

Introducing



Exec Summary



Hyperledger FireFly

HL FireFly is a Multi-Party System - for enterprise data flows

- A larger system around a blockchain
- Think docker → kubernetes
- Multi-protocol blockchain support
- Highly pluggable and extensible by design (open, future-proof, etc.)

No more plumbing to build on enterprise blockchain

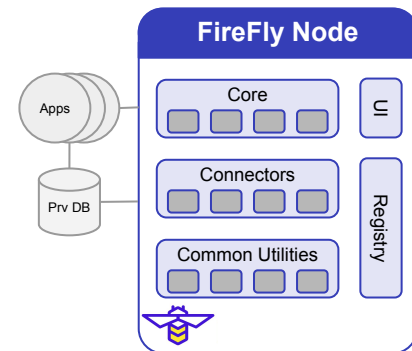
- The right mix of distributed and decentralized technologies all pre-integrated into an end-to-end system: blockchain, messaging, connectors, pluggable compute, identity registry

Hyperledger is the right place for FireFly

- Large, ambitious, pluggable project aiming to simplify building and running enterprise blockchain projects
- Compliments many HL projects: Fabric, Besu, Indy, Cactus/Weaver, etc
- Keys to success: open governance, broad participation, market-driven evolution

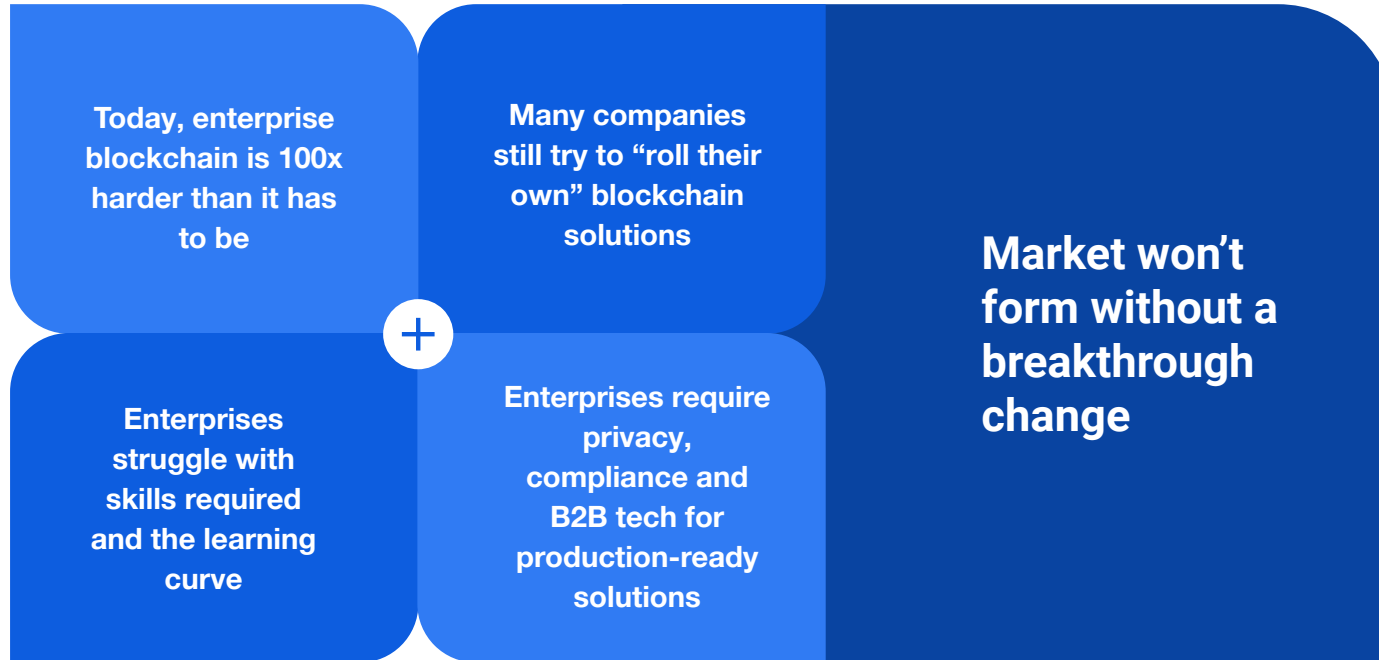
Strong starting point for the project

- Seed contribution from Kaleido
 - 3 years of engineering
 - Production code that Fortune 500 customers actively run on
 - 6 years of enterprise blockchain learnings
- Kaleido founders have 60+ years core systems experience, veterans of enterprise OSS, cloud native architecture, etc



Problem statement

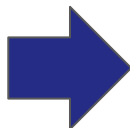
What's holding enterprise blockchain back?



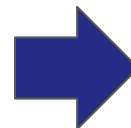
Building your first enterprise blockchain use case



What enterprises think the job is



What the job becomes



What the job ought to be

1. Write smart contracts
2. Start a blockchain node
3. Build a web application
4. Figure out how to deploy

1. Design how to use the blockchain
2. Build off chain plumbing
3. Struggle to code to blockchain API
4. Realize deployment is far off

1. Model Assets and Data
2. Define process orchestration
3. Code to simple APIs
4. Click *deploy*

“using a blockchain”



“building off-chain plumbing”



“Model, code, deploy”

3-5 components



10-40 components



1 platform

4-6 months



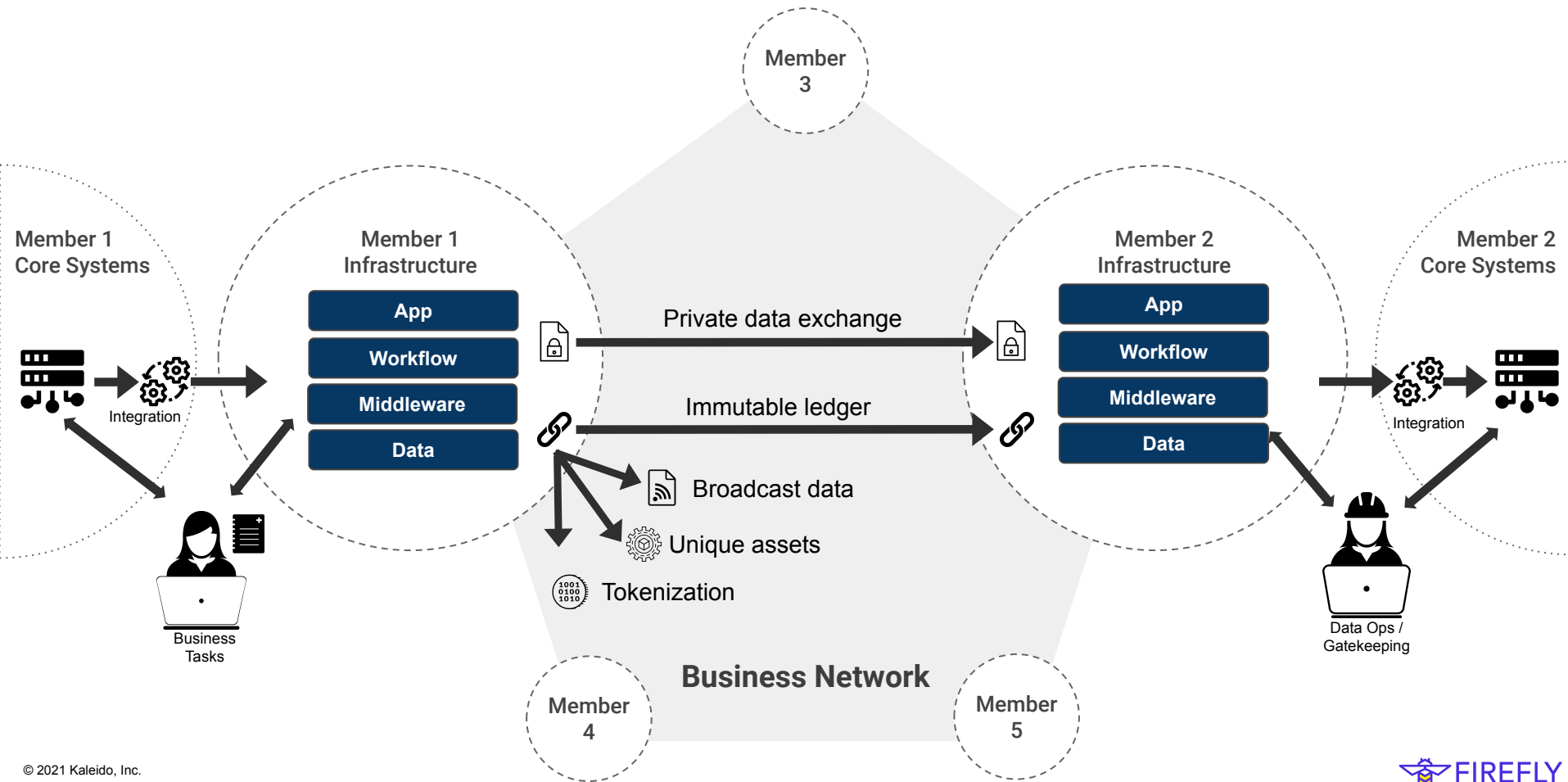
24-48 months



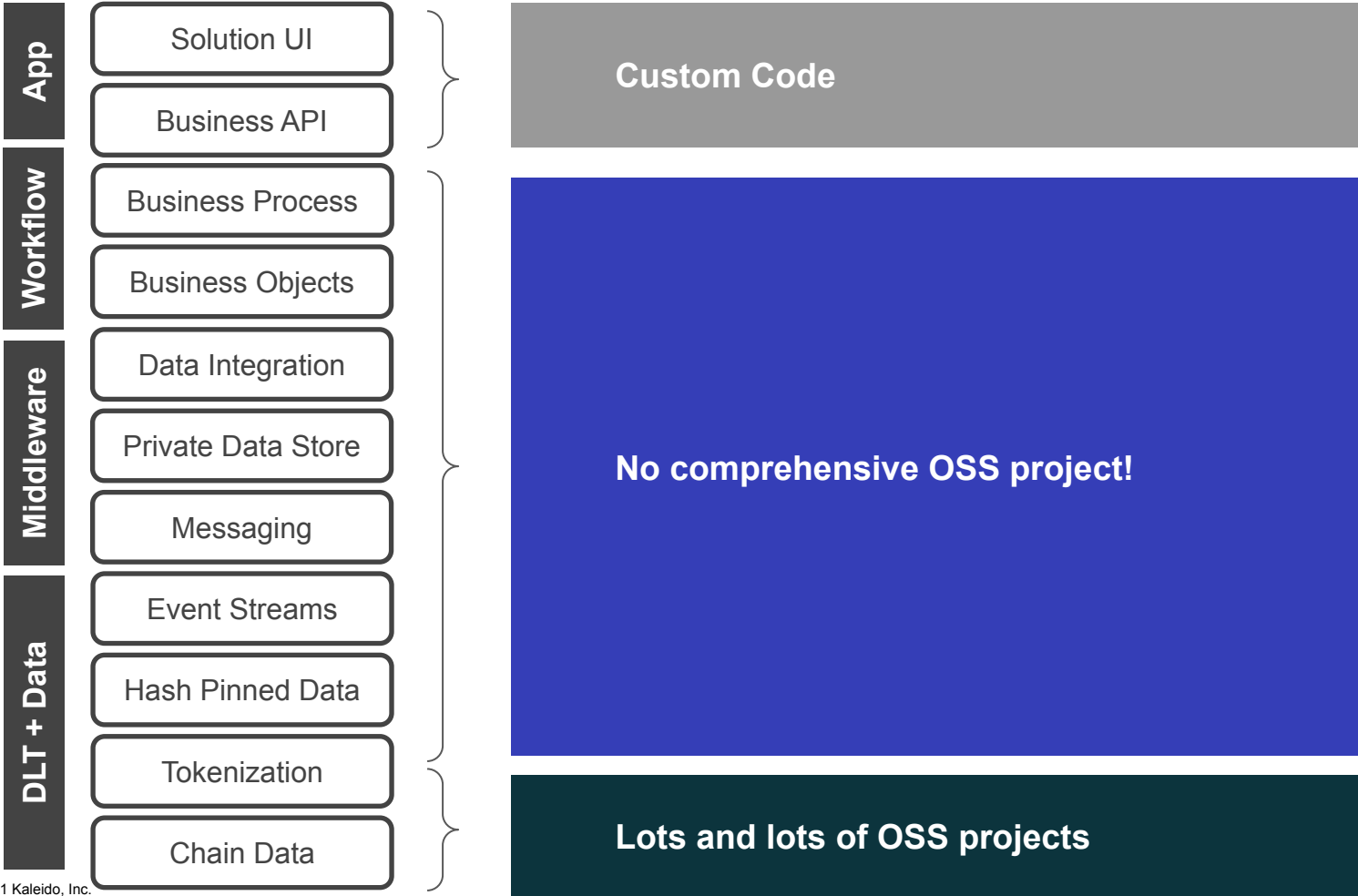
2 weeks

Today it's 10-100x too difficult because the whole problem is much larger than the blockchain

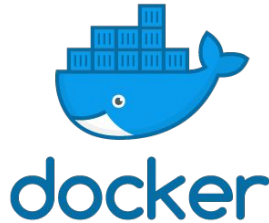
Typical Enterprise Blockchain Network



Anatomy of a typical enterprise blockchain app



An analogy: Docker & Kubernetes

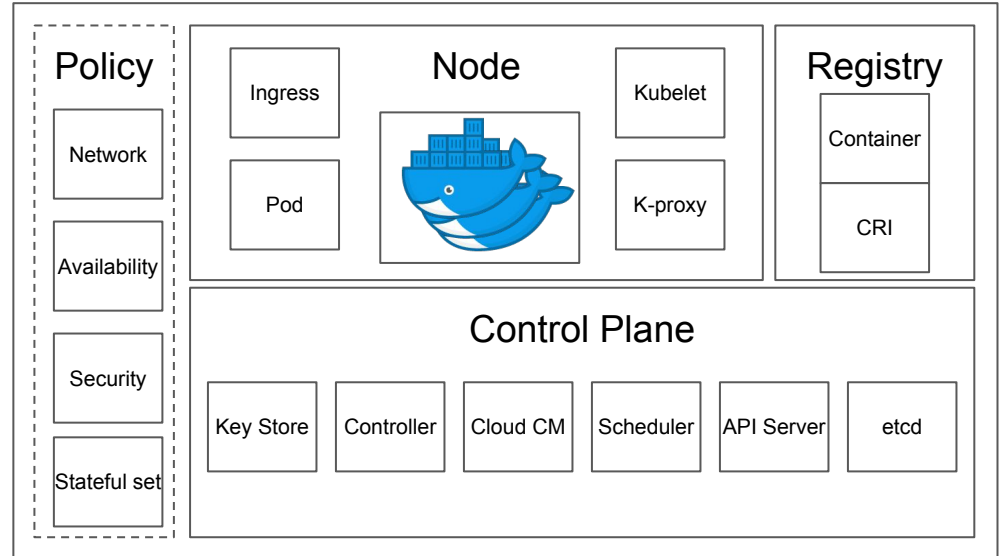


The breakthrough

- All software fitting into the same uniform box
- Standardize the hardest parts of software management

The problem

- Many missing functional pieces in order to standardize
- Standardize the hardest parts of software management



kubernetes

Introducing FireFly

Multi-Party System for enterprise data flows

Easily create cross-org data flows

Distributed, event-driven system makes building robust flows easy

A flexible technology framework

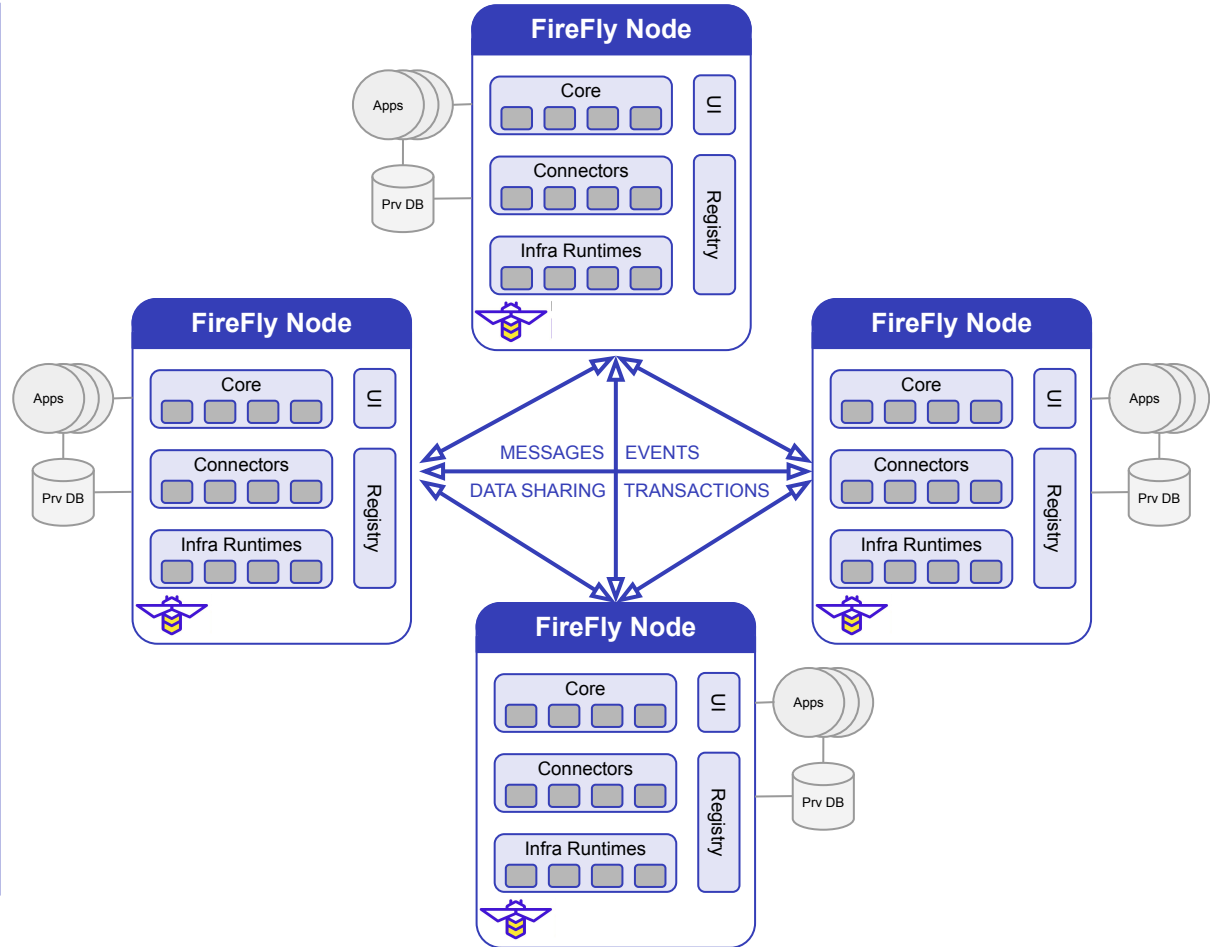
The right mix of distributed and decentralized technologies: blockchain, messaging, connectors, pluggable compute, identity registry

Built in network management tools

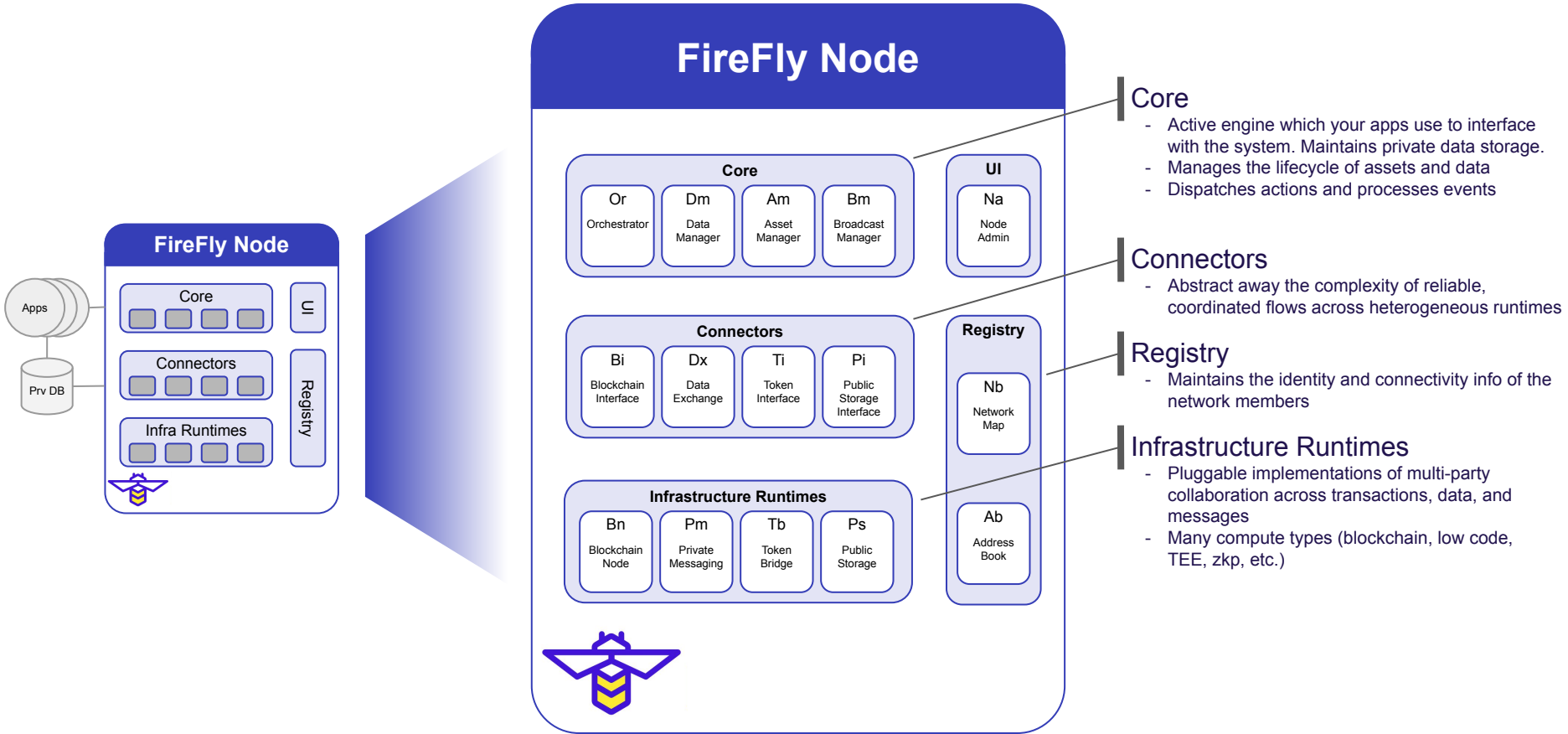
A distributed registry for member management, a UI console for node administration

Reliable and robust programming model

Define assets, data schema, event handling flows, and messages all configurably pinned to blockchain ordering and immutability

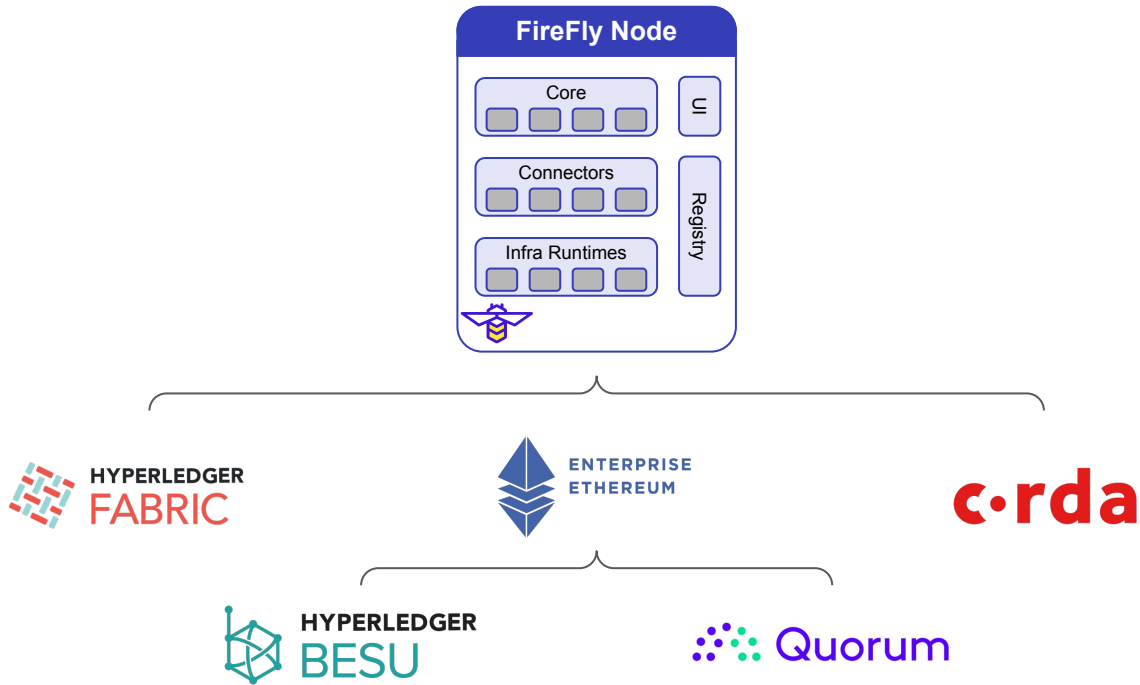


The FireFly Node



Pluggable Blockchain Protocol

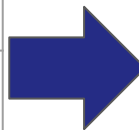
Choose from the popular “big 3” enterprise blockchain protocols



FireFly & Blockchain: The Golden Usage Pattern

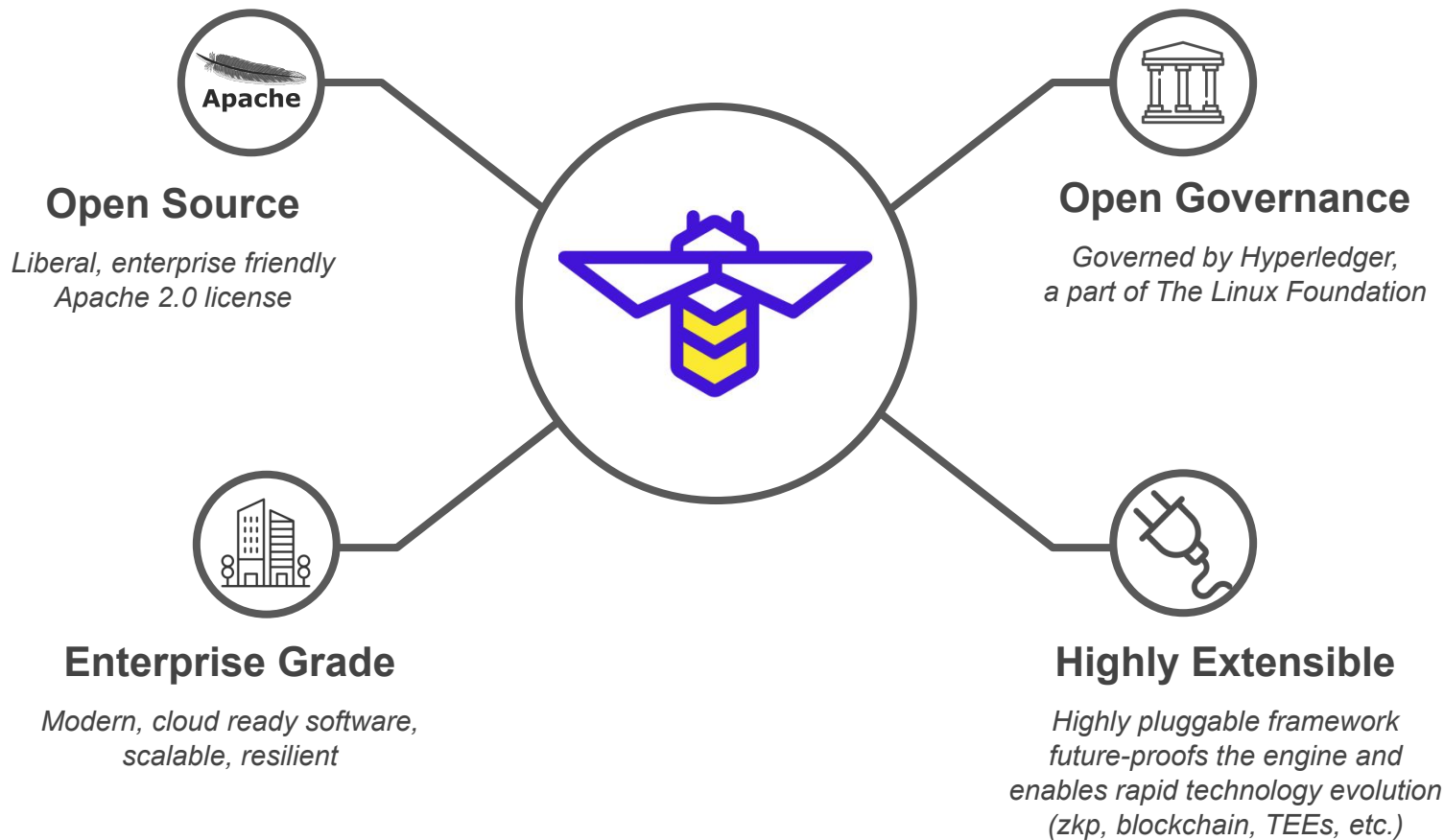


How FireFly <u>leverages</u> blockchain	
Transactions	<ul style="list-style-type: none">• Global ordering• Finality
Data	<ul style="list-style-type: none">• Data immutability (hash pinning)• Schema definition and lifecycle
Process Orchestration	<ul style="list-style-type: none">• Sequencing• Triggering• Trusted event-driven coordination
Digital Assets, Tokens, NFTs	<ul style="list-style-type: none">• Conservation of value• Double spend protection• Lineage of ownership• Data Immutability
Identity	<ul style="list-style-type: none">• Digital signatures• Ownership Proofs



How FireFly <u>extends</u> blockchain	
Transactions	<ul style="list-style-type: none">• Generated simple REST APIs• Built-in operations for common enterprise patterns
Data	<ul style="list-style-type: none">• Messages & Documents• Private Off Chain Transfer• Efficient Broadcast of large data• Rich query, fast search cache
Process Orchestration	<ul style="list-style-type: none">• Reliable event streaming for triggering• Pluggable decision/authorization logic• Extensible off-chain logic execution engines
Digital Assets, Tokens, NFTs	<ul style="list-style-type: none">• Asset Lifecycle Management• Built-in operations for common enterprise patterns
Identity	<ul style="list-style-type: none">• Identity Registry• Address book• Transport encryption keys

Enterprise Ready Open Source



Explorer

NETWORK MEMBERS

5

MESSAGES

1932

DATA

87

TRANSACTIONS

5261

Latest Messages

AUTHOR	TYPE	DATA HASH	CREATED ON
A Member Name		215b9...842f8	05/18/21 05:25 PM
B Member Name		215b9...842f8	05/18/21 05:25 PM
P Member Name		215b9...842f8	05/18/21 05:25 PM
A Member Name		215b9...842f8	05/18/21 05:25 PM
N Member Name		215b9...842f8	05/18/21 05:25 PM

Transactions

Last 24 Hours

128

Transactions

- Successful: 843
- Pending: 57
- Queued: 10
- Failed: 2

Messages

Node/7/5
Last 24 hrs
Search
List
Timeline

Last 24 hrs

- A Cui imperdiet elit a feugiat ductor... 0 B
17 SECS AGO
- B Nunc quis eros sit amet nibh mattis... 1 B
12 MIN AGO
- C Nunc quis eros sit amet nibh mattis... 1 B
3 HRS AGO
- D Cui imperdiet elit a feugiat ductor... 4 B
22 HRS AGO
- E Nunc quis eros sit amet nibh mattis... 2 B
05/18/21 04:10PM

Members / Groups

- +6 Everyone
4 MEM AGO
- A Acme Corp
17 MIN AGO
- Y Massive Dynamic
1 MEM AGO
- S Sterling Cooper
6 MEM AGO
- D Dunder Mifflin
1 MEM AGO
- W Workia
1 MEM AGO

Messages

Node/7/5
Last 24 hrs
Search
List
Timeline

AUTHOR	TYPE	TOPIC	CONTEXT	PINNED	DATA HASH	CREATED ON
A Member Name		Schema	System	✓	215b9...842f8	05/18/21 05:25 PM
B Member Name		Schema	System		215b9...842f8	05/18/21 05:25 PM
N Member Name		Schema	System	✓	215b9...842f8	05/18/21 05:25 PM
A Member Name		Schema	System	✓	215b9...842f8	05/18/21 05:25 PM
P Member Name		Schema	System		215b9...842f8	05/18/21 05:25 PM
A Member Name		Schema	System	✓	215b9...842f8	05/18/21 05:25 PM

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Plug-and-Play Services

Standalone services in the Kaleido catalog:

- REST API Gateway
- Event Streams
- App2app messaging
- Document exchange
- On Chain Registry

Kaleido Asset Trail

Refactored with a core 'brain' component that made it simple to build complete applications



Latest generation re-engineered from the ground up to improve developer experience, deployment model, and extensibility (TypeScript->Go)

Fully pluggable architecture, designed for open community engagement

Additional projects included:
Blockchain connectors, CLI, UI



BOB



AUCE



CHARLIE

DIFFERENT ORGANIZATIONS



BOB



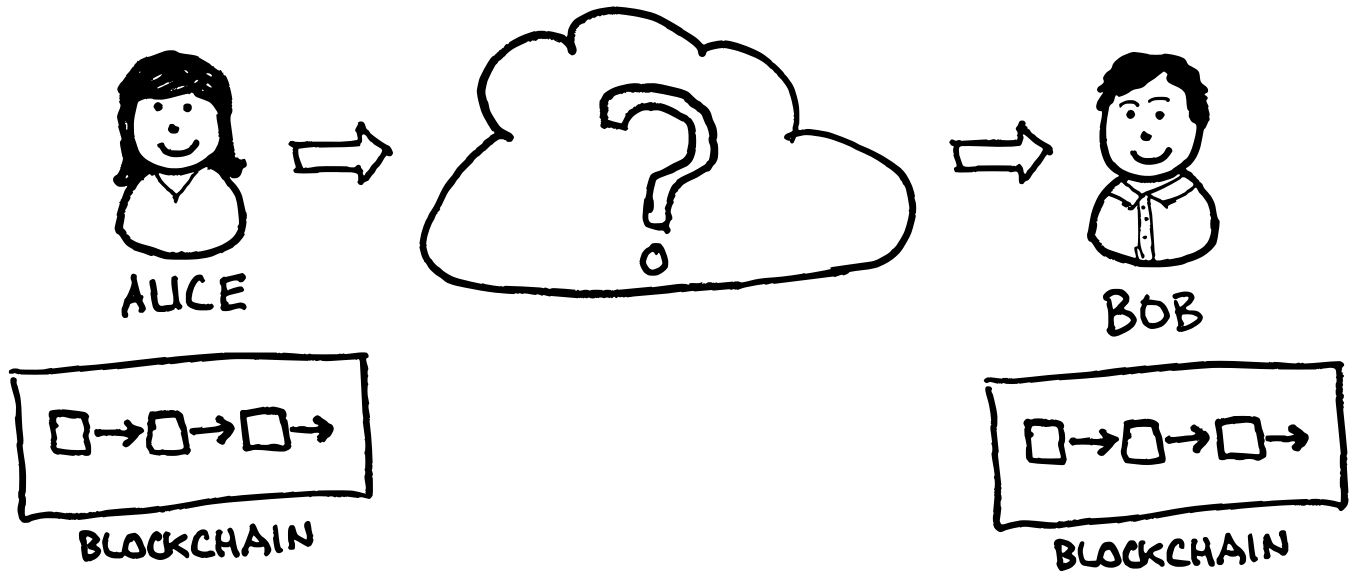
Alice



CHARLIE

WHAT IS FIREFLY ?

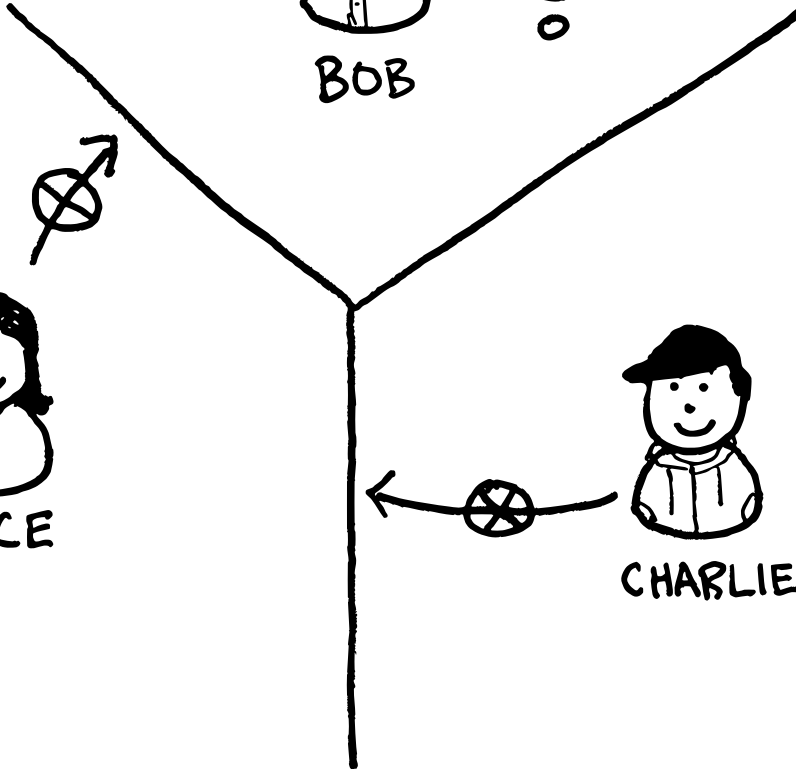
Multi-Party System for enterprise data flows,
powered by blockchain.



DIFFERENT ORGANIZATIONS



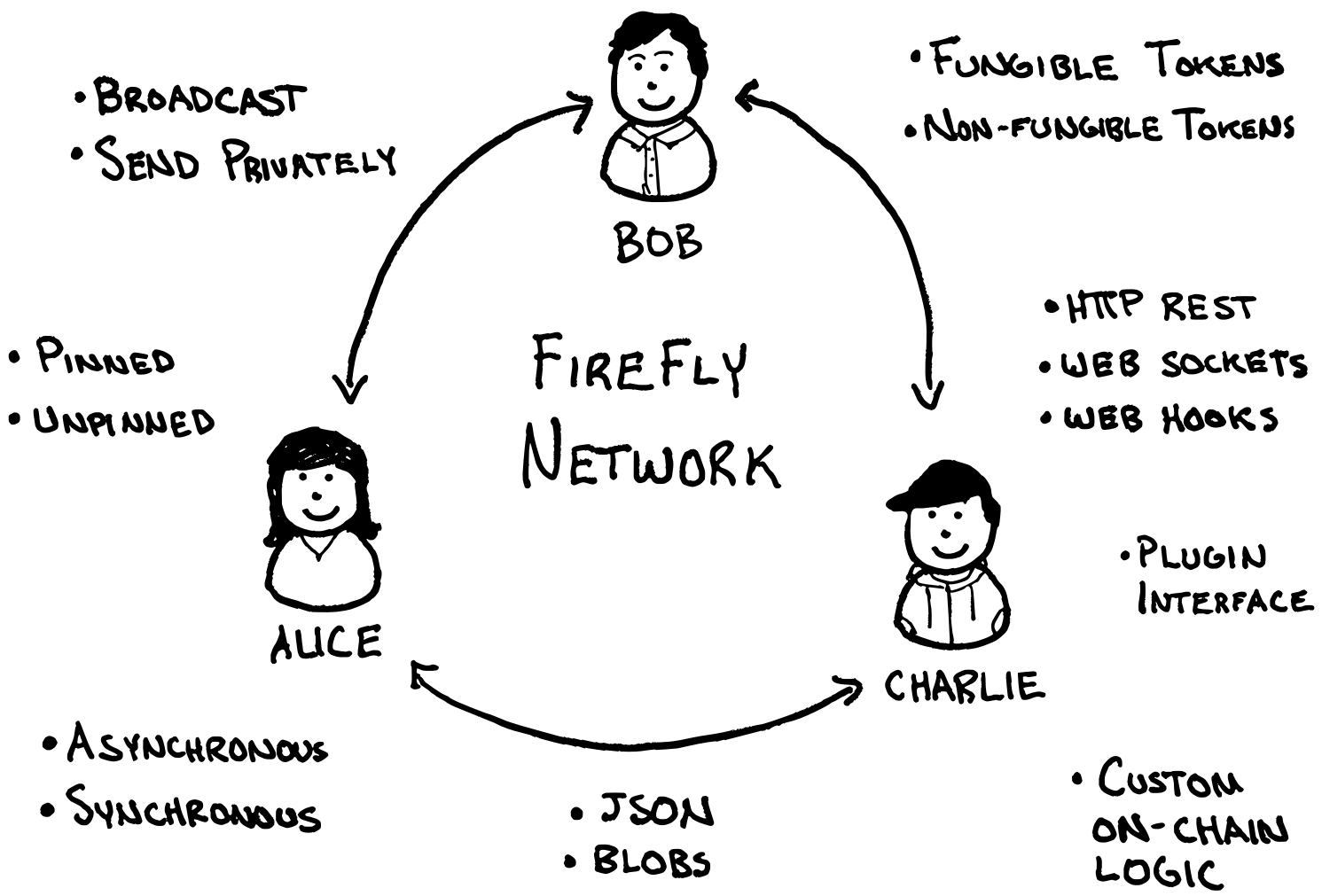
BOB



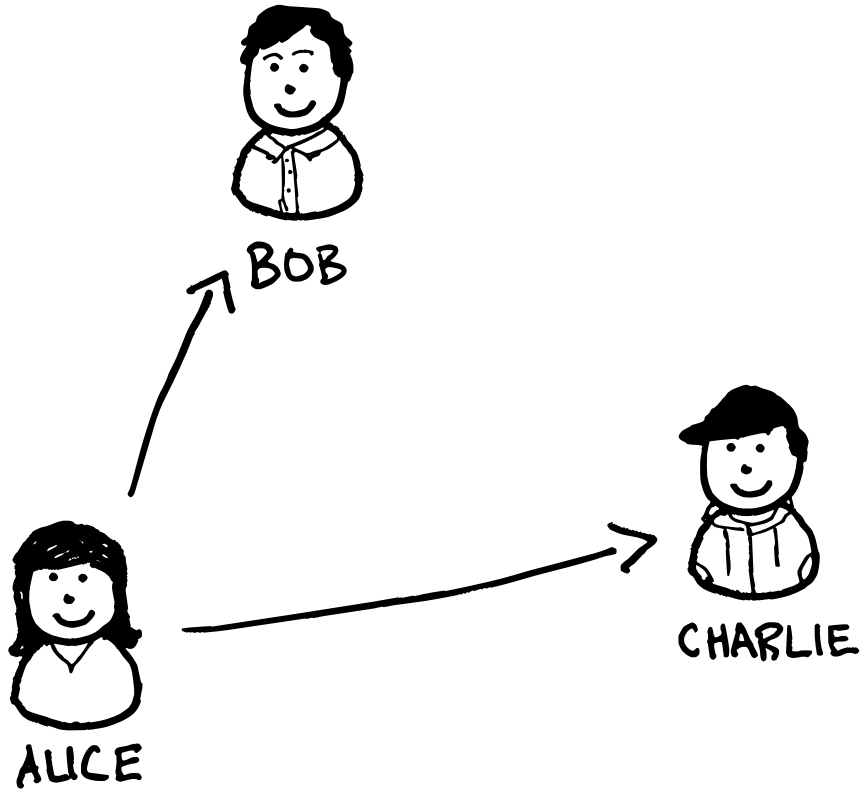
AUCE



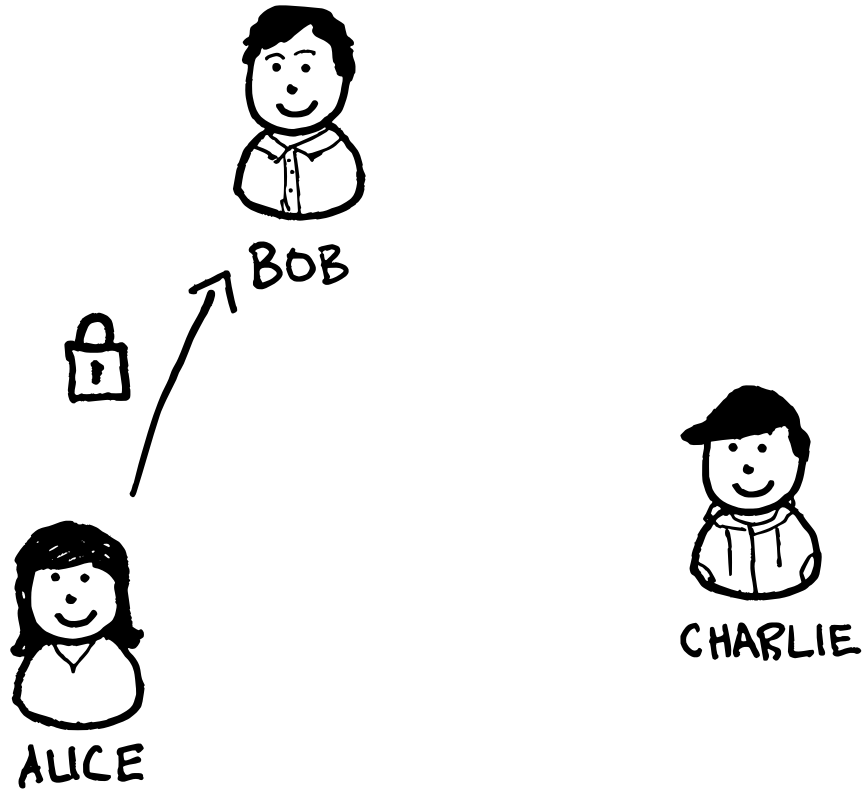
CHARLIE

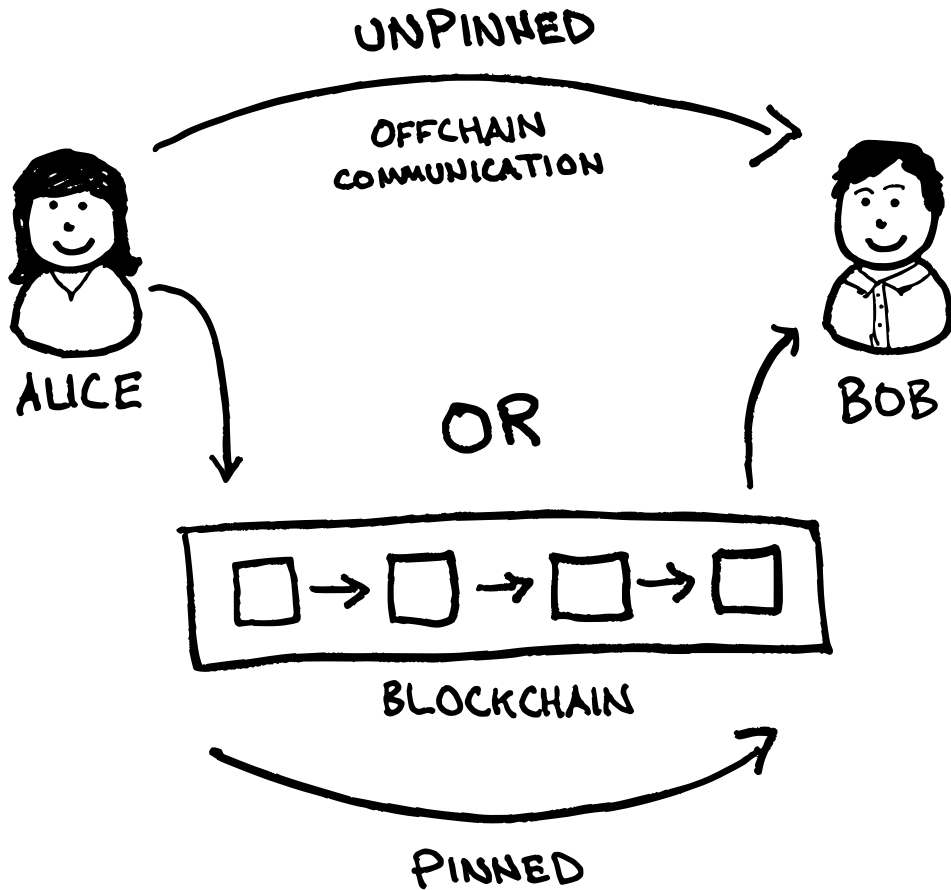


BROADCAST



SEND PRIVATELY







ALICE

{ "json": true } OR

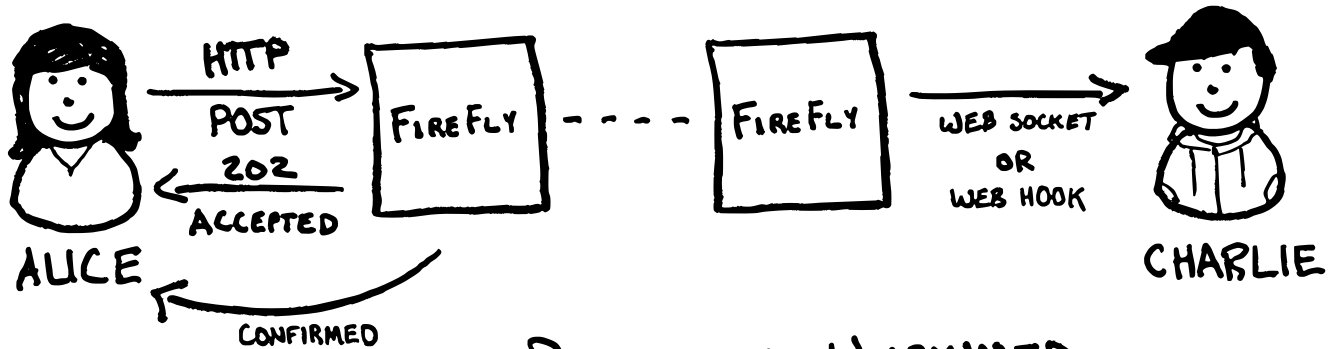


BOB

- DATA CAN BE INLINE
OR LINKED

- DATA CAN BE PUBLIC
OR PRIVATE

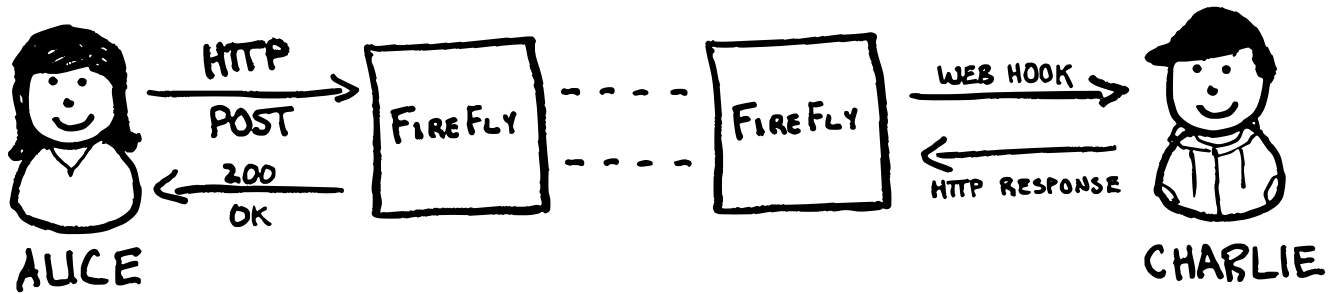
EVENT DRIVEN



- PINNED OR UNPINNED

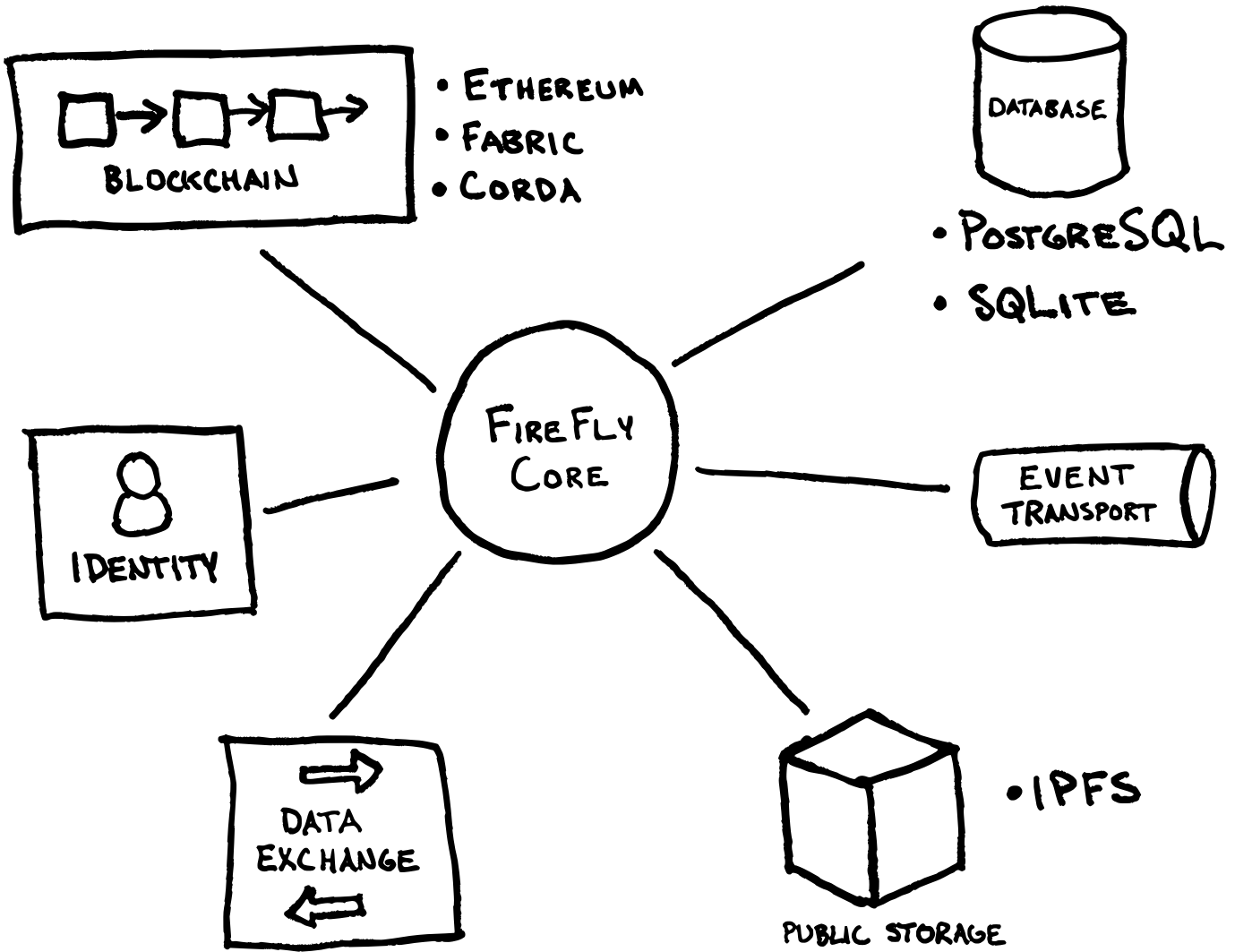
- JSON OR BLOB

REQUEST/RESPONSE

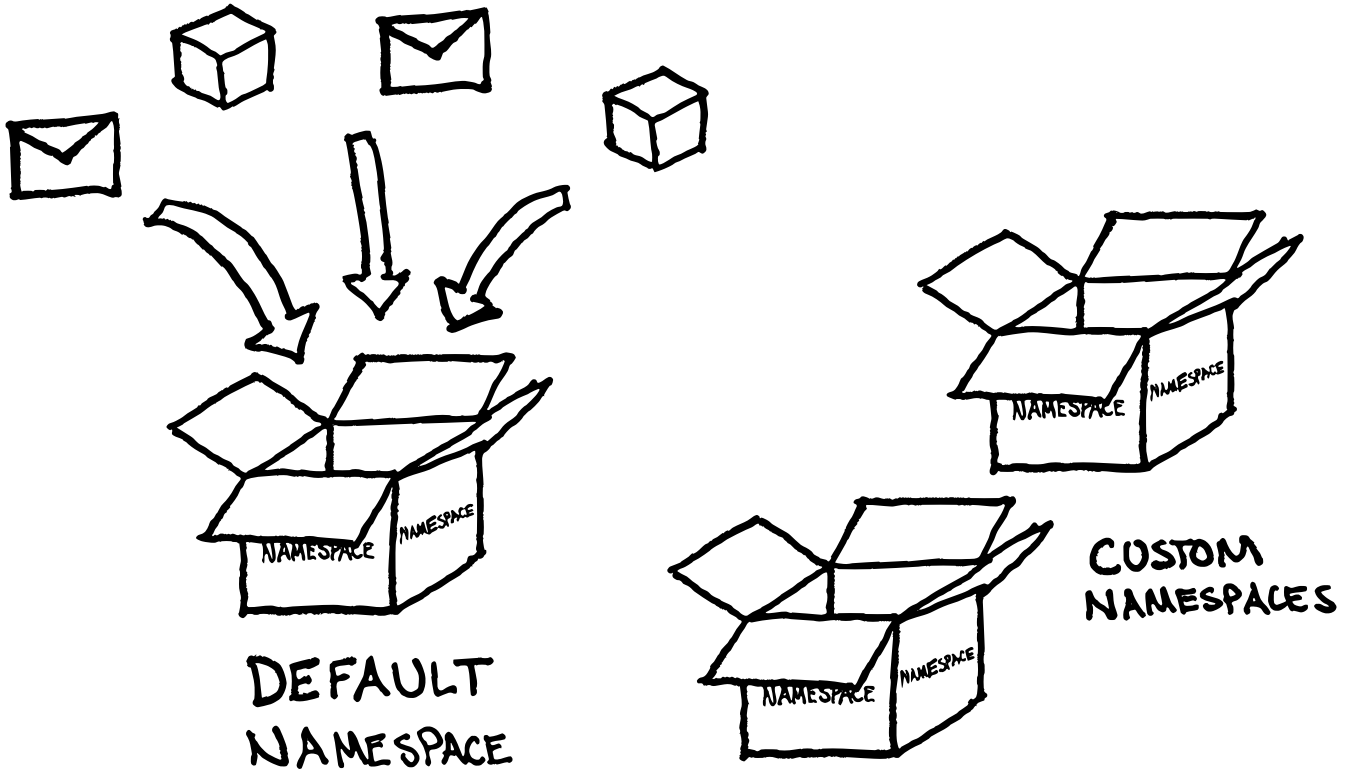


- PINNED OR UNPINNED

- JSON OR BLOB



NAMESPACES



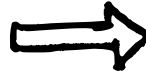
MESSAGES



ALICE



MESSAGE



BOB

```
1 {
2   "data": [
3     {
4       "value": "Hello word"
5     }
6   ]
7 }
```

```
1  {
2    "data": [
3      {
4        "value": "Hello word"
5      },
6      {
7        "value": "Another data item"
8      }
9    ]
10 }
```

```
1  {
2  "data": [
3    {
4      "value": "Secret data"
5    }
6  ],
7  "group": {
8    "members": [
9      {
10     "identity": "charlie"
11     }
12   ]
13   }
14 }
```

```
1  {
2    "data": [
3      {
4        "value": "Secret data"
5      }
6    ],
7    "group": {
8      "members": [
9        {
10         "identity": "bob"
11       },
12       {
13         "identity": "charlie"
14       }
15     ]
16   }
17 }
```



```
1  {
2    "header": {
3      "tag": "new-order-placed"
4    },
5    "data": [
6      {
7        "value": "Customer order data"
8      }
9    ]
10 }
```

```
1  {
2    "header": {
3      "tag": "new-order-placed",
4      "topics": ["customerId1234"]
5    },
6    "data": [
7      {
8        "value": "Customer order data"
9      }
10   ]
11 }
```

```
1  {
2    "header": {
3      "txtype": "none"
4    },
5    "data": [
6      {
7        "value": "Top secret data"
8      }
9    ],
10   "group": {
11     "members": [
12       {
13         "identity": "bob"
14       }
15     ]
16   }
17 }
```

WHAT'S NEXT FOR FIREFLY

- FABRIC CONNECTOR
 - CORDA CONNECTOR
- } CURRENT ACTIVE DEVELOPMENT
- FUNGIBLE AND NON-FUNGIBLE TOKENS
 - CUSTOM ON-CHAIN LOGIC
 - CONTRIBUTIONS FROM YOU!