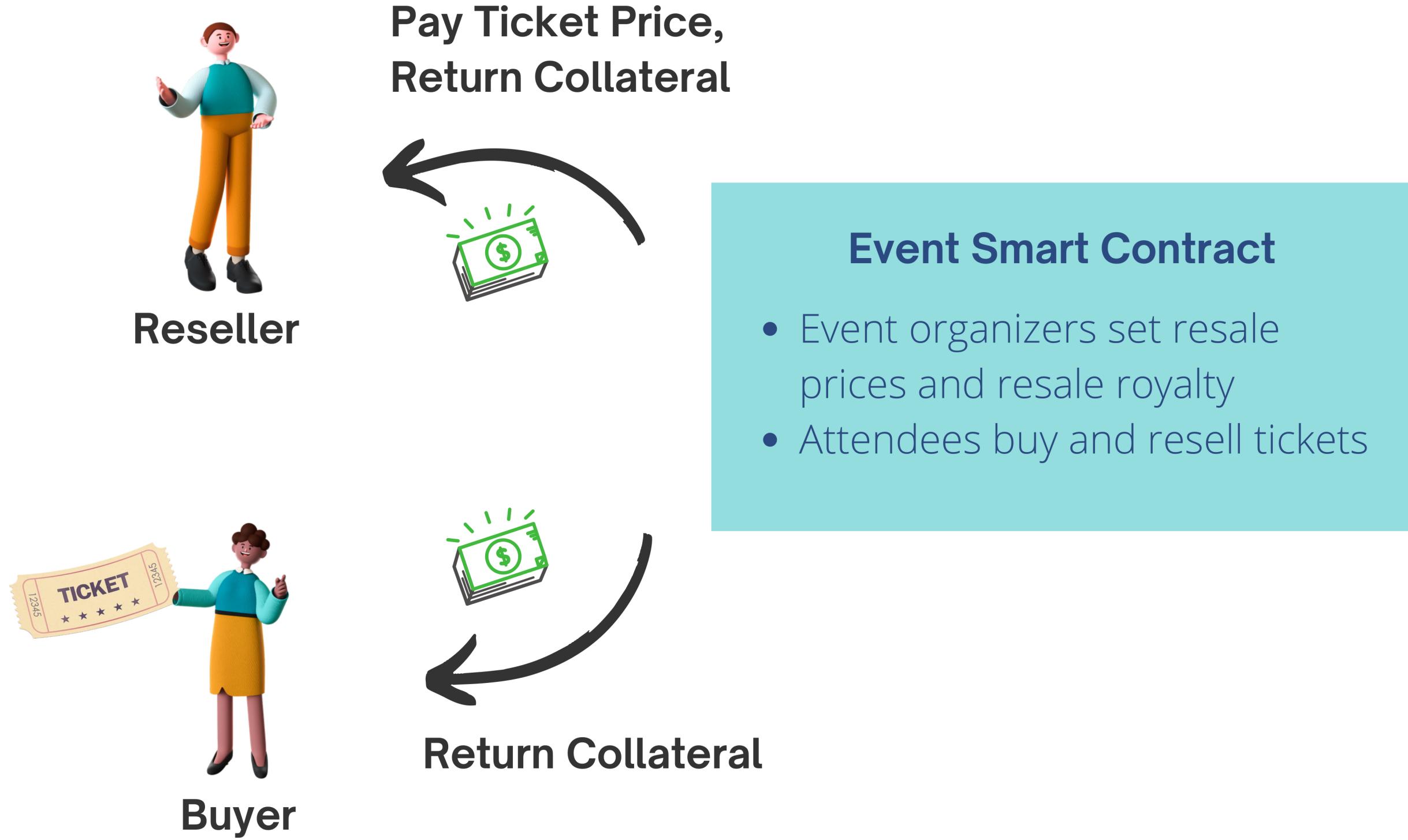
Strawman II: Honest Resale



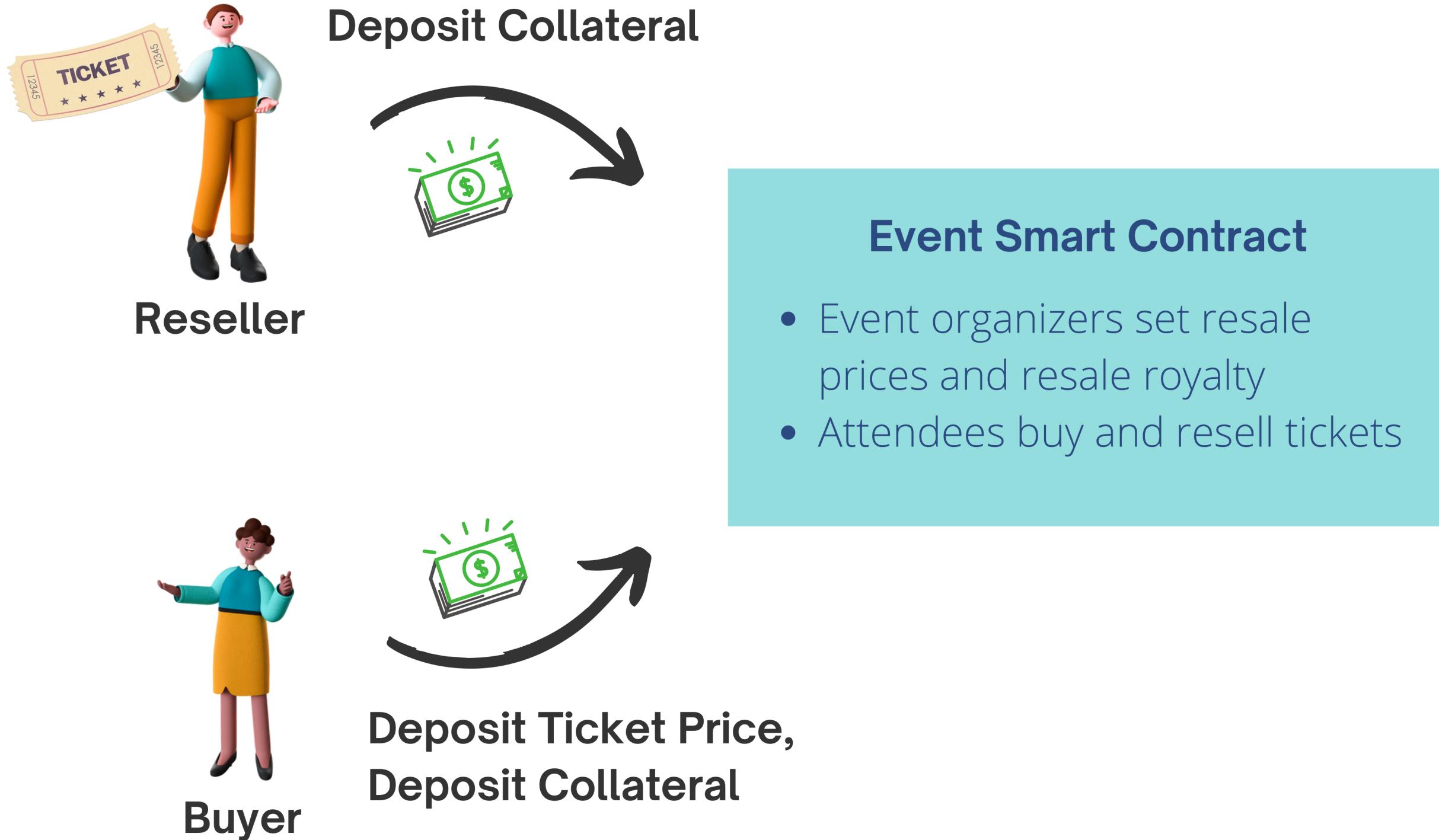
Event Smart Contract

- Event organizers set resale prices and resale royalty
- Attendees buy and resell tickets

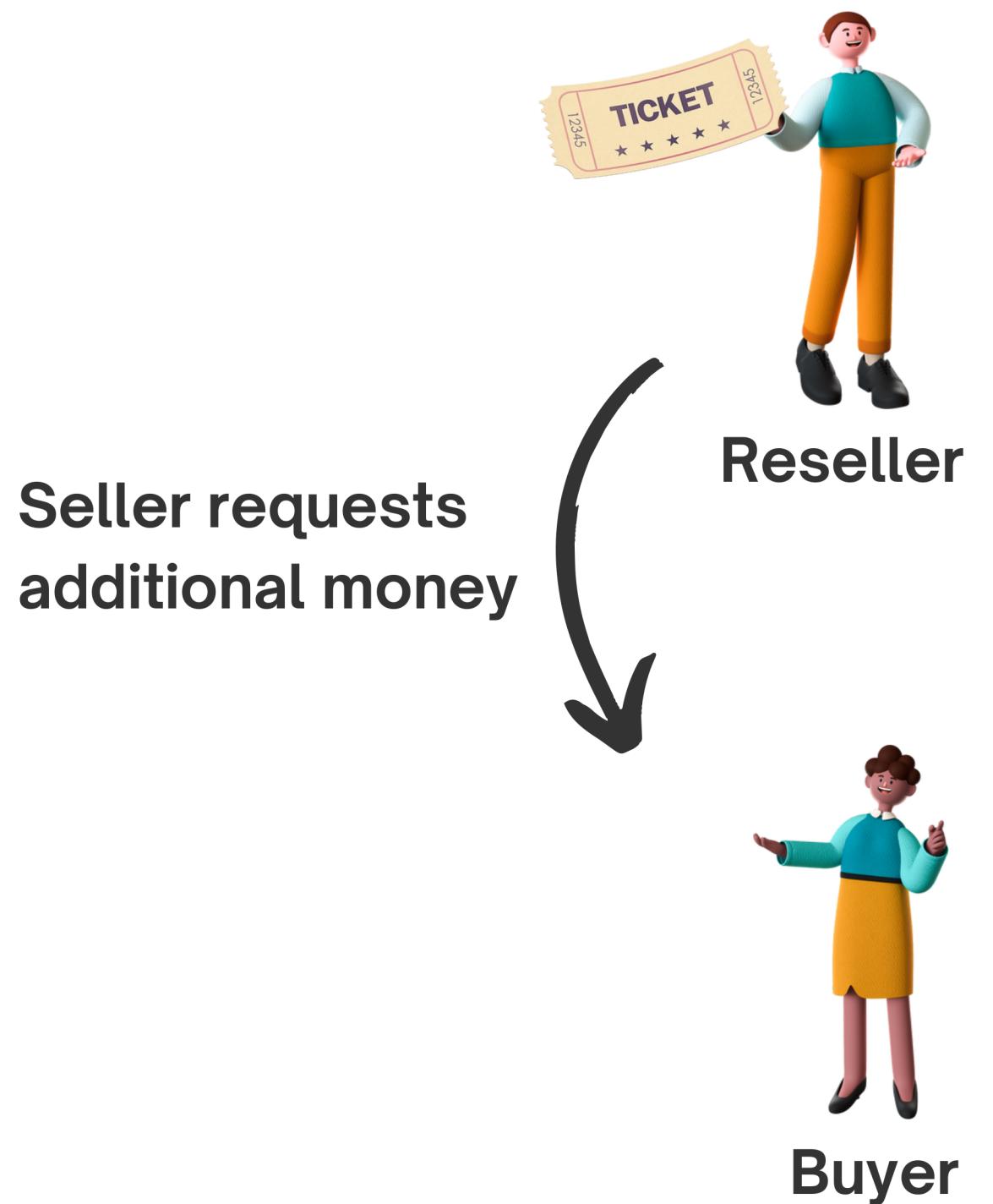
Strawman II: Honest Resale



Strawman II: Dishonest Resale



Strawman II: Dishonest Resale



Event Smart Contract

- Event organizers set resale prices and resale royalty
- Attendees buy and resell tickets

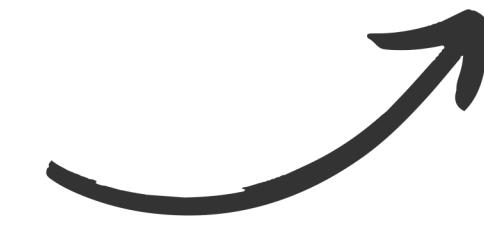
Strawman II: Dishonest Resale



Reseller



Buyer



**Ticket Not
Received**

Event Smart Contract

- Event organizers set resale prices and resale royalty
- Attendees buy and resell tickets

Strawman II: Drawbacks

Drawbacks

- **Deposit**
- **Assumes honesty of ticket buyer**



Reseller



Buyer



Return Ticket Price and Collateral

Event Smart Contract

- Event organizers set resale prices and resale royalty
- Attendees buy and resell tickets

Drawbacks of Past Research

Does not prevent off-chain ticket sales

STRAWMAN I

Deposit Required

Assumes Honesty of Ticket Buyer

STRAWMAN II

III. Academic Objectives

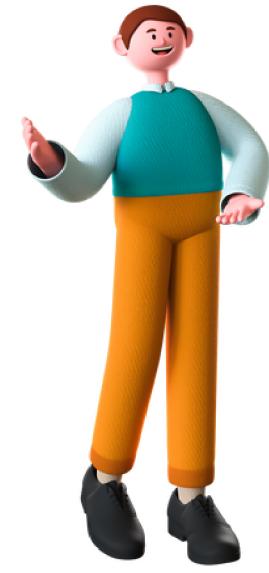
		Page
A	Past Research on Blockchain-based Event Ticketing	29
B	Research Goals	42
C	System Design	47
D	System Implementation	61
E	Evaluation	71
F	Threat Model	77
G	Demo	88
H	Conclusion	91

System Properties

Implement a blockchain-based event ticketing system with the following properties:

1. Control over secondary market: Guarantees the event organizer can set secondary market ticket prices and take a percentage of resale royalties.
2. Anti-forgery: Guarantees the ticket buyer can verify the ticket is not fake.
3. Prevent off-chain ticket sales: Guarantees the ticket reseller cannot resell the ticket for a price higher than that set by the event organizer.
4. No deposit: Avoids the need for the buyer and seller to make a deposit.
5. Unlinkability: Guarantees an attacker cannot link an attendee to multiple events.

System Actors



Reseller



Event Organizer



Buyer



Event Smart Contract



Credential Issuance Committee

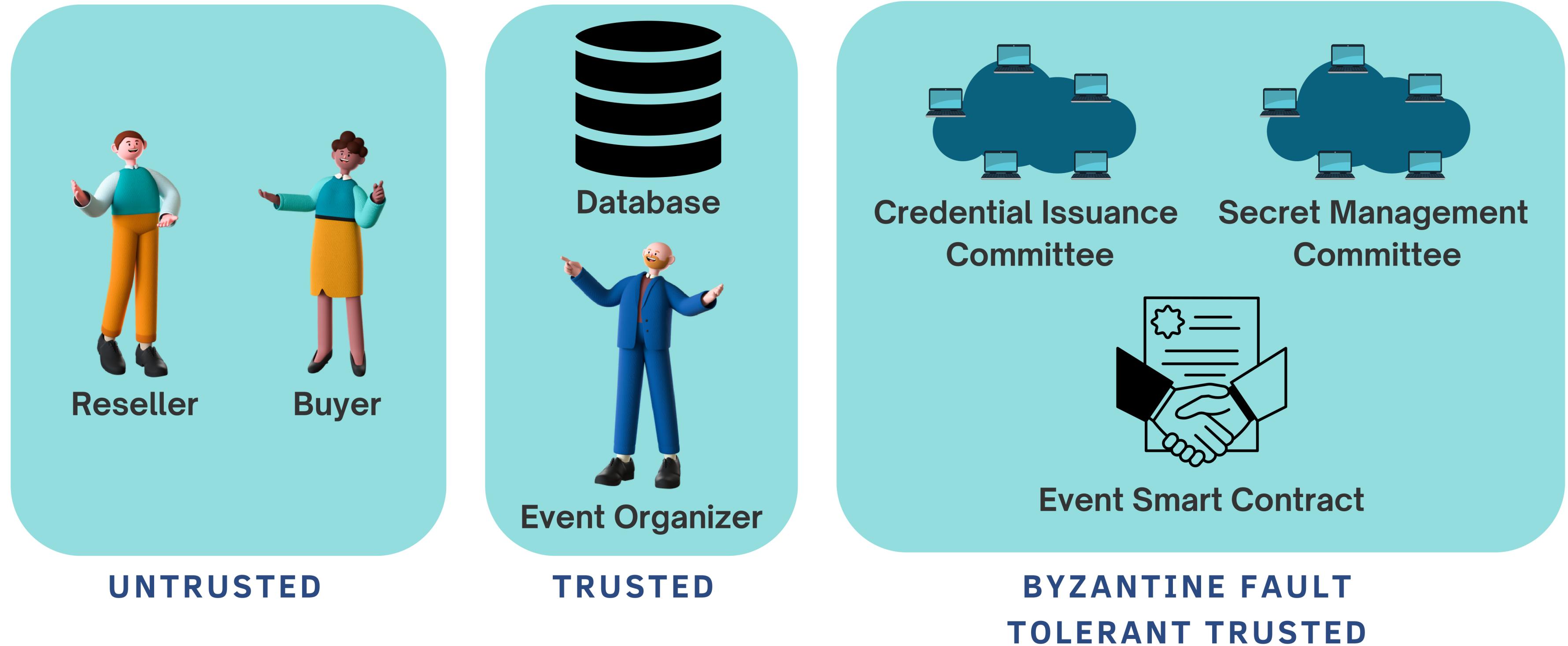


Secret Management Committee



Database

Threat Model



III. Academic Objectives

		Page
A	Past Research on Blockchain-based Event Ticketing	29
B	Research Goals	42
C	System Design	47
D	System Implementation	61
E	Evaluation	71
F	Threat Model	77
G	Demo	88
H	Conclusion	91

System Overview

Identification System

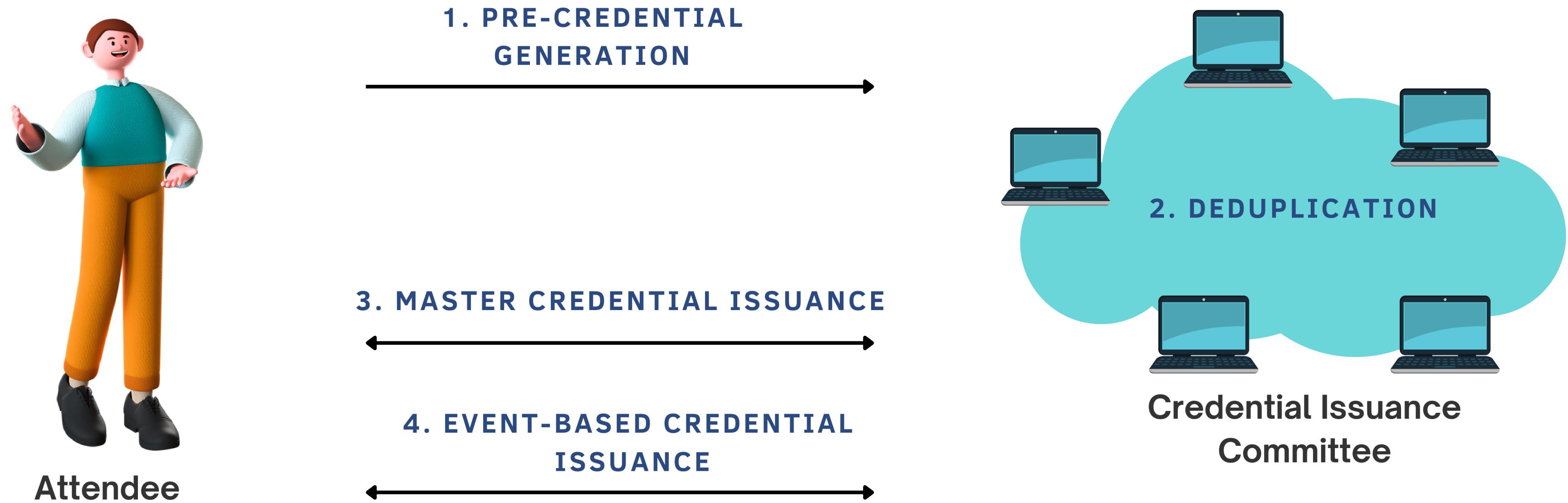
Attach identities to tickets in a privacy-preserving manner

- Attendees scan ID card, gain anonymous credentials
- Event organizers check credentials valid at event

Ticket Market

- Event Organizers create events and sell tickets
- Attendees buy, resell, use tickets

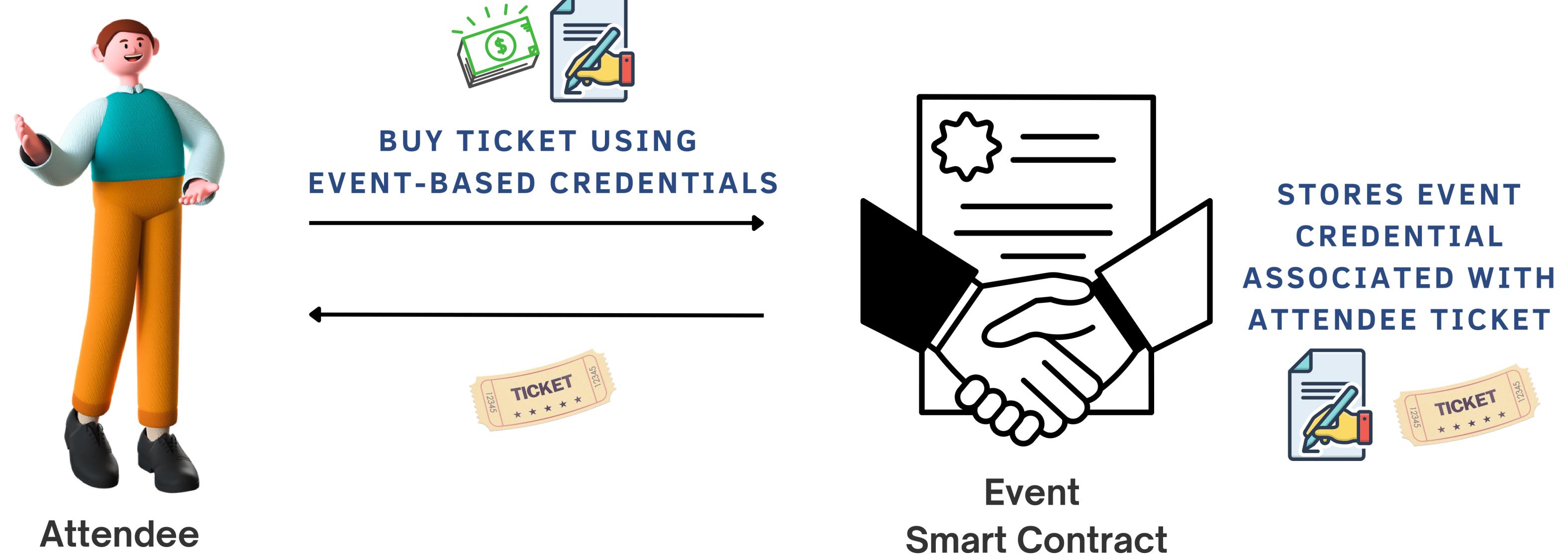
Identification System³ - Credential Generation



III.C System Design

³ Maram et al., “CanDID: Can-Do Decentralized Identity with Legacy Compatibility, Sybil-Resistance, and Accountability,” (2020). [Online]. Available: <https://eprint.iacr.org/2020/934>

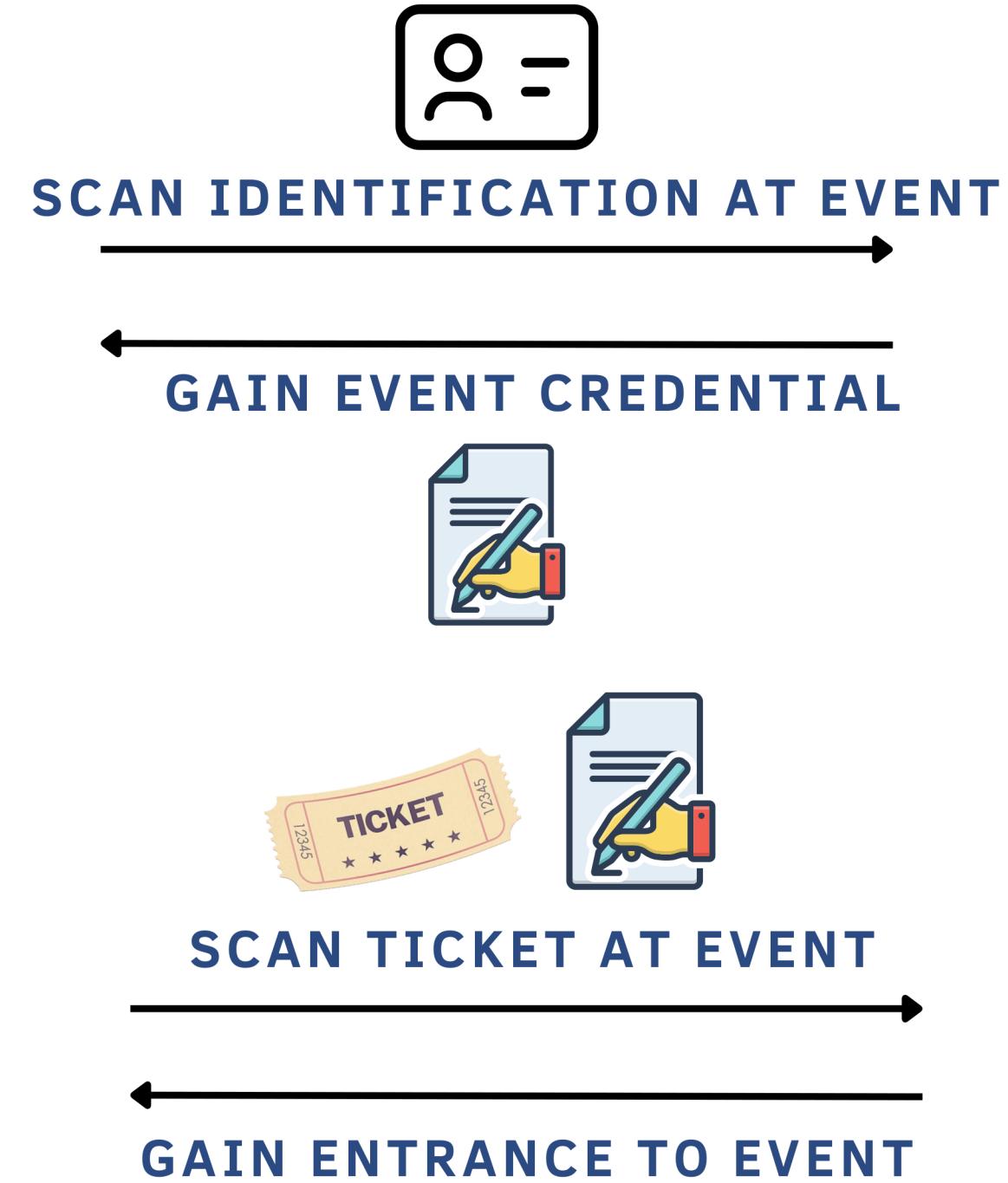
Identification System - Buy Event Ticket



Identification System - Event Entrance



Attendee



Credential Issuance Committee



Event Smart Contract

COMPUTE EVENT CREDENTIAL FROM IDENTIFICATION

CHECK TICKET IS VALID
CHECK CORRECT EVENT CREDENTIAL IS STORED

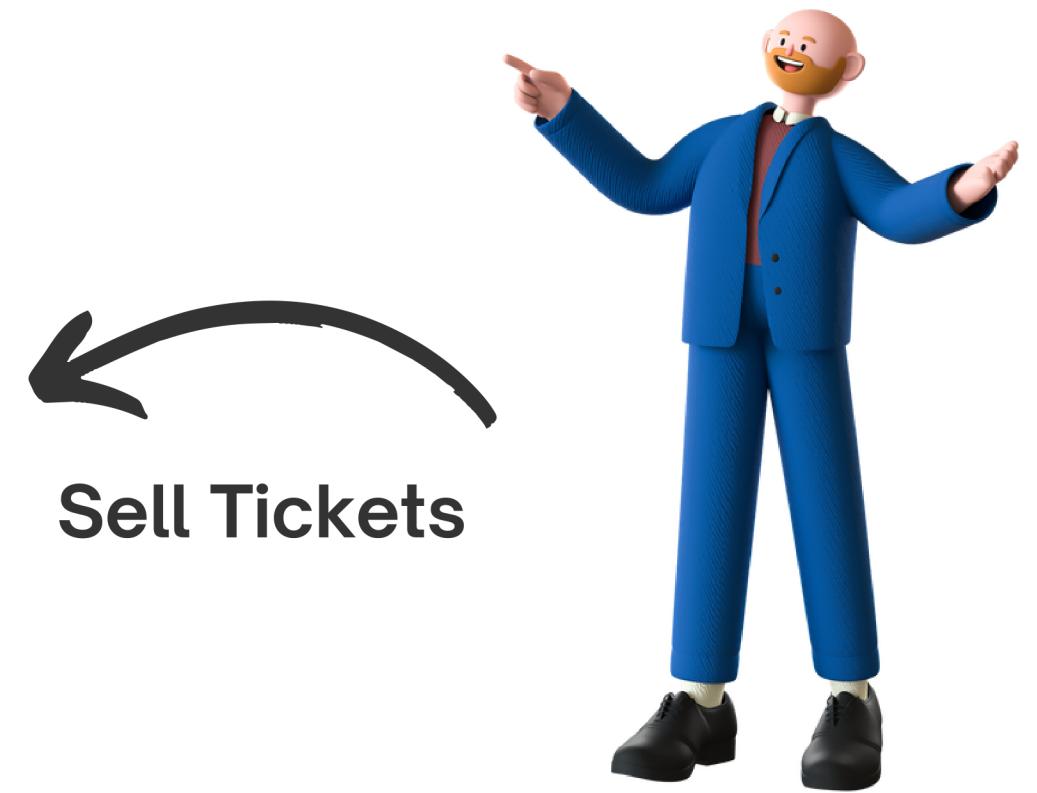
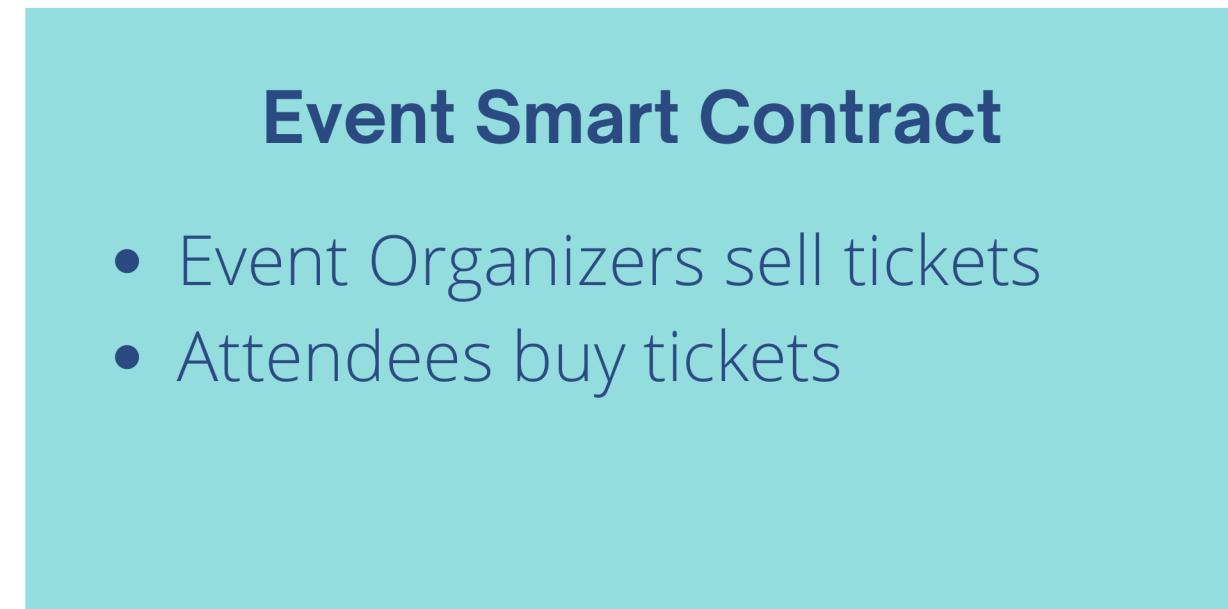
Primary Ticket Market



Buy Ticket



Attendee



Sell Tickets

Event Organizer

Secondary Ticket Market



Encrypted
Buy TX

Buy TX 1



Secret Management
Committee

Event Smart Contract

- Event organizers set resale prices and resale royalty
- Attendees buy and resell tickets



Secondary Ticket Market



Encrypted
Buy TX

Buy TX N



Event Smart Contract

- Event organizers set resale prices and resale royalty
- Attendees buy and resell tickets



Secondary Ticket Market



Encrypted
Sell TX

Sell TX 1



Event Smart Contract

- Event organizers set resale prices and resale royalty
- Attendees buy and resell tickets



Secondary Ticket Market



Encrypted
Sell TX

Sell TX N



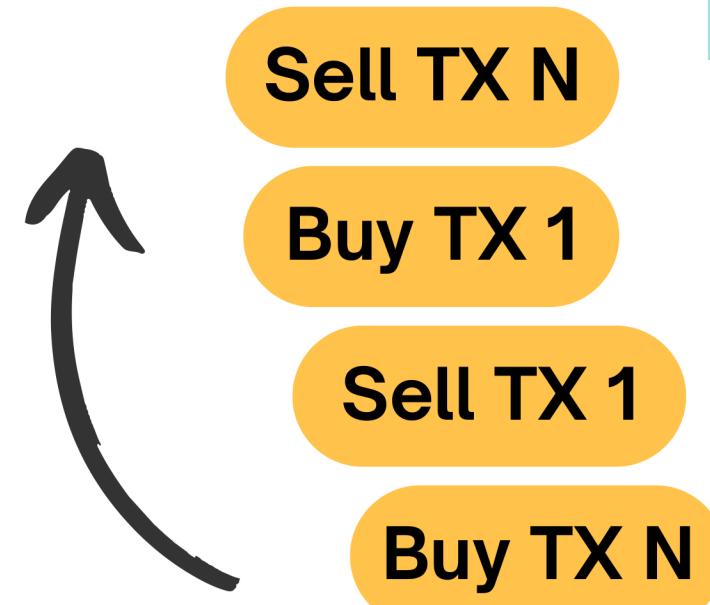
Event Smart Contract

- Event organizers set resale prices and resale royalty
- Attendees buy and resell tickets



Secondary Ticket Market

Before the event
Shuffle, Decrypt, and
Execute TX's



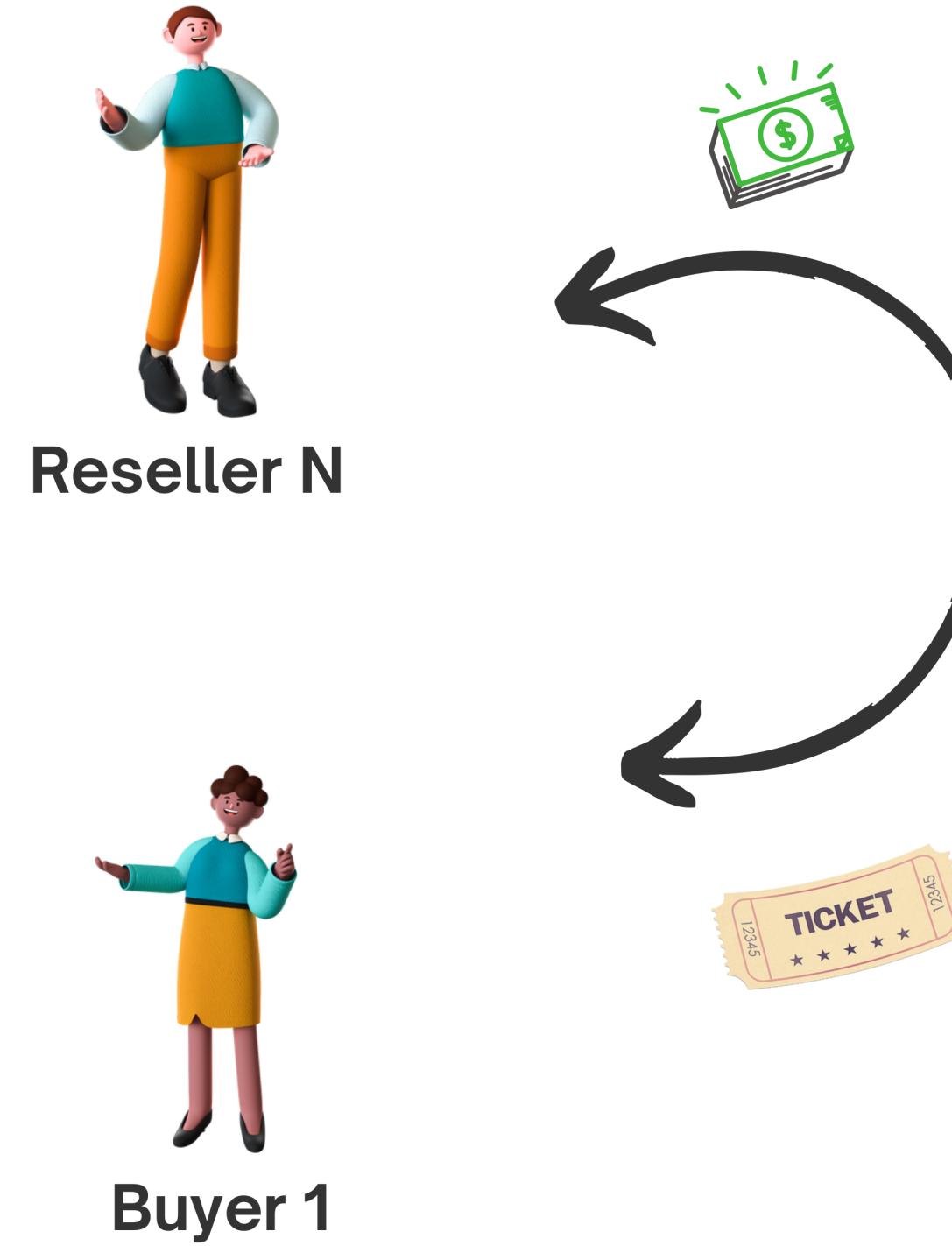
Event Smart Contract

- Event organizers set resale prices and resale royalty
- Attendees buy and resell tickets



**Secret Management
Committee**

Secondary Ticket Market



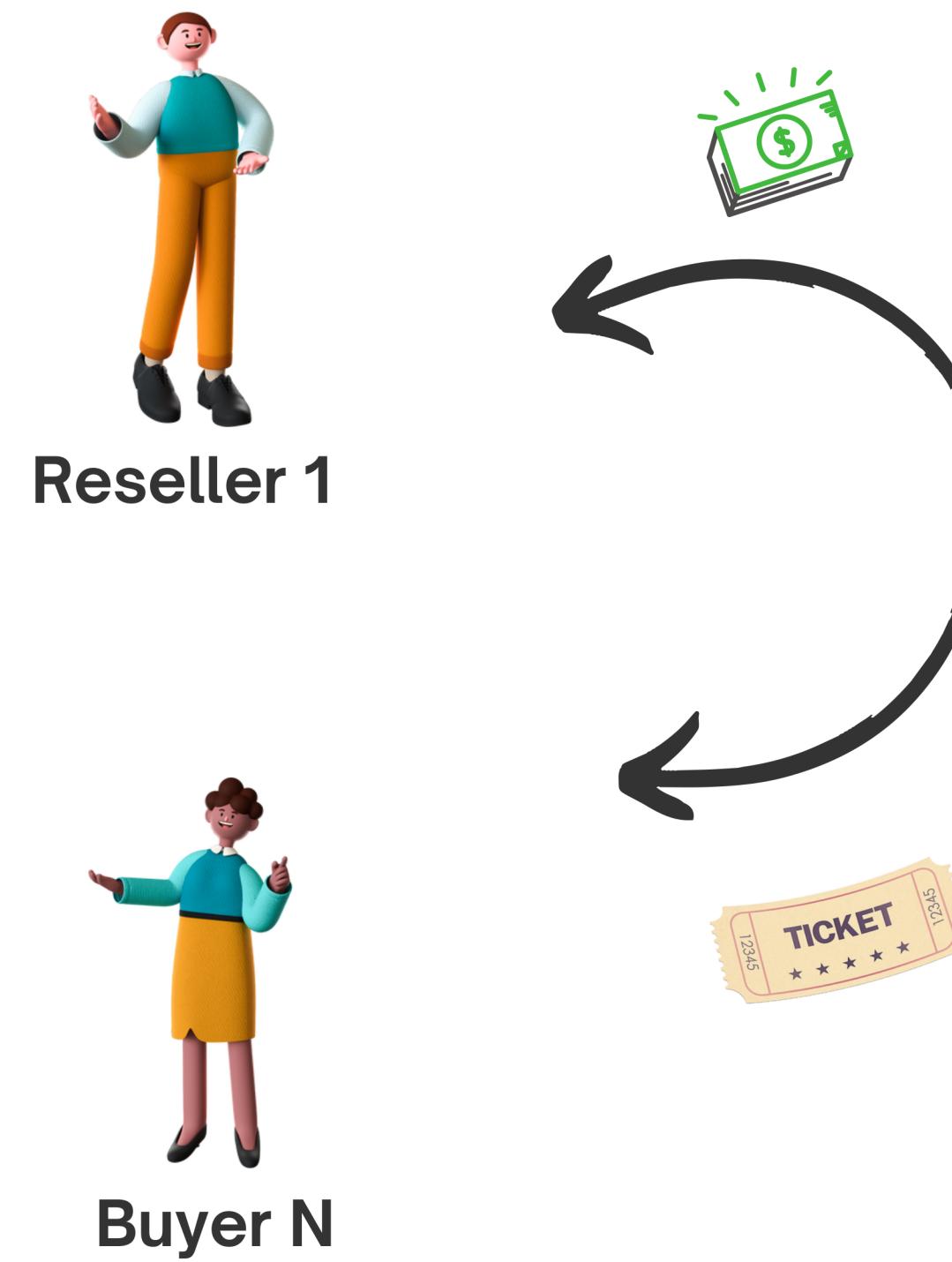
Event Smart Contract

- Event organizers set resale prices and resale royalty
- Attendees buy and resell tickets



Secret Management Committee

Secondary Ticket Market



Event Smart Contract

- Event organizers set resale prices and resale royalty
- Attendees buy and resell tickets



Secret Management Committee

Achieving System Properties

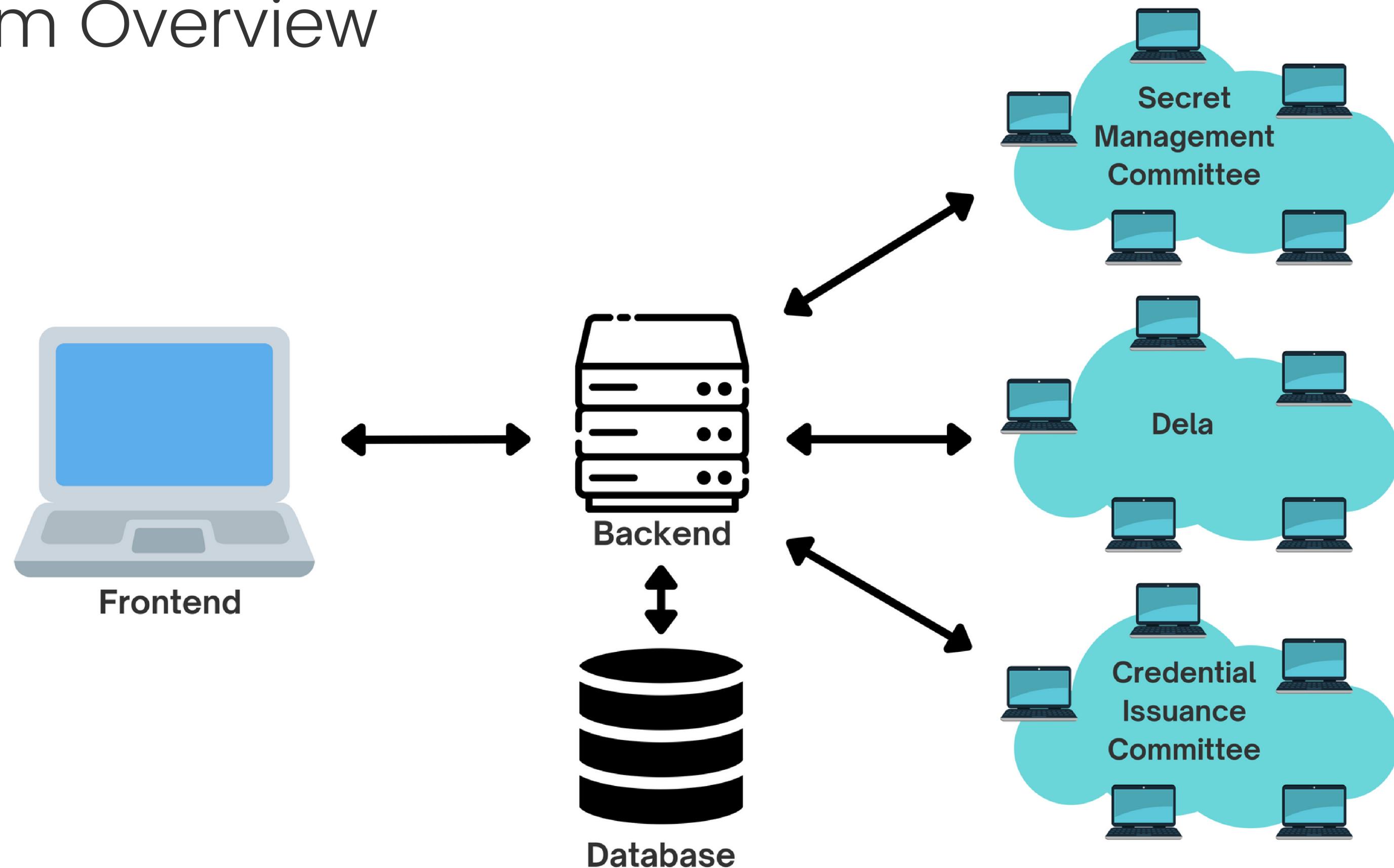
Implement a blockchain-based event ticketing system with the following properties:

1. Control over secondary market: Event smart contract allows the event organizer to set secondary ticket market prices and take a percentage of resale royalties.
2. Anti-forgery: Event smart contract allows ticket buyer to verify ticket is not fake.
3. Prevent off-chain ticket sales: Attaching identities to tickets and disallowing ticket reseller from choosing buyer prevents off-chain ticket sales.
4. No deposit: Buyer and reseller avoid making a deposit.
5. Unlinkability: Event-based credentials ensure that a user cannot be linked across events.

III. Academic Objectives

		Page
A	Past Research on Blockchain-based Event Ticketing	29
B	Research Goals	42
C	System Design	47
D	System Implementation	61
E	Evaluation	71
F	Threat Model	77
G	Demo	88
H	Conclusion	91

System Overview



Web Application Components



ReactJS Web Frontend

- Allows users to interact with event ticketing system
- Why ReactJS? Quick prototype development with reusable components, experience using ReactJS.

Flask Web Backend

- REST API created to respond to frontend requests, relay requests to identification system, DELA, database
- Why Flask? Quick development of REST API's, experience using Flask.

MongoDB Database

- Database used to store user and event data
- Why MongoDB? Data flexibly stored in JSON format, experience using MongoDB.

Identification System

- DESCRIPTION NECESSARY?

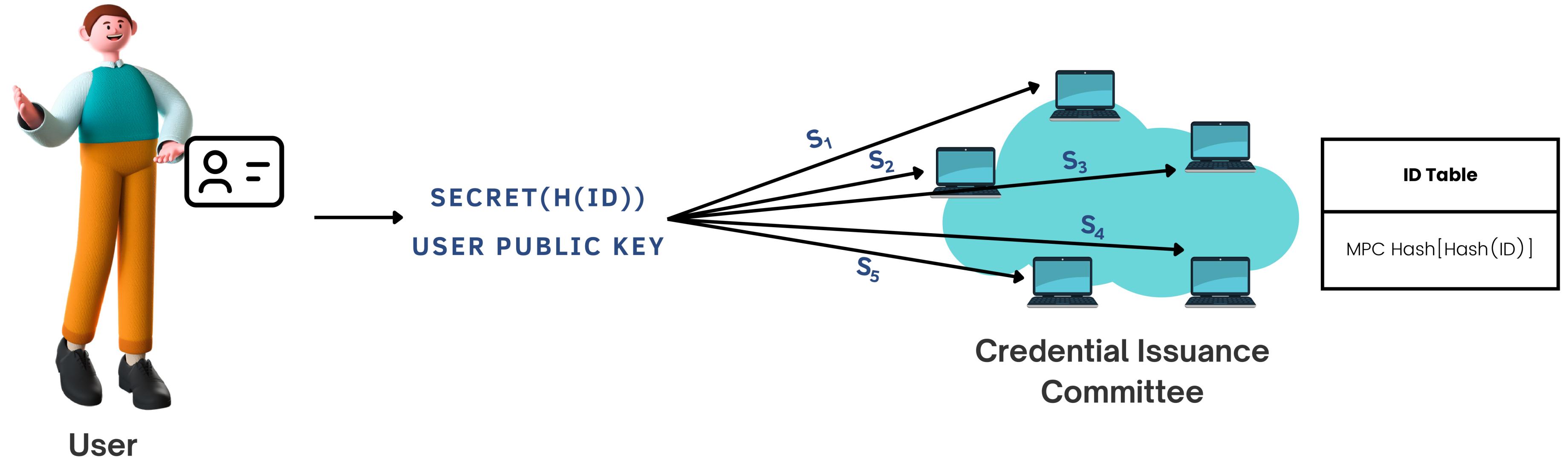
Deduplication

- Ensures each user can only obtain one master credential
- User submits identification, secret-management committee stores a secure-multiparty computed hash of user identification

Master and Event Credentials

- User obtains one master credential from identification
- User obtains one event credential for each event
- User uses event credential to purchase tickets, thereby attaching event ticket to user identity

Identification System - Deduplication



Identification System - Deduplication

MP-SPDZ

- MP-SPDZ is an implementation of 34 MPC protocol variants used with a high-level programming language

MiMC PRF

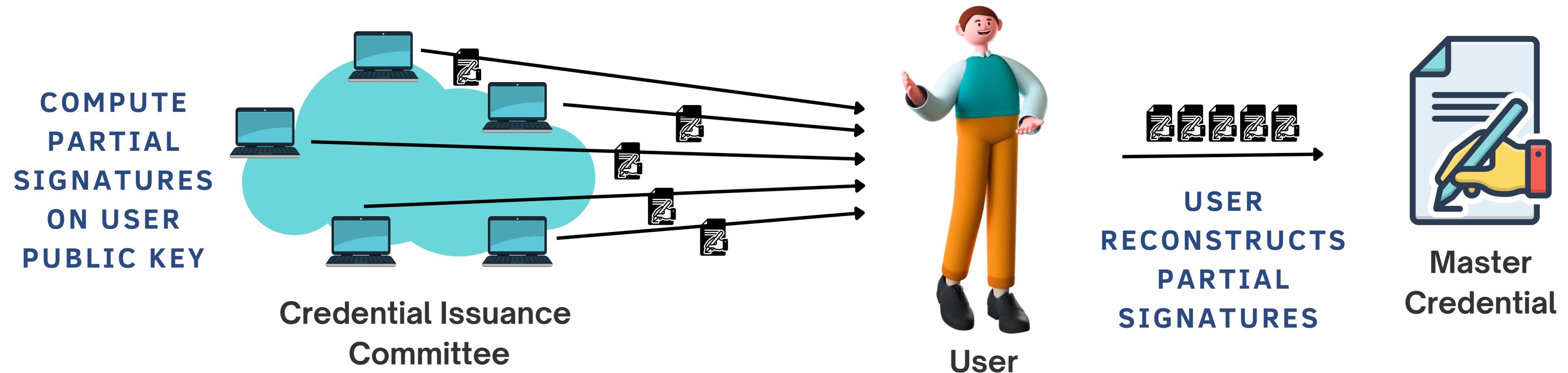
- MiMC pseudo-random function used because it runs efficiently in arithmetic circuits
- MiMC class instantiated with the number of rounds, key, number of times class will be called
- Encrypt function computes PRF by iterating a round function r times

```
class MiMC(object):
    def __init__(self, _rounds, _key, num_calls):
        self.rounds = _rounds
        self.constants = self.get_rounds_constants()
        self.key = _key
        if use_cubes:
            self.kd_pre = KDPreprocessing(num_calls, self.rounds)

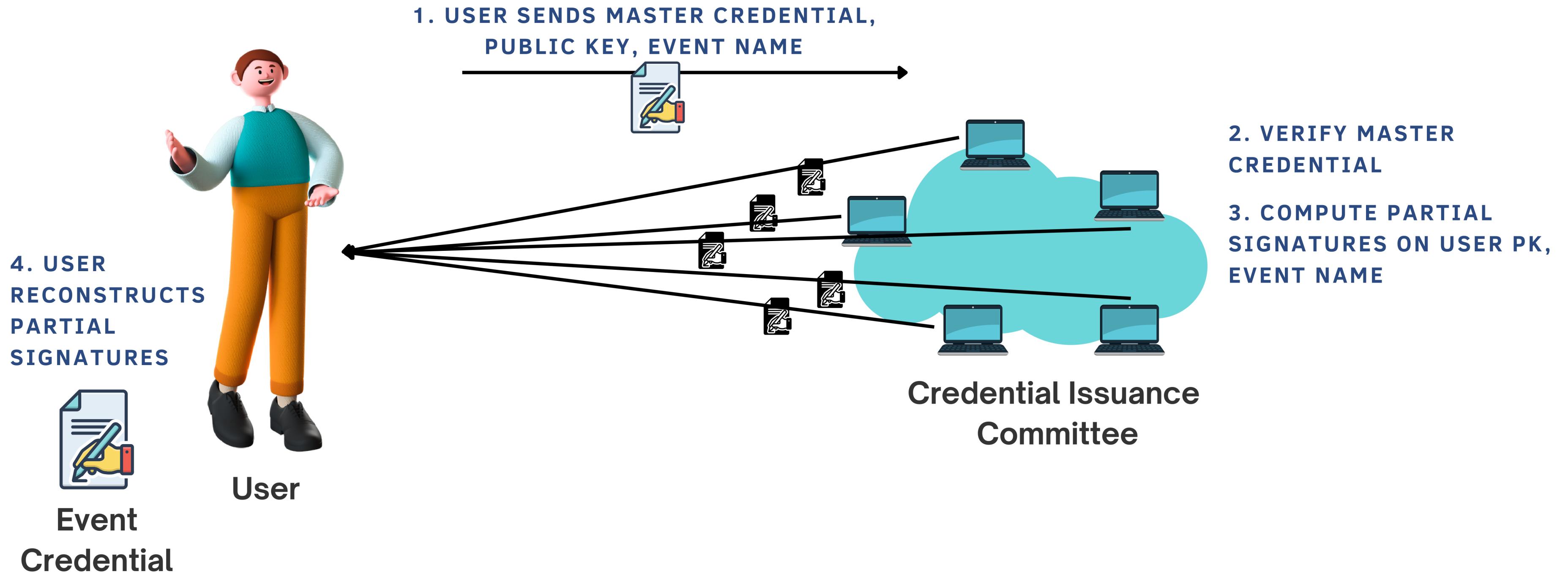
    def get_rounds_constants(self):
        return [sint.get_random_triple()[0].reveal() for i in range(self.rounds)]

    @vectorize
    def encrypt(self, m):
        key = self.key
        x = m + key
        for r in range(self.rounds):
            x = x ** 3
            x = x + key + self.constants[r]
        x = x + key
        return x
```

Identification System - Issue Master Credential



Identification System - Issue Event Credential



Identification System - Master and Event Credentials

Built on Dela DKG Package

- IssueMasterCredential(idHash, PK)
- IssueEventCredential(Master Credential, PK, EventName)
- VerifyEventCredential(EventCredential, PK, EventName)

Kyber bdn Package

- Used to create, reconstruct, and verify partial signatures
- Implementation of Boneh-Drijvers-Neven signature scheme

Ticket Market

- Update Class Diagram

Event Smart Contract	
+ owner, name, num_tickets, price, max_resale_price, resale_royalty	
+ users[]	
+ buyers[], buyer_tickets[], buyer_event_credentials[]	
+ resellers[], rebuyers[]	
+ Init(name, num_tickets, price, max_resale_price, resale_royalty)	
+ Buy(num_tickets, price, event_credential)	
+ Resell(num_tickets, price)	
+ Rebuy(num_tickets, price, event_credential)	
+ Read()	

III. Academic Objectives

		Page
A	Past Research on Blockchain-based Event Ticketing	29
B	Research Goals	42
C	System Design	47
D	System Implementation	61
E	Evaluation	71
F	Threat Model	77
G	Demo	88
H	Conclusion	91

Quantitative Evaluation

1

Storage

2

Identification System
Latency

3

Ticket Market
Throughput

Evaluation Used:

- Macbook Pro with a 2.2GHz Intel core i7 processor
- Varied size of Credential-Issuance Committee, Secret-Management Committee, and Dela

Storage Requirements

	NUMBER OF TICKET OWNERS	TRADITIONAL AUCTION (KBYTES)
Storage	100	26
increases linearly	1,000	256
with event size	10,000	2,560

Table 2: Storage vs Number of Ticket Owners

Identification System

Latency

High Latency
for
MP-SPDZ

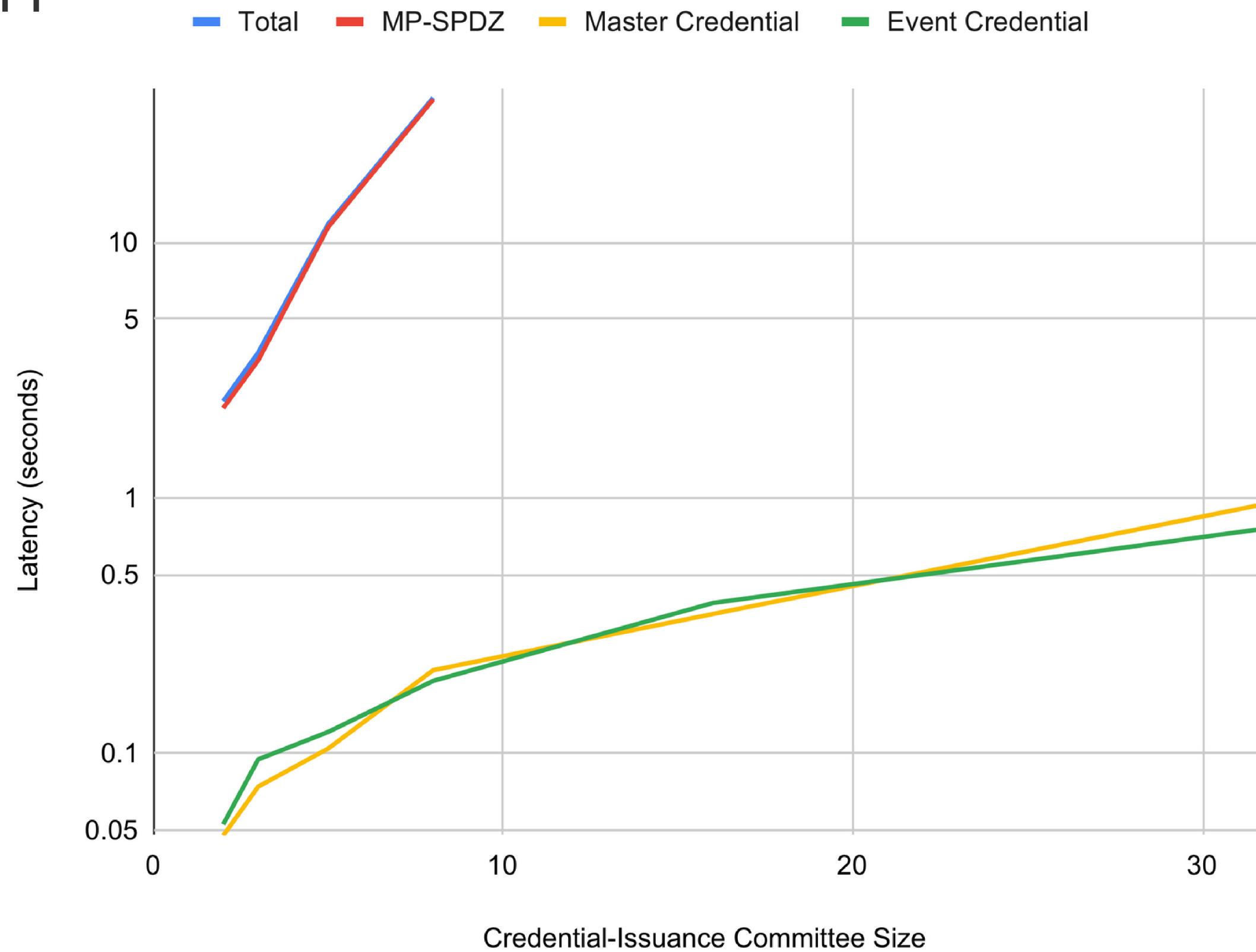


Figure WHAT: Credential-Issuance Committee Size vs Latency

Primary Ticket Market Throughput

Low Throughput
for Primary Ticket
Market of any
Dela Size

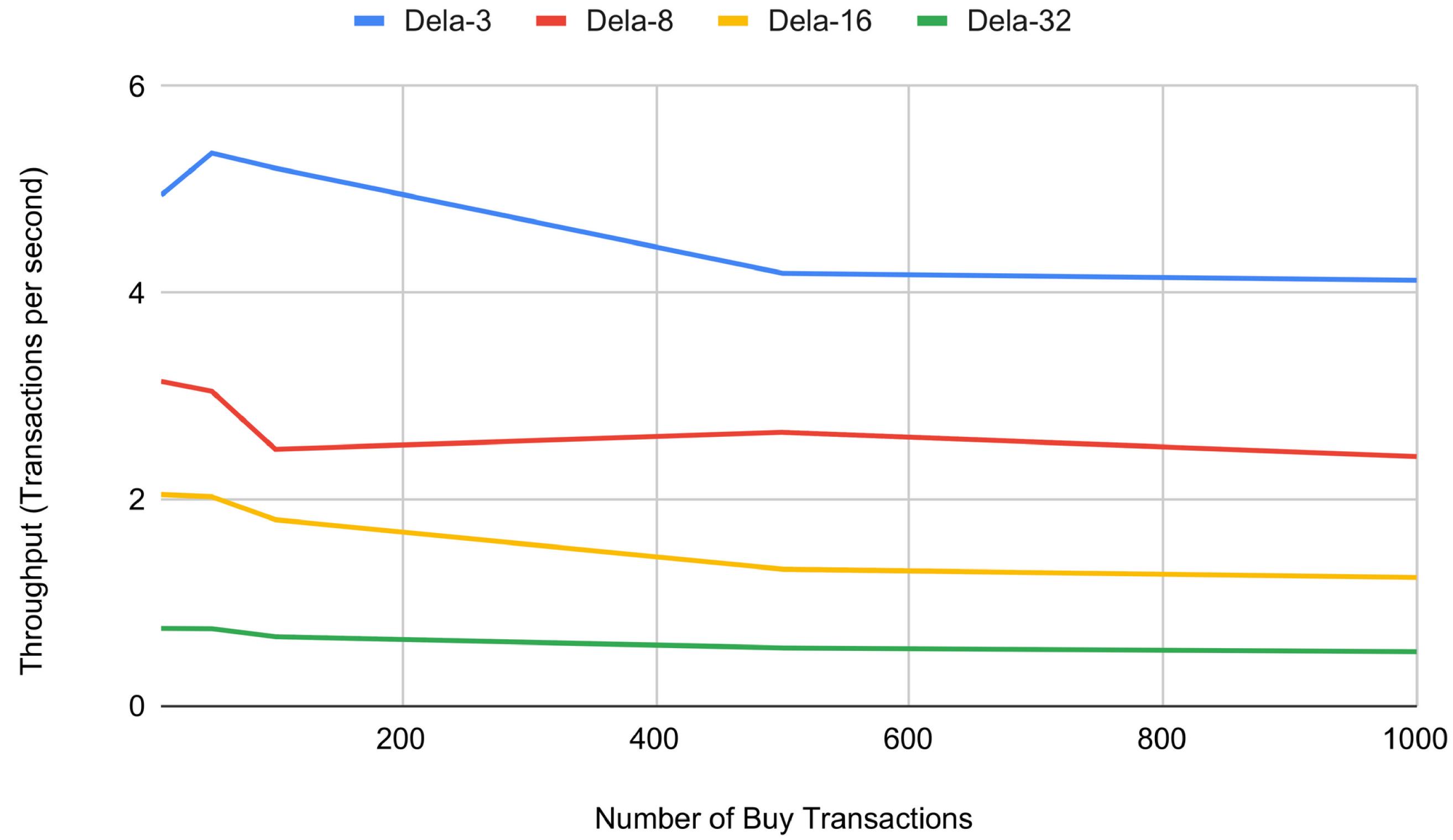


Figure WHAT: Dela Size vs Throughput

Secondary Ticket Market Throughput

Low Throughput
for Secondary Ticket
Market of any
SMC Size

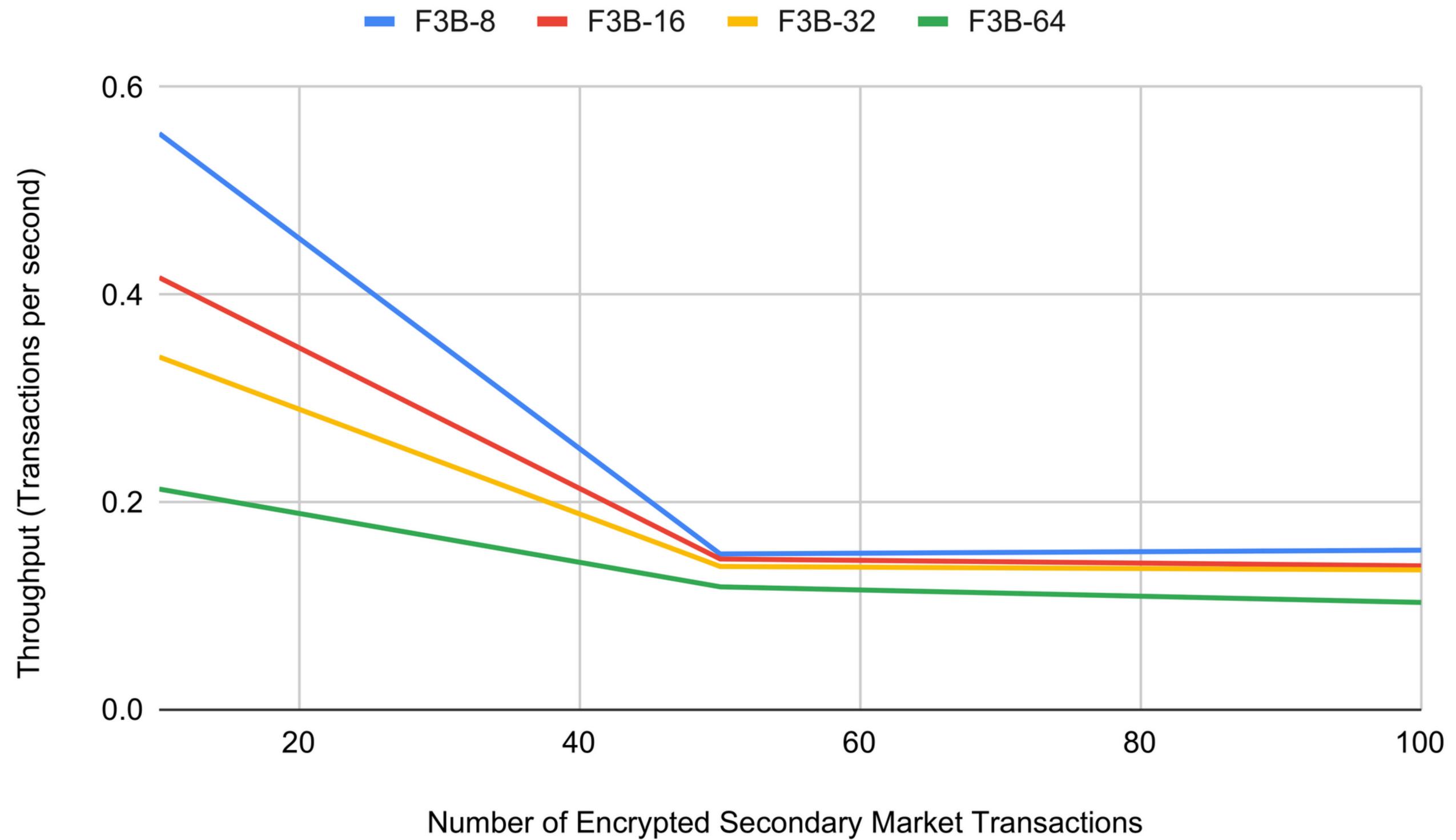


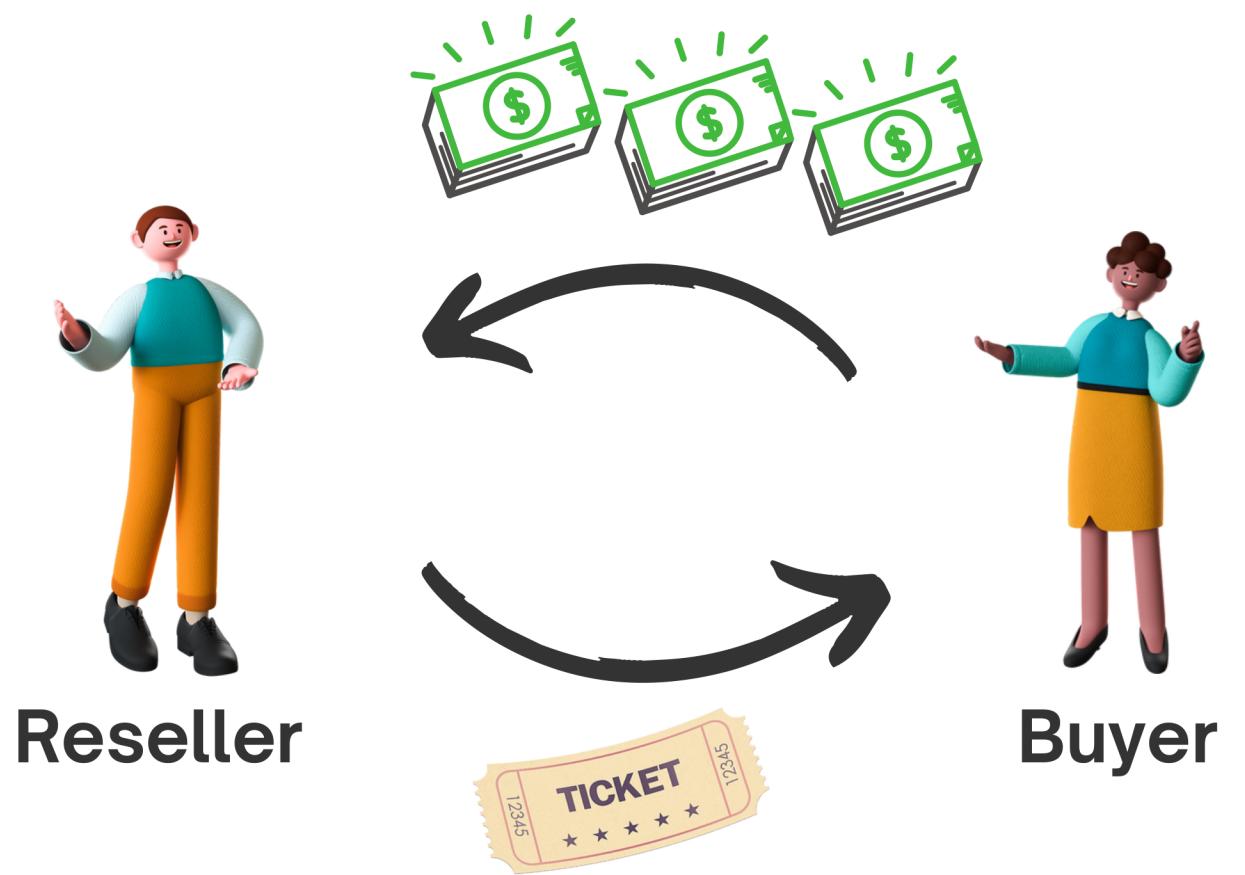
Figure WHAT: Secret-Management Committee Size vs Throughput

III. Academic Objectives

		Page
A	Past Research on Blockchain-based Event Ticketing	29
B	Research Goals	42
C	System Design	47
D	System Implementation	61
E	Evaluation	71
F	Threat Model	77
G	Demo	88
H	Conclusion	91

Threat Model

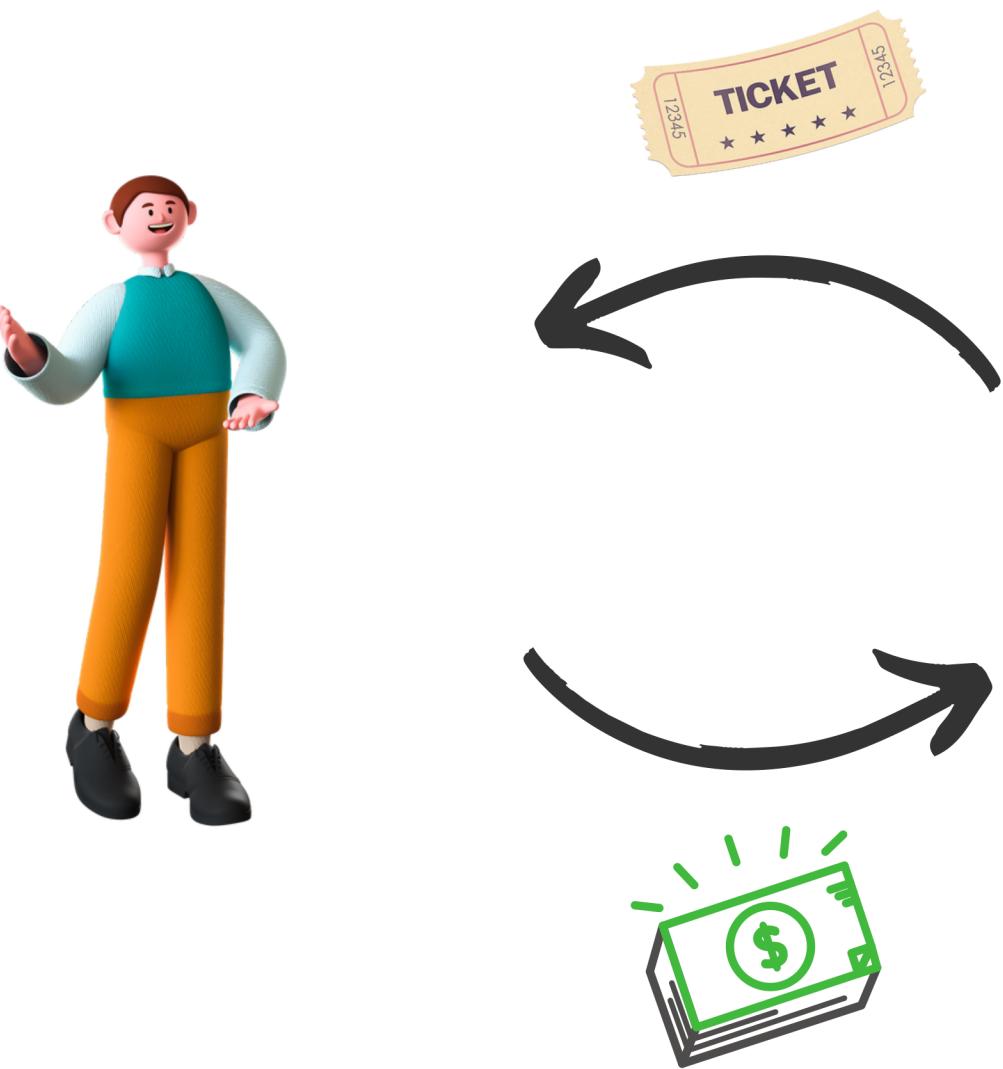
Major Goal: Prevent Off-Chain Ticket Sales



**Event
Smart Contract**



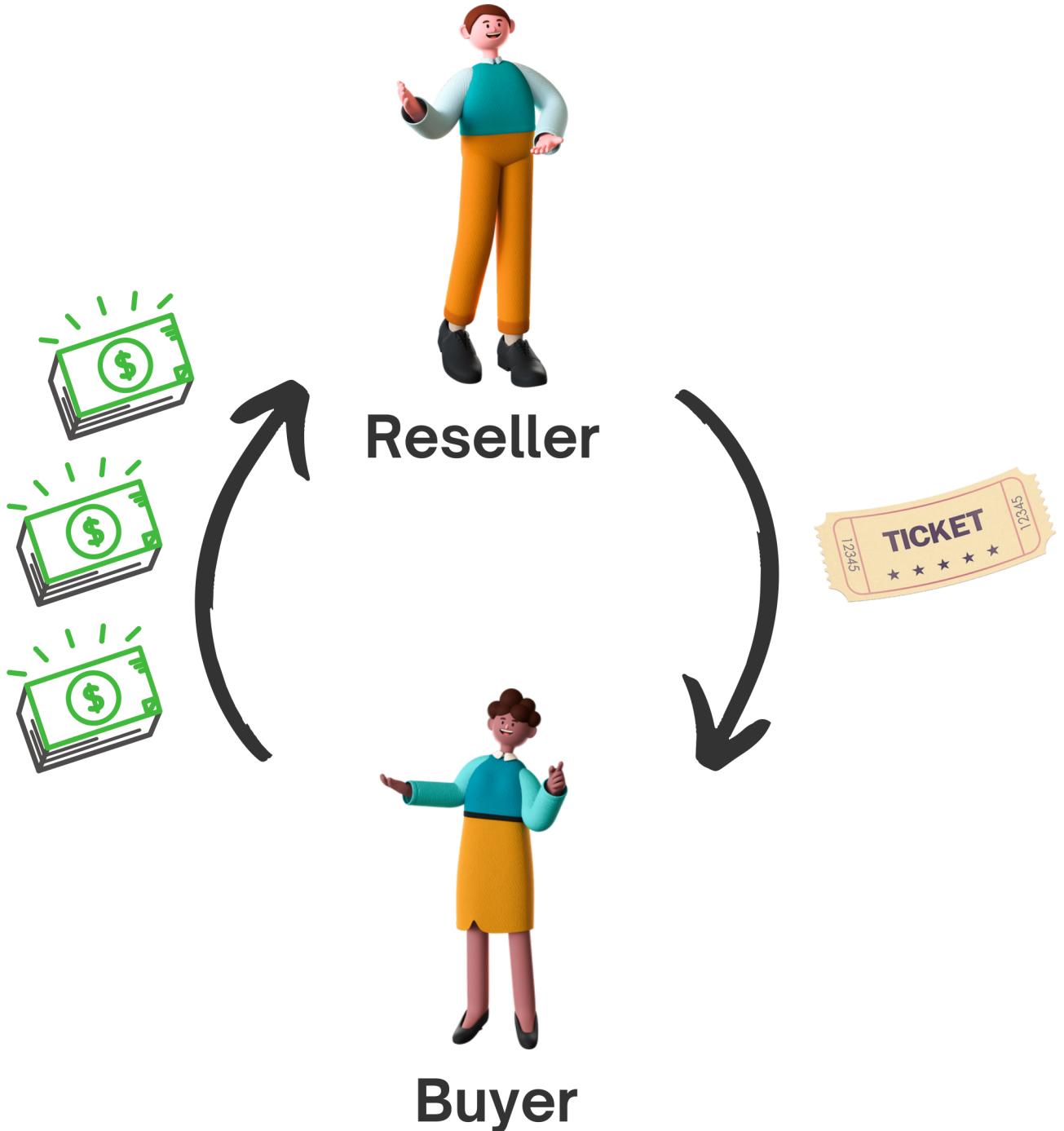
Attack I



Event Smart Contract

- Event organizers set resale prices and resale royalty
- Attendees buy and resell tickets

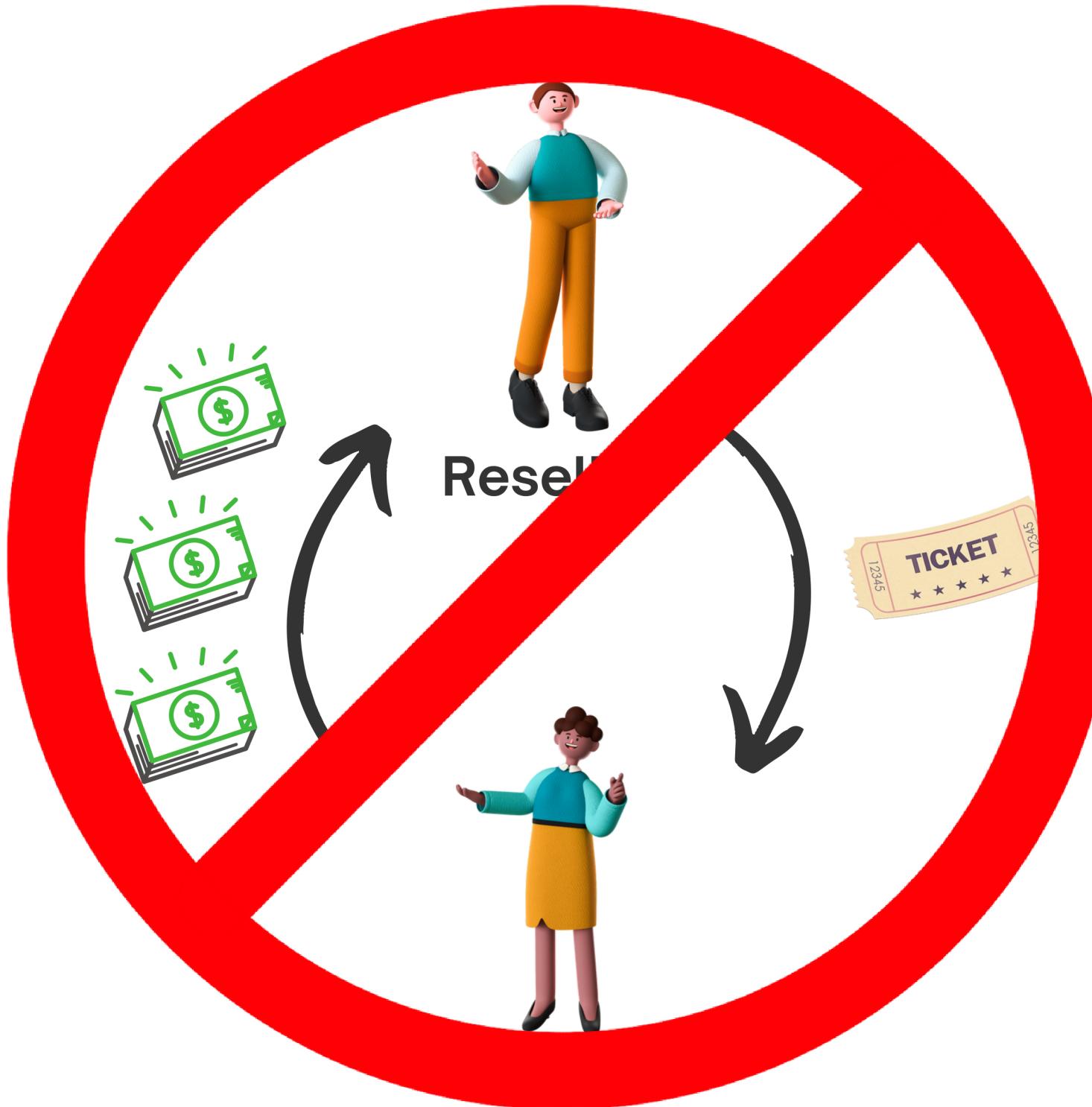
Attack I



Event Smart Contract

- Event organizers set resale prices and resale royalty
- Attendees buy and resell tickets

Attack I



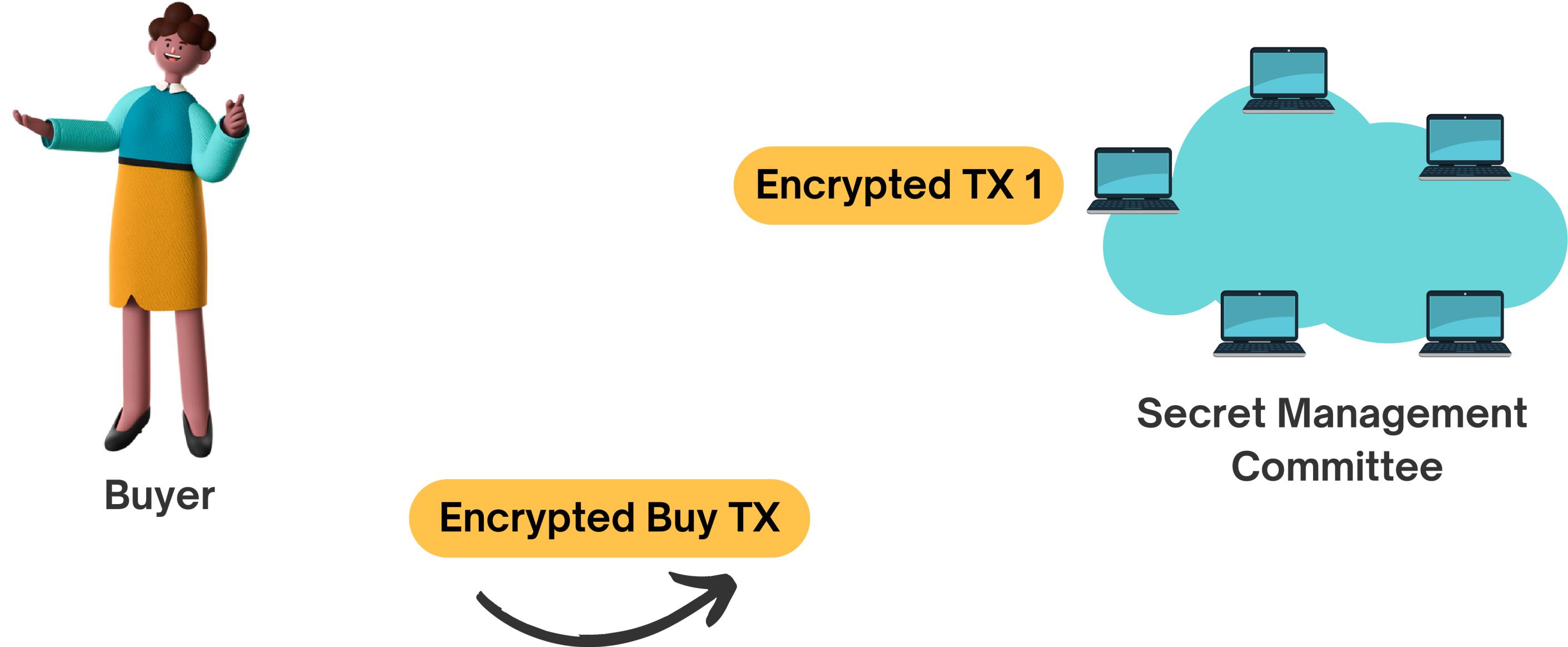
Attack Prevented By

- Identification System attaches event tickets to identities
- Secret-Management Committee shuffles, decrypts, and executes secondary market tx

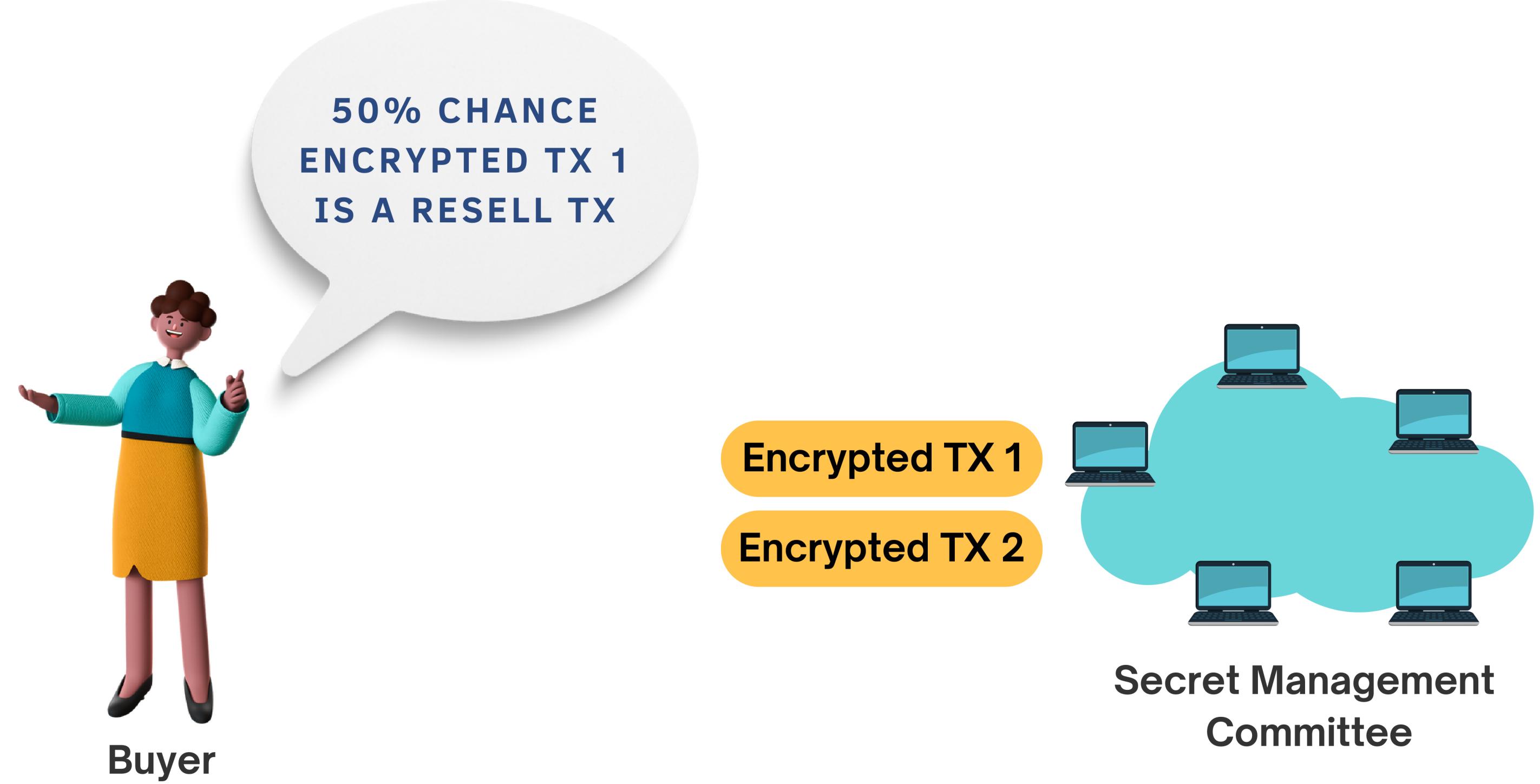
Attack II



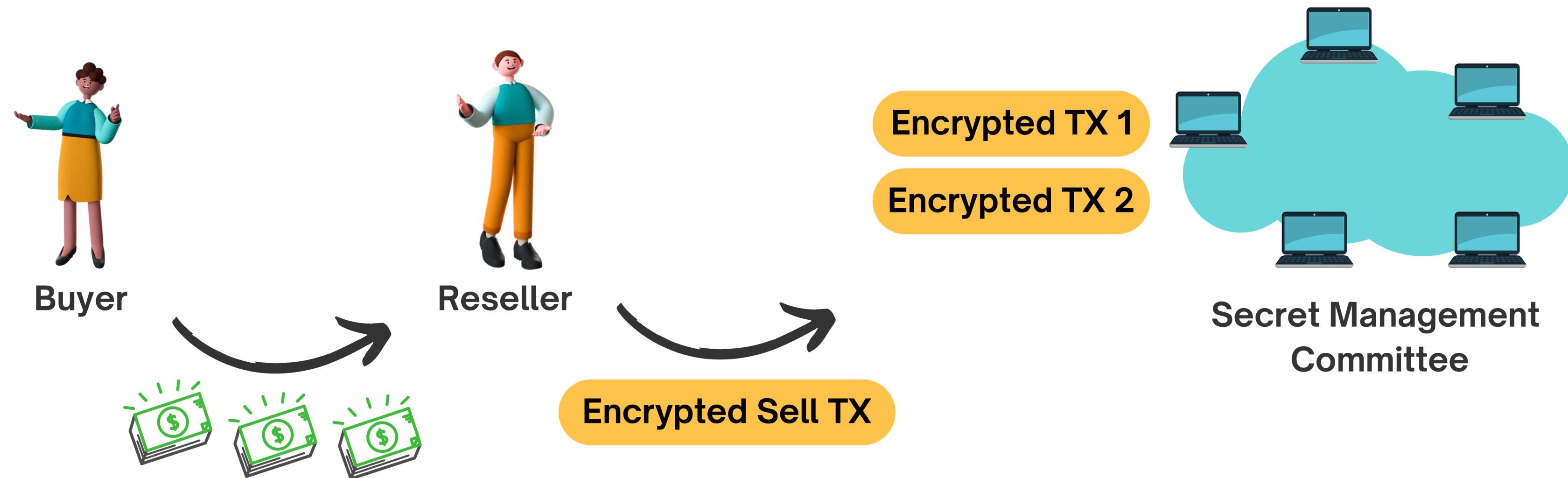
Attack II



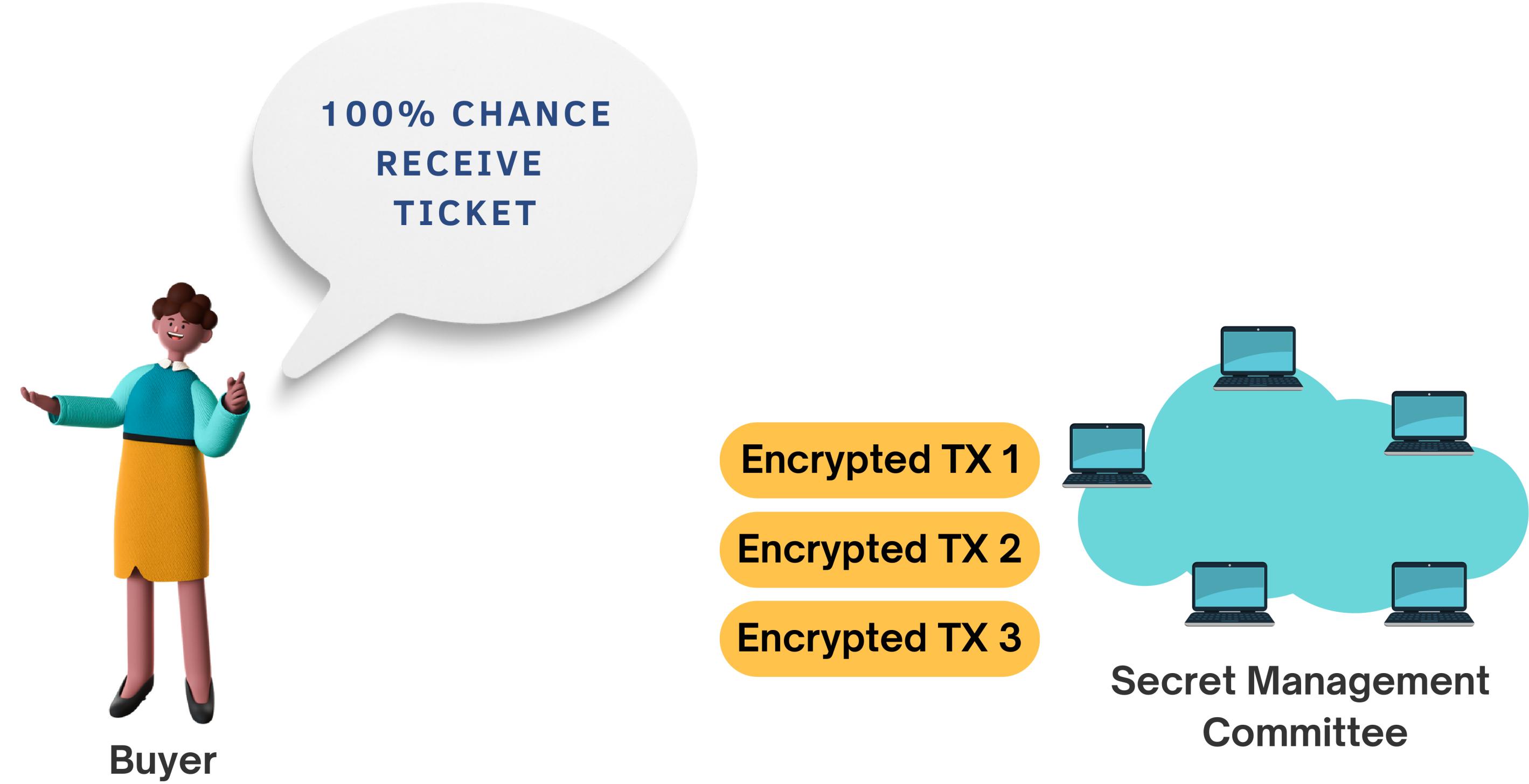
Attack II



Attack II



Attack II



Attack II



Buyer

Attack Mitigated By:

- Dummy secondary market tx
- Secret-Management Committees used for many purposes

III. Academic Objectives

		Page
A	Past Research on Blockchain-based Event Ticketing	29
B	Research Goals	42
C	System Design	47
D	System Implementation	61
E	Evaluation	71
F	Threat Model	77
G	Demo	88
H	Conclusion	91

EXPLORER

PROJECT_CODE

- setup_dela.py
- setup_dkg.py
- setup_info.json

backend > setup_info.json > # start_port_dkg

```
1 "server_port": 2100,  
2 "num_nodes_dela": 3,  
3 "num_nodes_dkg": 3,  
4 "num_nodes_mpc": 2,  
5 "start_node_dela": 220,  
6 "start_port_dela": 2220,  
7 "start_node_dkg": 1220,  
8 "start_port_dkg": 6220  
9  
10 }
```

frontend

- node_modules
- public
- src
 - components
 - helpers
 - api.js
 - context.js
 - pages
 - AddEvent.jsx
 - Admin.jsx
 - Event.jsx
 - Events.jsx
 - F3B.jsx
 - Homepage.jsx
 - Landing.jsx
 - Navigation.jsx
 - Value.jsx

PROBLEMS

- # App.css
- App.js
- App.test.js
- # index.css
- index.js
- logo.svg
- reportWebVitals.js
- setupTests.js
- .gitignore
- package-lock.json
- package.json
- README.md
- > venv
- > OUTLINE
- > TIMELINE
- > GO

OUTPUT

DEBUG CONSOLE

TERMINAL

```
● $ cd backend/  
bash: __git_ps1: command not found  
michaelgysel backend  
○ $ python3 setup_dela.py[]
```

```
● $ cd backend/  
bash: __git_ps1: command not found  
michaelgysel backend  
○ $ python3 setup_dkg.py[]
```

bash backend

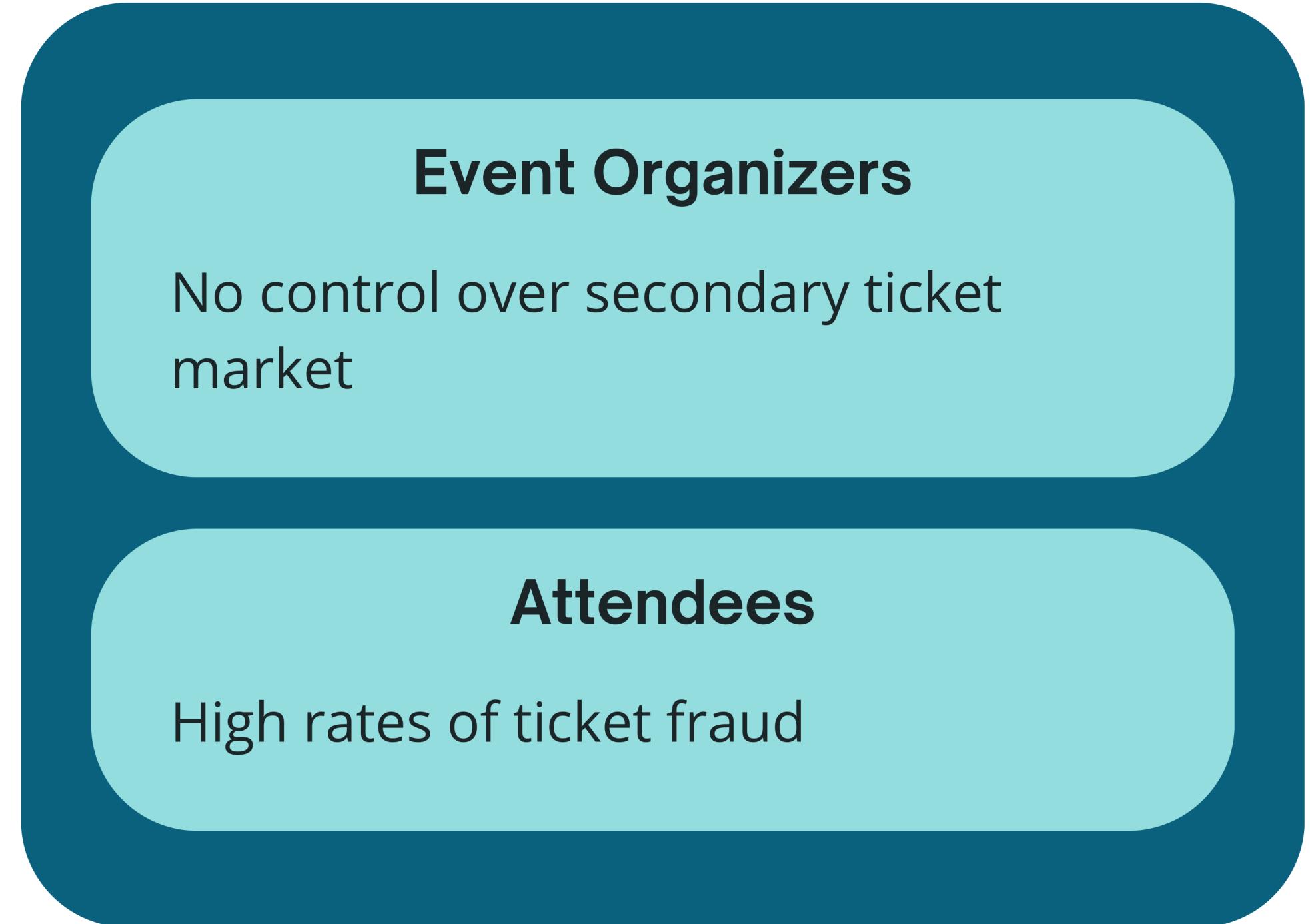
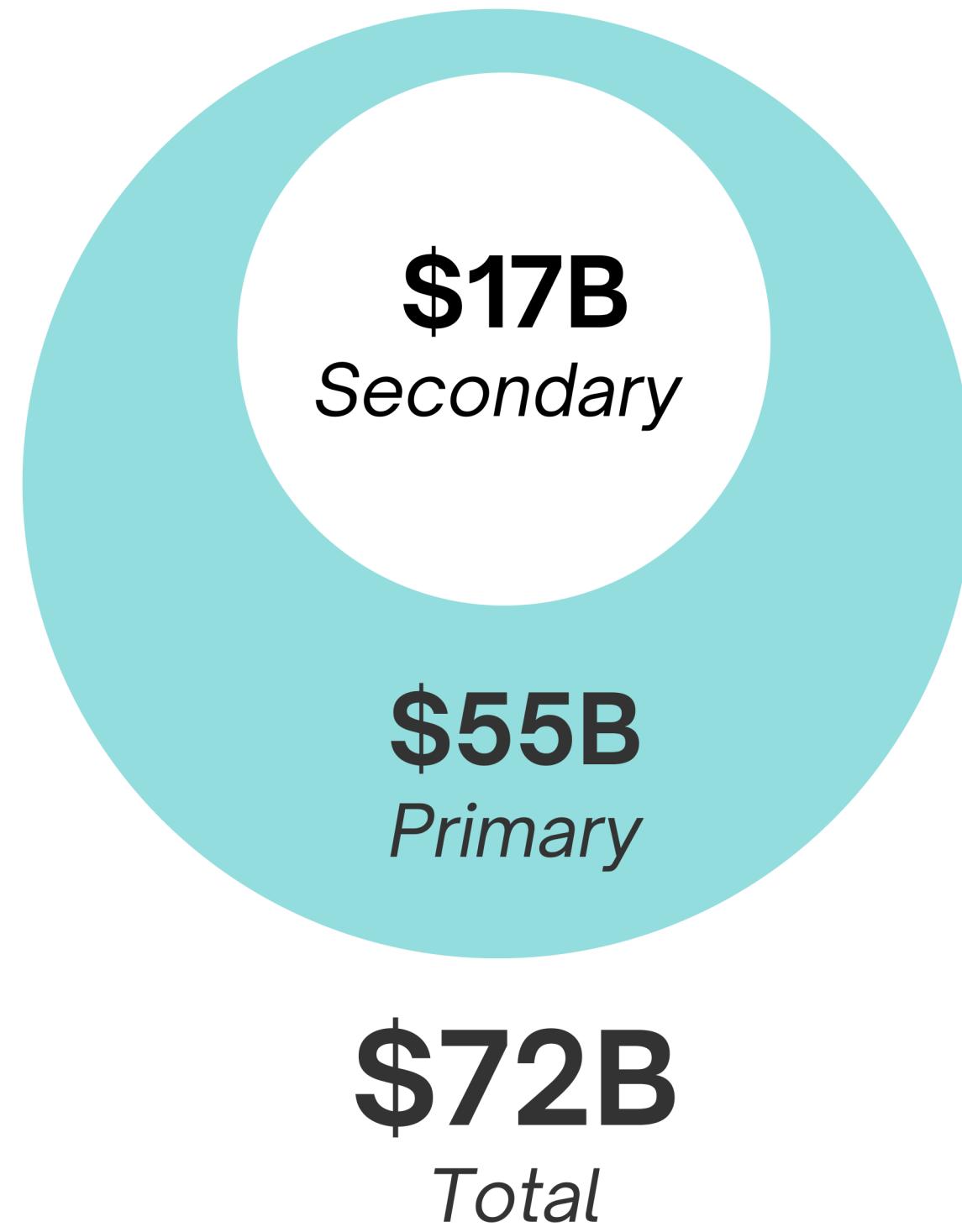
- bash backend
- bash frontend
- bash backend

Ln 9, Col 26 Spaces: 4 UTF-8 LF () JSON Go Update Available R Q

III. Academic Objectives

		Page
A	Past Research on Blockchain-based Event Ticketing	29
B	Research Goals	42
C	System Design	47
D	System Implementation	61
D	Evaluation	71
E	Threat Model	77
F	Demo	88
G	Conclusion	91

Secondary Ticket Market Issues



Drawbacks of Past Research

Does not prevent off-chain ticket sales

STRAWMAN I

Deposit Required

Assumes Honesty of Ticket Buyer

STRAWMAN II

System Overview

Identification System

Attach identities to tickets in a privacy-preserving manner

- Attendees scan ID card, gain anonymous credentials
- Event organizers check credentials valid at event

Ticket Market

- Event Organizers create events and sell tickets
- Attendees buy, resell, use tickets

Achieving System Properties

Implement a blockchain-based event ticketing system with the following properties:

1. Control over secondary market: Event smart contract allows the event organizer to set secondary ticket market prices and take a percentage of resale royalties.
2. Anti-forgery: Event smart contract allows ticket buyer to verify ticket is not fake.
3. Prevent off-chain ticket sales: Attaching identities to tickets and disallowing ticket reseller from choosing buyer prevents off-chain ticket sales.
4. No deposit: Buyer and reseller avoid making a deposit.
5. Unlinkability: Event-based credentials ensure that a user cannot be linked across events.

Evaluation

1

Storage

2

Identification System
Latency

3

Ticket Market
Throughput

- 256 kBytes for event with 1,000 attendees
- Storage increases linearly with number of event attendees

- 3.5 second latency for a credential issuance committee of 3 nodes
- Latency must be improved for large-sized events

- ~3 tx/sec for primary ticket market with 16 Dela nodes
- ~0.2 tx/sec for secondary ticket market with secret-management committee with 16 nodes
- Throughput must be improved for large-sized events

Limitations and Future Work

1

Identification Methods

- 42% of event organizers not willing to check ID cards
- Other identification methods such as phone numbers can be used
- DECO and TownCrier currently developing this

2

Key Management

- Prototype assumes custodial management of user keys
- Non-custodial key management and key recovery methods can improve this

3

Scalability

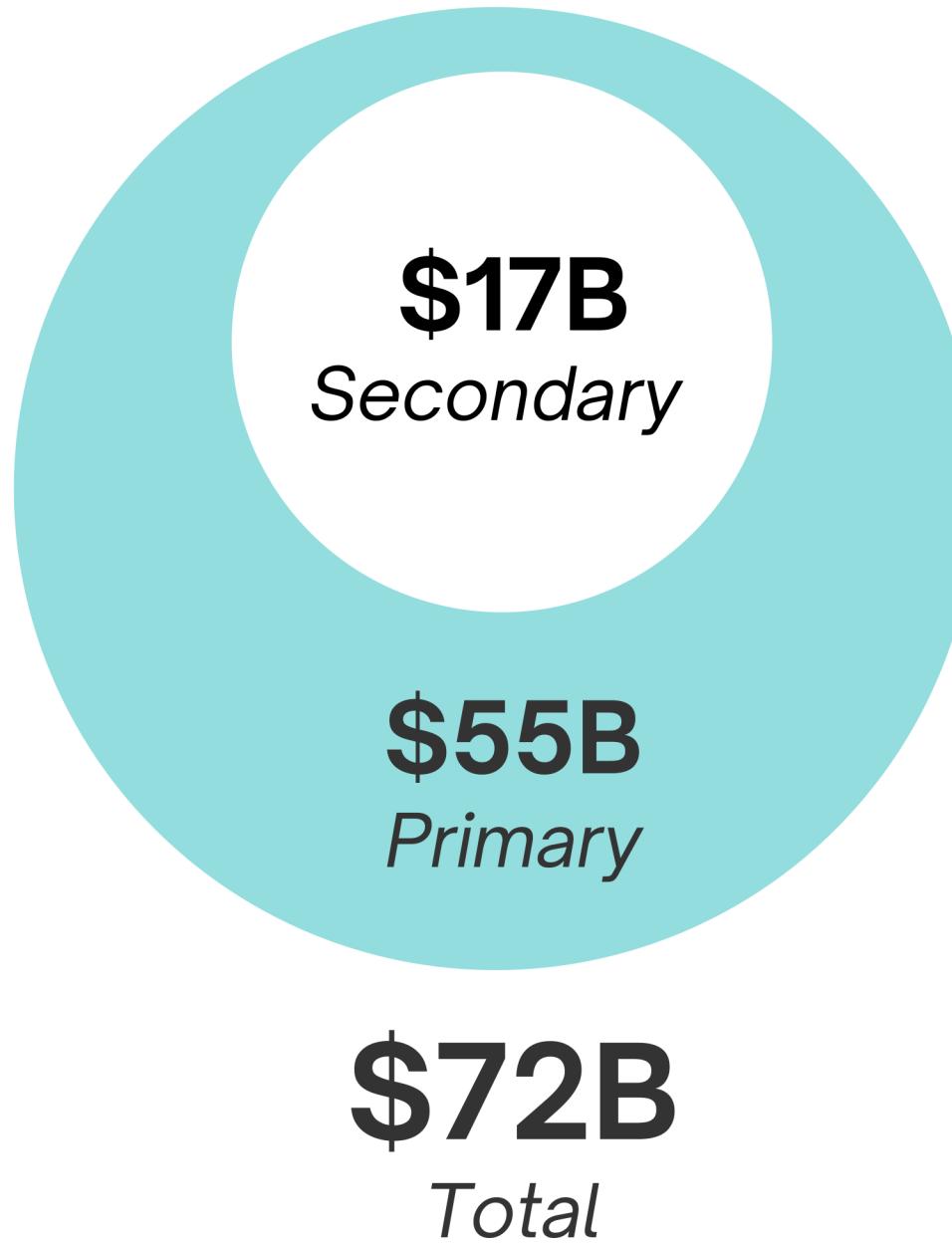
- Scalability must be improved for large-sized events
- Lower identification system latency needed
- Higher primary and secondary ticket market throughput needed

Table of Contents

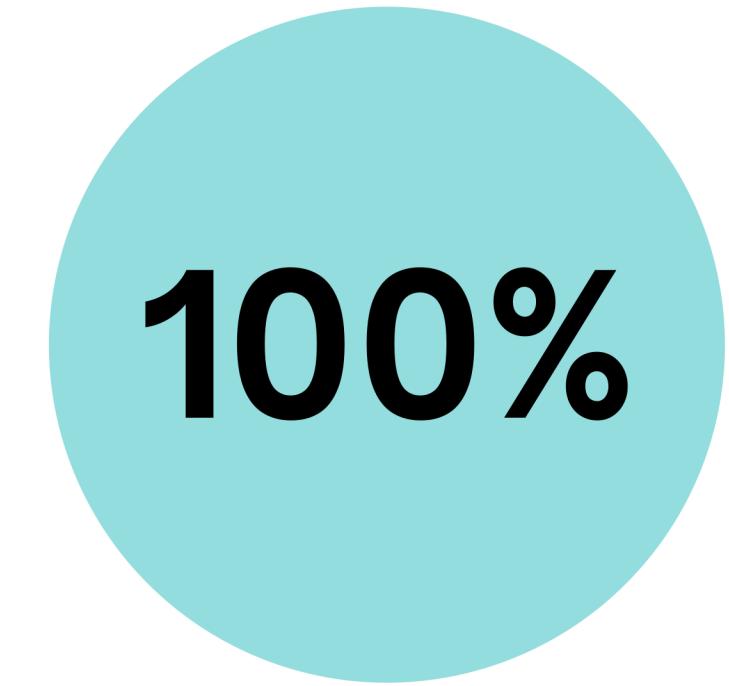
	Page
I Introduction	2
II Business Objectives	6
III Academic Objectives	28
IV Conclusion	98

Event Ticketing Industry Issues

Major Market



Major Issues



Large-sized event organizers stated secondary market control and ticket fraud are major issues

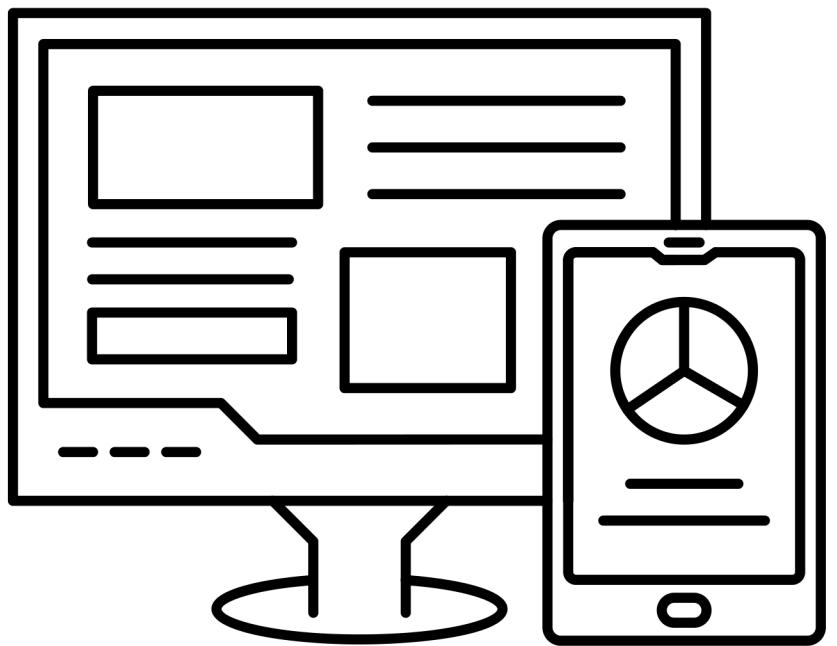
Prototype developed with those 5 properties

Solution Customers Interested In

Still issues need to be solved for use on a large scale

Scalability Challenges for serving clients

Next Steps



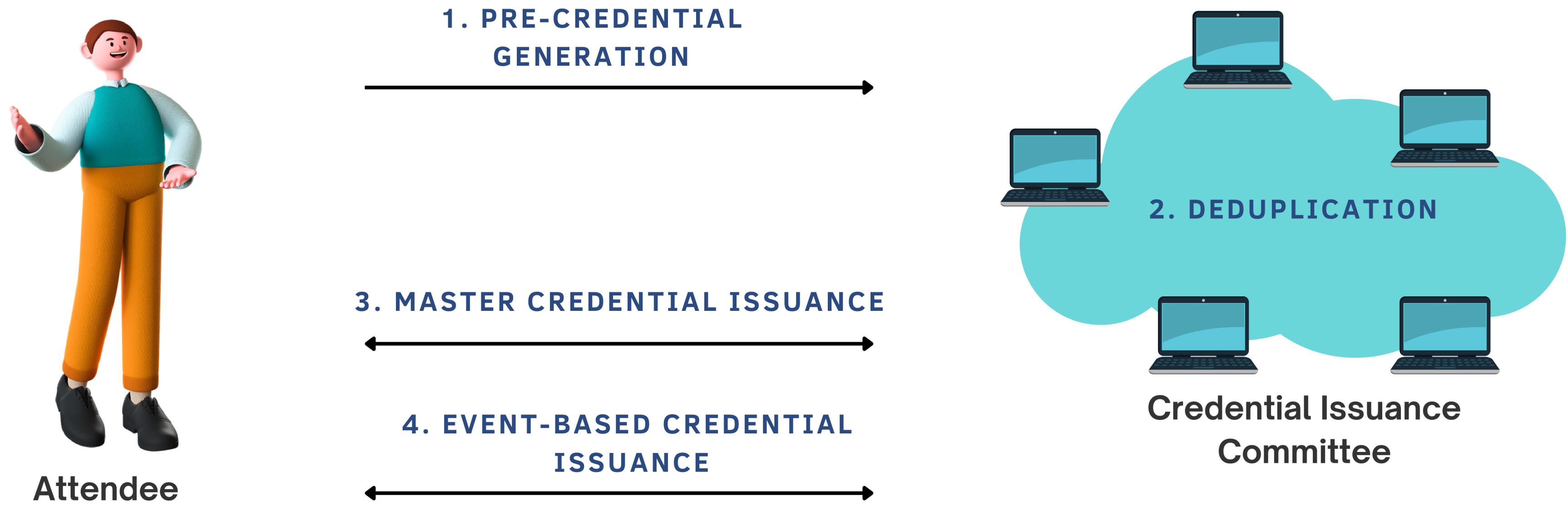
**Build a market ready
prototype to sell to
initial clients**



**Thank you
for listening!
Questions?**

Appendix Slides

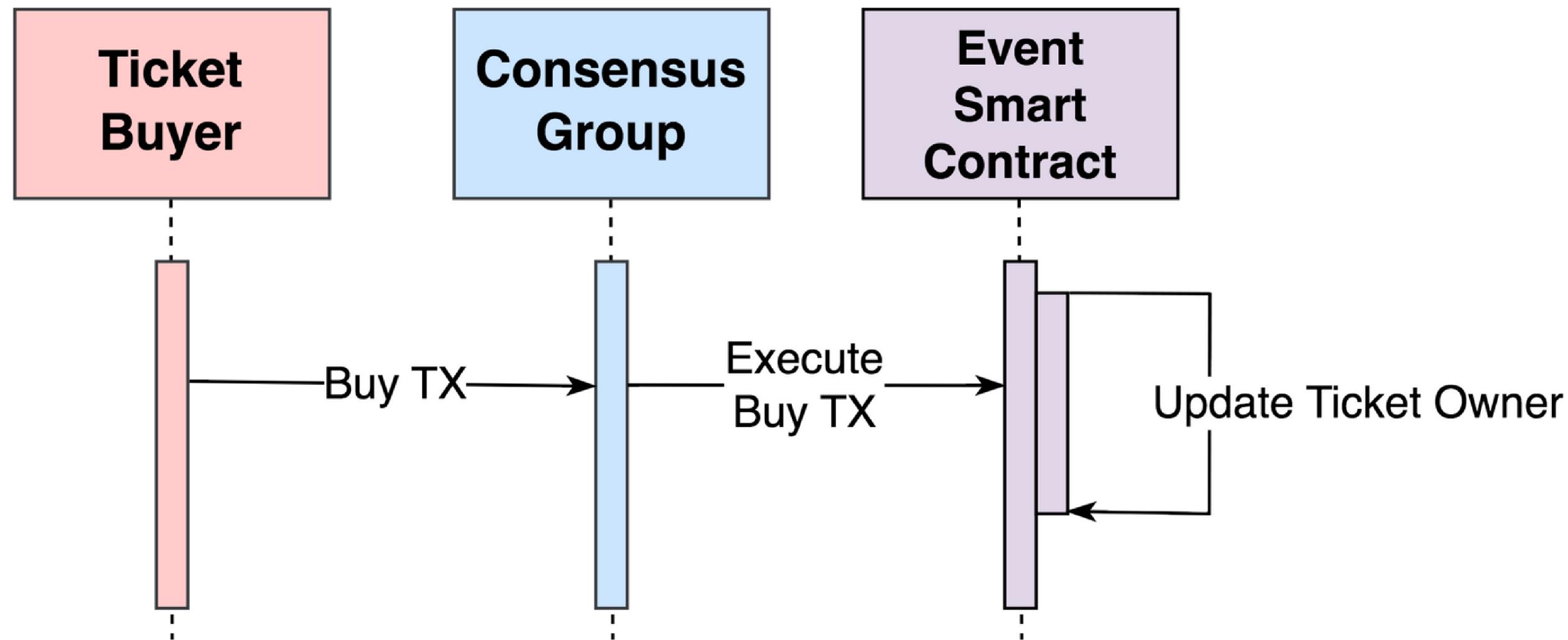
Identification System³: Credential Issuance



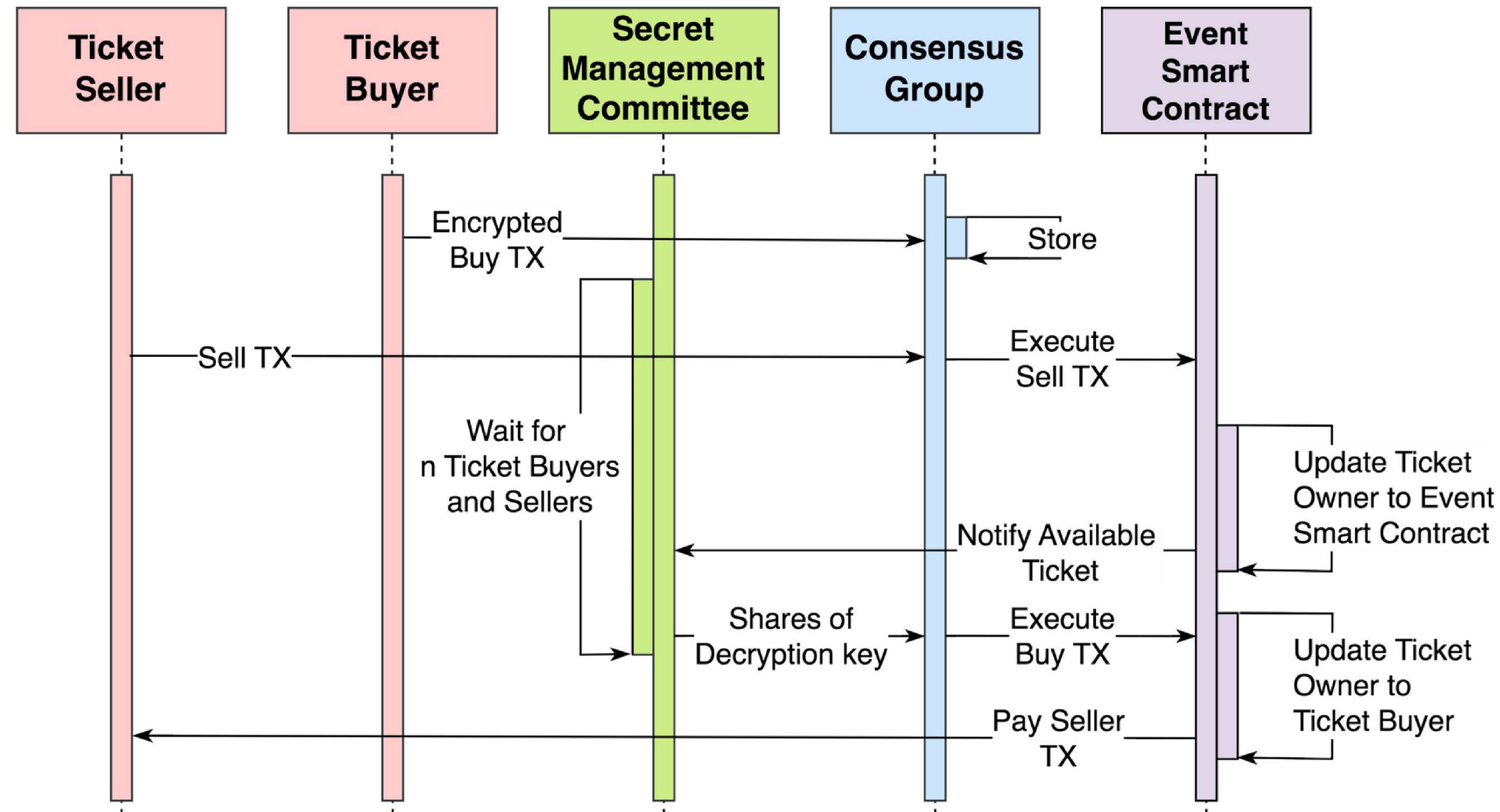
Appendix

³ Maram et al., "CanDID: Can-Do Decentralized Identity with Legacy Compatibility, Sybil-Resistance, and Accountability," (2020). [Online]. Available: <https://eprint.iacr.org/2020/934>

Primary Ticket Market



Secondary Ticket Market



COST STRUCTURE

		Year 1	Year 2	Year 3	Year 4	Year 5
Costs						
Number of Employees		5	6	7	15	25
Payroll	\$100k per employee	\$500,000	\$600,000	\$700,000	\$1,500,000	\$2,500,000
Office Space	\$500 per employee per month	\$0	\$0	\$42,000	\$90,000	\$150,000
Tech Stack	30% of total costs	\$312,161	\$393,206	\$526,738	\$1,181,821	\$2,226,200
Legal Costs	\$2k incorporation in first year 2% of revenue on-going costs	\$4,756	\$15,781	\$41,966	\$117,900	\$338,111
Accounting	4% of revenue	\$5,513	\$27,563	\$79,931	\$231,801	\$672,222
Team-related Costs	\$2,000 per employee per year	\$10,000	\$12,000	\$14,000	\$30,000	\$50,000
Marketing	20% of total costs	\$208,108	\$262,138	\$351,159	\$787,880	\$1,484,133
TOTAL		\$1,040,538	\$1,310,688	\$1,755,794	\$3,939,402	\$7,420,665

		Year 1	Year 2	Year 3	Year 4	Year 5
Revenue						
Tickets Sold	Assumes - 5x increase in tickets year 2 - Average 2.9x increase after	25,000	125,000	362,500	1,051,250	3,048,625
Revenue from Tickets Sold	Revenue assumes - 10% of all ticket sales and resales - 5% of all tickets sold are resold - \$40 average ticket price	\$131,250	\$656,250	\$1,903,125	\$5,519,063	\$16,005,281
Revenue from event sponsorships	5% of total revenue	\$6,563	\$32,813	\$95,156	\$275,953	\$800,264
TOTAL		\$137,813	\$689,063	\$1,998,281	\$5,795,016	\$16,805,545

		Year 1	Year 2	Year 3	Year 4	Year 5
Break Even Analysis						
EBITDA	\$ (902,725.00)	\$ (621,625.00)	\$ 242,487.50	\$ 1,855,613.75	\$ 9,384,879.88	
Taxes	\$ -	\$ -	\$ 50,922.38	\$ 389,678.89	\$ 1,970,824.77	
Net Income	\$ (902,725.00)	\$ (621,625.00)	\$ 191,565.13	\$ 1,465,934.86	\$ 7,414,055.10	
Break Even?	\$ (902,725.00)	\$ (1,524,350.00)	\$ (1,332,784.88)	\$ 133,149.99	\$ 7,547,205.09	

BUSINESS MODEL CANVAS

Key Partners		Key Activities		Value Propositions		Customer Relationships		Customer Segments	
<ul style="list-style-type: none"> - Event organizers: Initial focus on Web3 event organizers, but can expand to other technical/business areas - Web3 media relationships, where I could gain free marketing 		<ul style="list-style-type: none"> - Technical development of event marketplace - Technical development of event ticketing system - Building relationships with web3 event organizers - Marketing events 		<p>Smaller events (short term)</p> <ul style="list-style-type: none"> - Targeted marketplace for web3 events - Data analytics for web3 events <p>Larger events (longer term)</p> <ul style="list-style-type: none"> - Control secondary ticket market, including min/max resale price and percentage of resale royalties - Reduce ticket fraud 		<p>Relationships with event organizers is critical, must spend time/money to develop these relationships</p>		<p>Event Type</p> <ul style="list-style-type: none"> - Web3 event organizers (smaller events and larger conferences) - Other technical/business event organizers 	
		Key Resources				Channels			
		<ul style="list-style-type: none"> - Software and blockchain developers - Employees who have or can build relationships with web3/technical/business event organizers - Marketing team 				<p>Event Organizers:</p> <ul style="list-style-type: none"> - in-person to build relationships <p>Attendees:</p> <ul style="list-style-type: none"> - web3 events website - social media marketing - SEO - email list 		<p>Location</p> <ul style="list-style-type: none"> - Initial focus on Switzerland - medium term focus on Europe/US - long term global focus 	
Cost Structure				Revenue Streams					
<ul style="list-style-type: none"> - Detailed cost breakdown on 'Cost Structure' slide - 50% of cost is payroll - 30% of cost is tech stack - 20% of cost is marketing 				<ul style="list-style-type: none"> - 10% of all ticket sales and resales 					

MARKET VALIDATION

Event Organizers

Format: Interview

Assumptions validated:

- Willingness to change their ticketing services
- Interest in controlling secondary market
- Increase of Tickets' Digitalizing

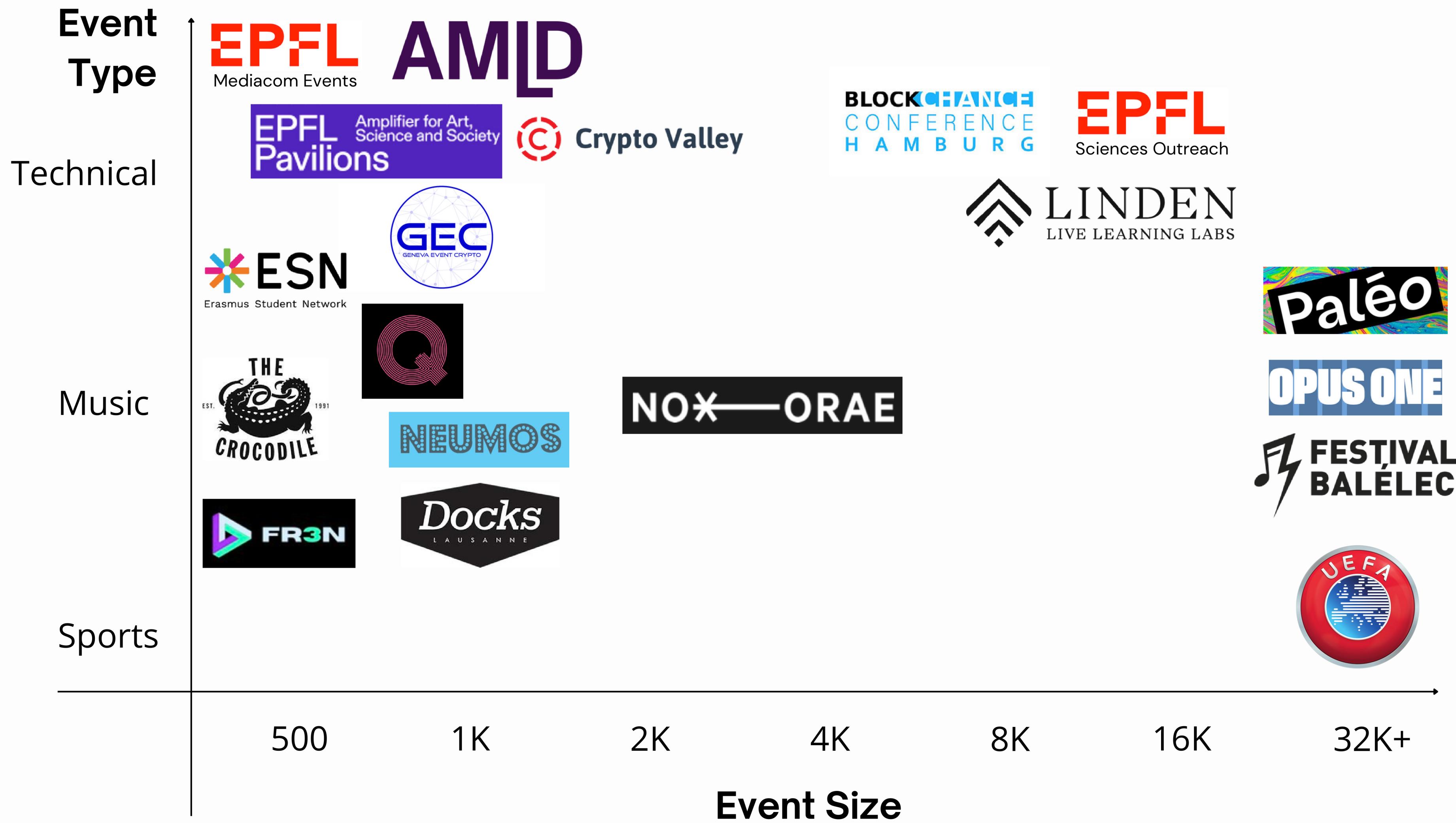
Attendees

Format: Survey

Assumptions validated:

- 60% have experienced high priced tickets on the secondary market
- 15% have experienced ticket fraud

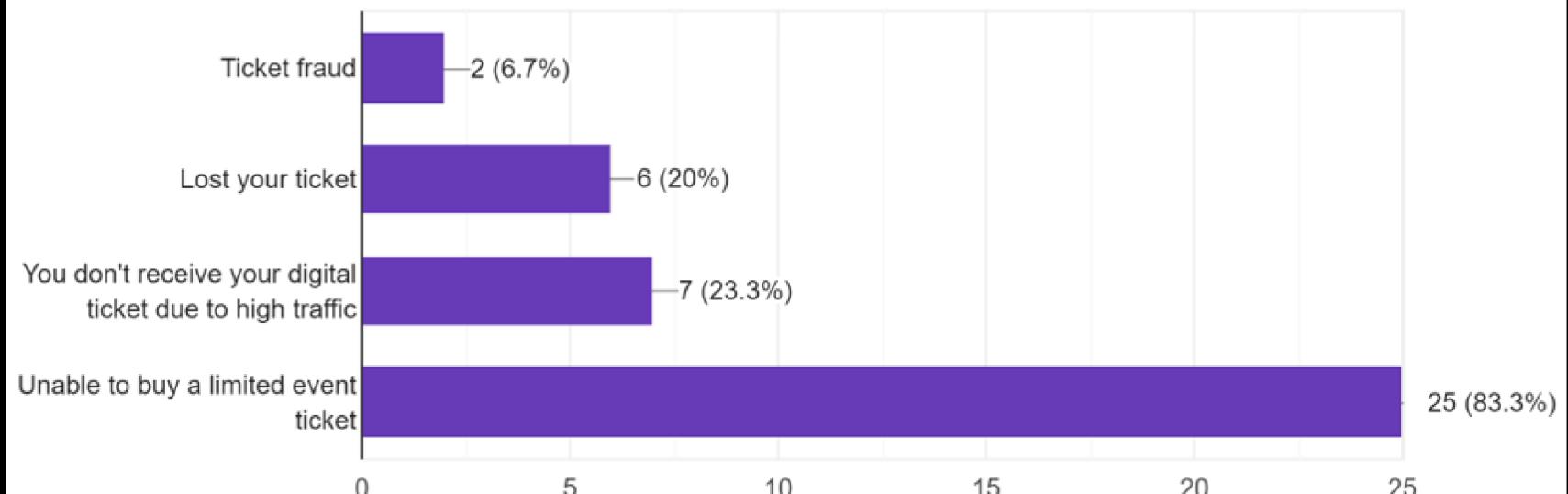
Both event organizers and attendees want to moderate the secondary market.



ATTENDEE SURVEY KEY RESULTS

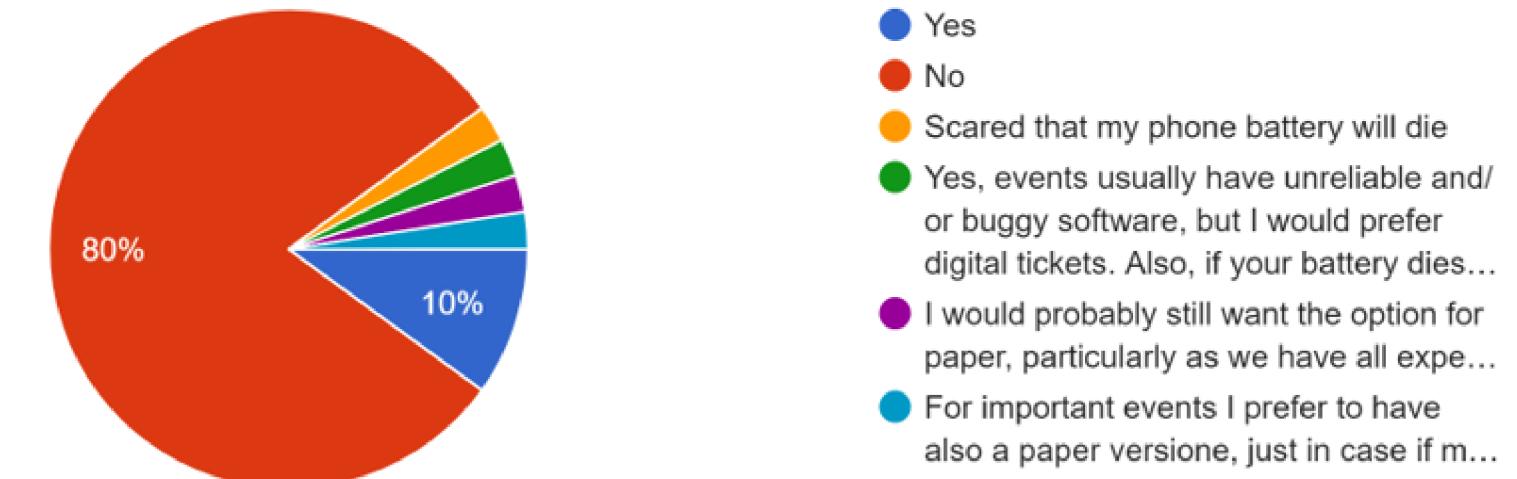
Did you ever encounter some of the following problems with ticketed events?

30 responses



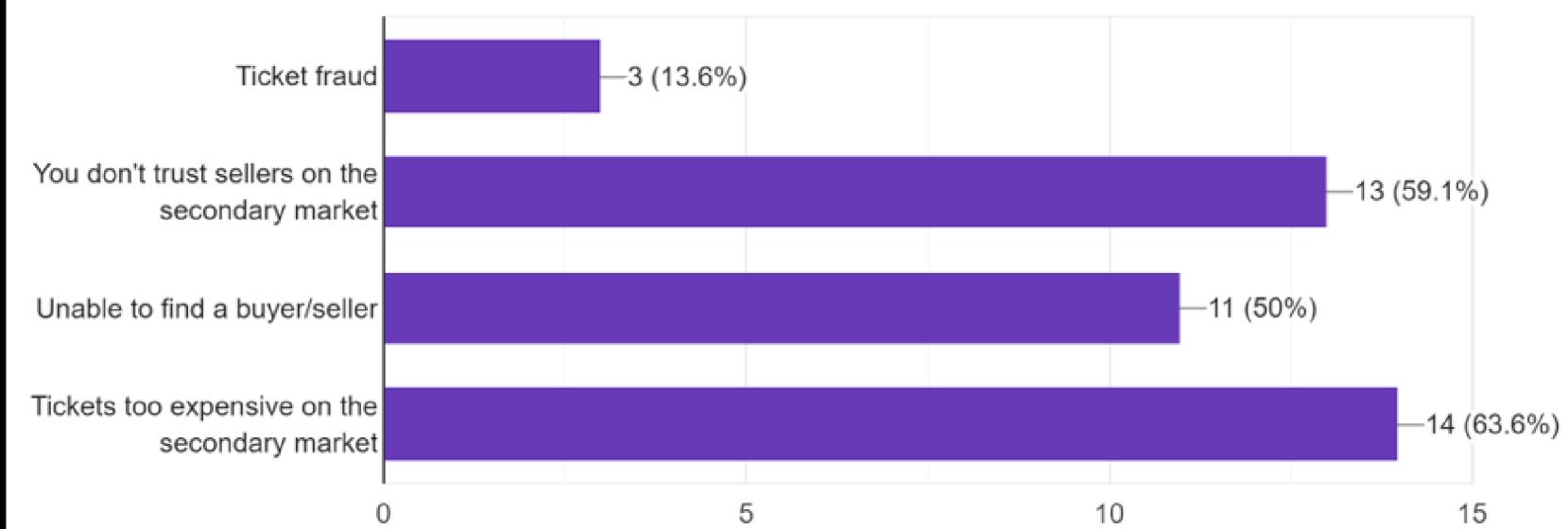
Do you have any problems with having only a digital ticket?

40 responses



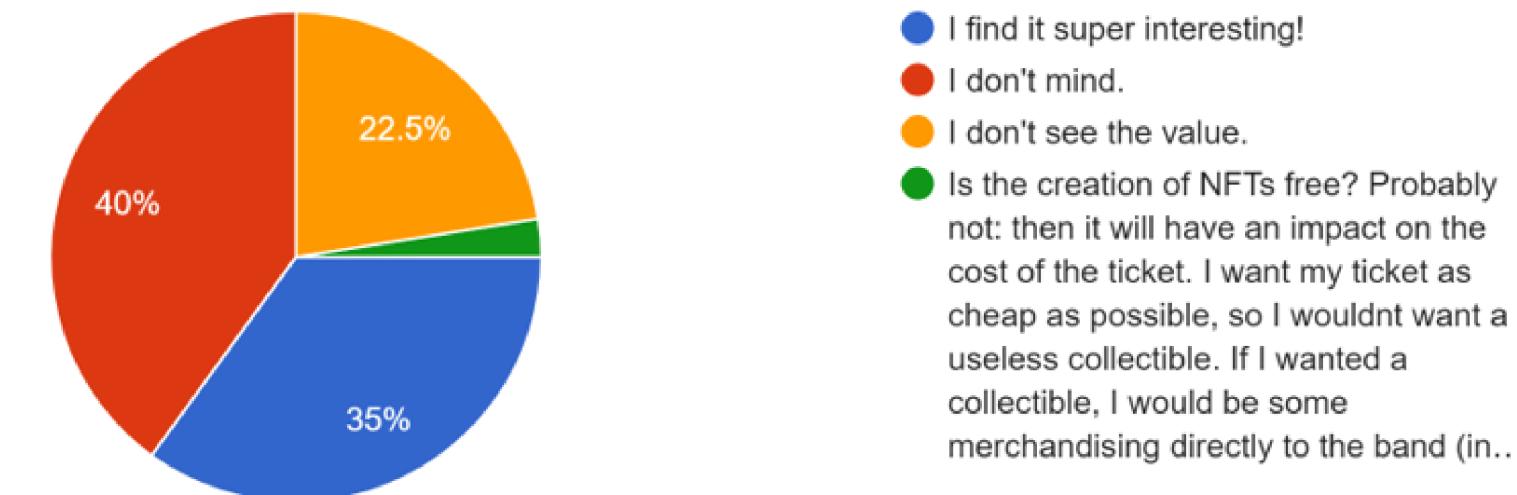
Did you ever encounter some of the following problems trying to buy or sell your ticket on the secondary market ?

22 responses



Do you enjoy the idea of owning collectibles in the form of NFTs for different ticketed events you attend?

40 responses



ATTENDEE SURVEY KEY RESULTS

What are your thoughts on event organizers having the possibility to control prices on the secondary market?

"If it is to control the abusive resell, I am all for! But if it is to make more money than what they already did with the sell of the ticket on the primary market, I don't really believe that it's fair, as the price on the secondary market would increase (to compensate from the margin of the organizer)"

"I think it's their event, so it should be their right."

"It's great because it's not okay when people buy tickets just to sell them. But it should still be ok to sell a ticket on secondary market when one cannot attend anymore to the event. It should however be same price or cheaper."

"Good way to avoid high prices"

"I can see the value in it, as there have been many situations where opportunists bulk buy tickets on the primary market, and then sell them at a premium to those who truly want to attend the event."