



WORLD SIBU

# The Enterprise Blockchain Development Platform

A unified development platform to create and deploy  
enterprise smart contract systems.

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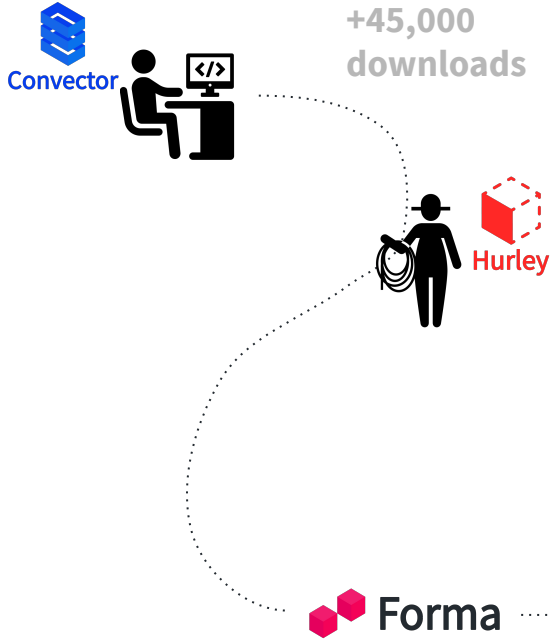
[worldsibu.tech](http://worldsibu.tech)

# Costa Rica : High tech and nature

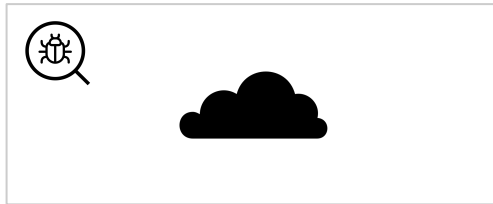


## About Costa Rican government tech

- Digital Transformation following examples of Estonia, Belgium, Singapur.
- Big focus on Interoperability between governmental institutions and private organizations.
- Country-wide digital signature - BCCR CA.
- 5 million people.
- Top 5 healthcare system.



DEVELOPMENT/QA

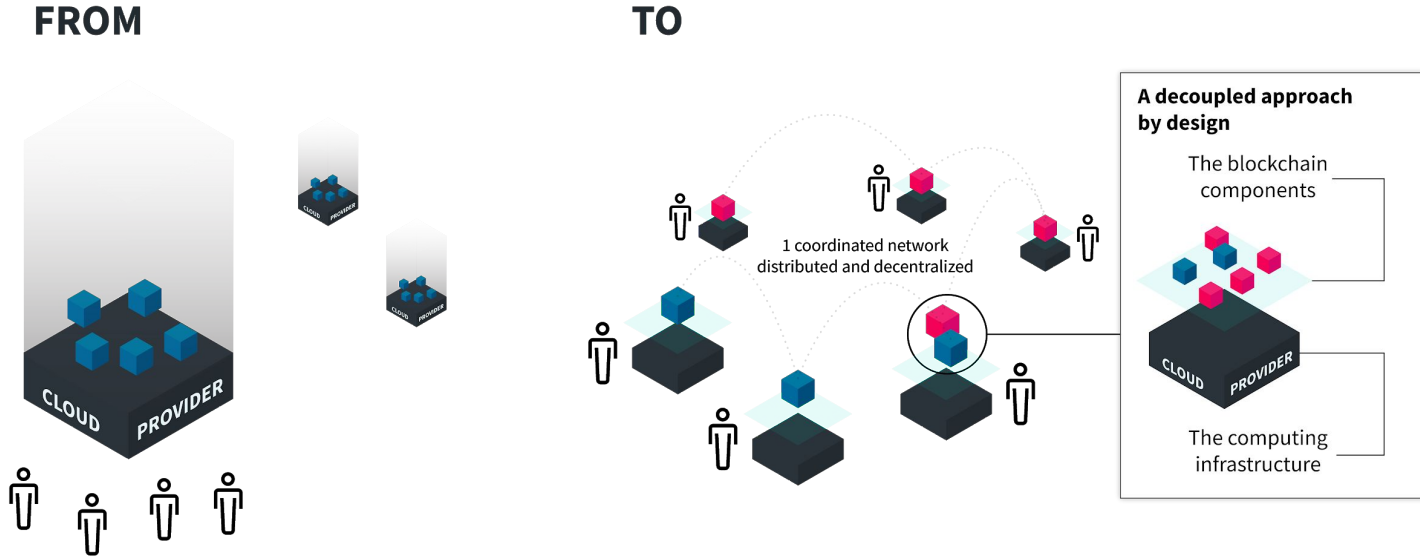


PILOT/PRODUCTION









# Remote Infrastructure Orchestrator

- Easier and faster.
- Multi-cloud by design with major cloud provider integrations.



 Blockchain Nodes

[worldsibu.tech/forma](https://worldsibu.tech/forma)



# Remote Infrastructure Orchestrator

Forma NETWORKS SERVICES CLUSTERS WorldSibu W

## New Network

**What**  
General information regarding the new Network.

**Where**  
You can choose between a fully managed service by WorldSibu, deploy the whole network in one of your clusters or create a fully distributed multi-cloud network made of the clusters from every participating organization.

**Who**  
Organizations to join the new network. They will receive a request to join.

### What

Network name \*  
MainNet

Invitation message \*  
Please join me on this new network

### Blockchain technology

**Where**

## About the Convector Suite

# Convector Suite



**Convector**

- Development framework
- Like Angular for Blockchain
- MVC-based
- Typescript
- Target: Developers
- Enterprise development
- Its own CLI



**Hurley**

- Development environment
- Resolves all dependencies
- 1 command to network
- Immutable setup
- Decoupled from Convector

## About Convector

- Actual development platform.
- Compilation. Detect errors.
- Fullstack TypeScript/JavaScript. NestJS, Express, Angular, React.
- Models and Controllers. Focus on business and complex modeling.
- Unit tests. CI/CD integration. Debugging.
- Modular. Logic units that can be merged. Better for code scaling.
- Native features from Fabric as it is a peer dependency.
- Helpers that allow for a explicit predictable behaviour.



# About Convector

## Models and Controllers

```
export class Product extends ConvectorModel<Product> {
  @ReadOnly()
  @Required()
  public readonly type = 'io.worldsibu.hackathon.product';

  @Required()
  @Validate(yup.string())
  public name: string;

  @Required()
  @Validate(yup.string())
  public owner: string;

  @Required()
  @Validate(yup.number())
  public weight: number;
}
```

```
@Controller('product')
export class ProductController extends ConvectorController {
  @Invokable()
  public async create(@Param(Product) product: Product) {
    product.owner = this.sender;

    await product.save();
  }

  @Invokable()
  public async transfer(
    @Param(yup.string()) id: string,
    @Param(yup.string()) newOwner: string
  ) {
    const product = await Product.getOne(id);

    if (product.owner !== this.sender) {
      throw new Error('Only the owner can transfer!');
    }

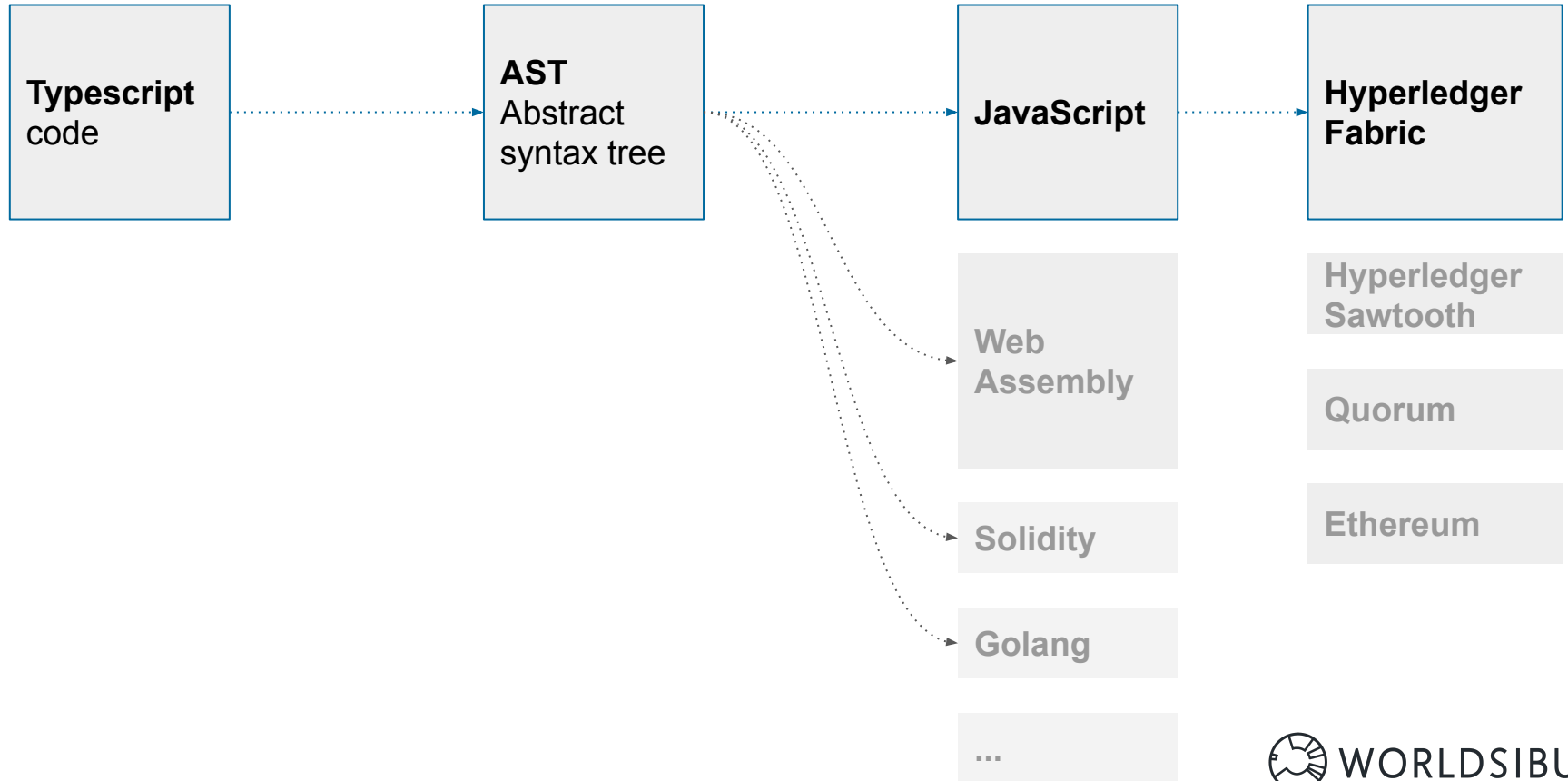
    product.owner = newOwner;
    await product.save();
  }
}
```

## About Convector

### Versus Hyperledger Composer

- Known programming language. No need for new syntaxis.
- Well defined target: developers.
- Flexible models as they are JavaScript-based.
- Data goes straight to the ledger. Easier to spot issues and work with the data through analytics.
- Transparent access to native APIs. Allowing the evolve faster and not get left behind (Convector migrated from 1.1 to 1.4 smoothly).
- Adapters allow for a decoupled design layer regarding the blockchain implementation, so the same code can run in multiple platforms (Chaincode, Server, FrontEnd, other blockchain techs).

# About Convector



Our overall goal

# Enable less transformational projects to benefit from the technology.

Just like databases once were too expensive to replace some paper-based processes.

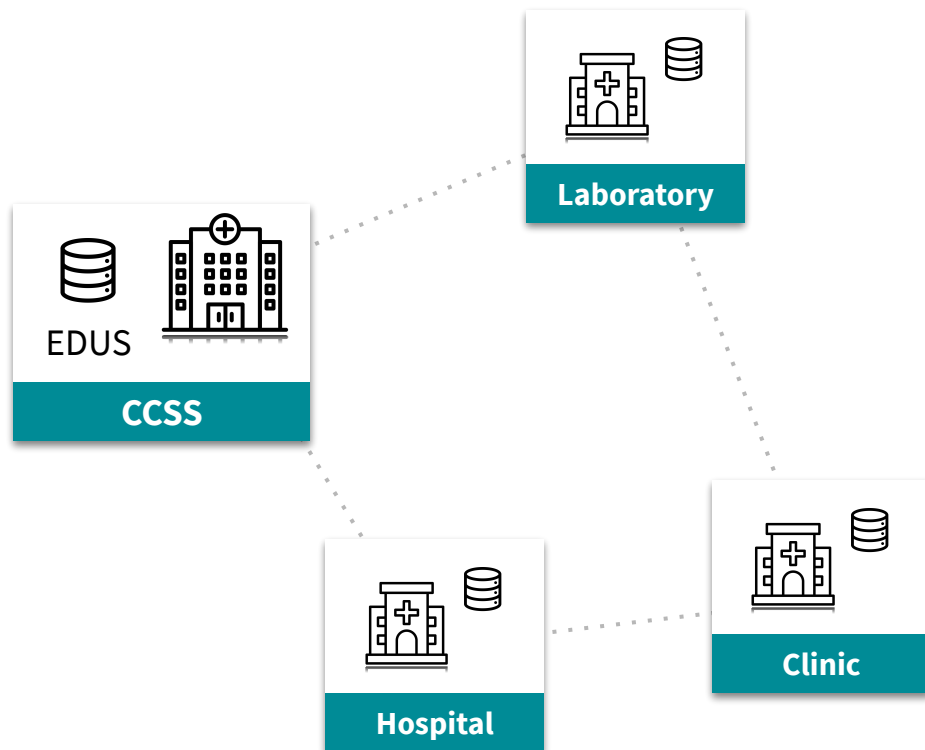
## Roadmap

# Public and private sector long-awaited interoperability

1. Data sharing evidence between parties
2. Privacy preserving features
3. EMR in the blockchain
4. User controls data on EMRs

# Phase 1

Peer-to-peer request to access patient data.  
Single store for data-sharing approvals trail.  
Laboratories with requests from the CCSS.



## Phase 1

Requester and Approver roles for data access. Patient with Costa Rican digital signature

Proof trail of patient-approved data sharing request and data-shared between parties

- Request: Digitally signed by the patient
  - Verifiable by the Approver through the Smart Contract
  - If approved (automatic signature review) the a one-time token is generated
- Data-share action: Hashed version of the data is logged with one-time token generation
- APIs checks token against the ledger

## Why blockchain/DLT for phase 1

Need	Solution
Request needs to be signed and verifiable	Patient official country digital signature, requester (dr, specialist) country digital signature, public keys distributed
Trail of multiple parties' requests	Both parties sign and store requests in their own ledger
Trail of multiple parties' data-shared proof	Two sided signature stored in their own database
Maintain correct public key in a single place	API for public key and patients' directory

### Unanswered questions

- Data integration to get single state of patient approved data-sharing requests:
  - Different formats
  - Time to get the data
  - Data accessibility (APIs)
    - Directory
    - Accesses
  - Who unifies it
- Third party revision and audit trail (auditors)- how to get the data?

Government keeping active record of everything?





Convactor Smart Contract

3

Verify Patient signature



Patient

1

Signs approving request

2

Make request

Hyperledger Fabric Ledger

4

Make request with Token

5

Respond data

5

Check token

6

Log data shared

EDUS

CCSS

Laboratory

Proof of approved access request

Proof of data access request

Proof of shared data

## Why blockchain/DLT for phase 1

Try the technology in the field

- The sponsors are on-board
- The industry shaker is pushing the project forward
- We have the tech to make it low-cost
- Scalability

# Demo

## Non-confidential piece of code in Convector

### Participants

CCSS  
Laboratories  
Clinics  
...

### Assets

Identities  
Patient directory  
Request  
Access token  
- Proof of data

### Transactions

RegisterPatient  
CreateRequest  
CloseToken

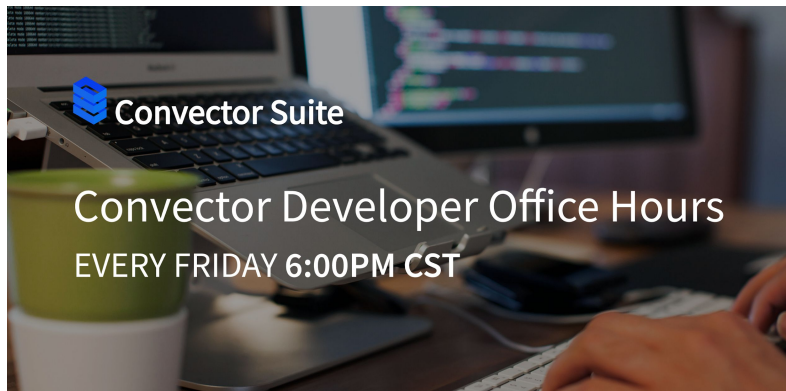
## Relevant Links

<https://worldsibu.tech>

<https://docs.worldsibu.com/convector>

<https://docs.worldsibu.com/article/73-code-samples>

<https://discord.gg/twRwpWt>





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