



A universal migrant worker contract on the blockchain  
**Whitepaper**, October 2017

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# Handshake

The ultimate goal of Handshake is to ensure that contracts between employers and migrant workers are upheld and protect the universal rights of migrant workers. Handshake achieves this by storing and signing contracts in the simplest, most secure, and sustainable way possible, by associating Ethereum technology. We propose the digitization, standardization and storage of “Universal Migrant Worker Contracts” on the blockchain, increasing transparency and security throughout the entire recruitment process.

Handshake is a protocol for creating and signing labor contracts for international migrant workers, employers, and recruitment agencies. By securing the contracts on the Ethereum blockchain, migrant workers have more security and control over their employment abroad. Ethereum, by its scalability, is technically ready to store registers on a large scale: we want to develop the framework of it and make the use of DApps useful for traditionally vulnerable populations who can be the last to benefit from this sort of technology. Facing contract substitution, high recruitment fees and a lack of legal resources and transparency for governments, actors in the space such as ethical agencies and government organizations are ready to use and offer innovative digital solutions to streamline and create transparency and security in the space. To accompany us in this project is to make a step towards a world in which migrant workers and governments can trust contracts and job orders provided by employers and agencies, and migrant workers’ rights are protected.

The Handshake team comes from a highly technical and policy-focused background, and has an advisory team of experts in the domain of migrant workers and global policy.

Handshake’s work and product contributes to development of the UN’s Sustainable Development Goals. These include SDG 8.8 of United Nations of protecting labor rights and SDG 16.9 on legal identity for all by building an “economic identity” for migrant workers and their families to have access to financial system when workers return home.

The problems listed here are faced every year by people looking for work and ways to improve their lives and support their families back home. Here are two stories to humanize that work that we outline below:

“I only received my work contract in the Kathmandu airport – one hour before my flight. When I noticed that the salary in the contract was 25% lower than the promised salary by my recruitment agency, I did not complain. At this point, I felt that I simply had to “make peace” with what had happened to me, and go abroad in order to pay off my loan.”

-- Nepalese migrant worker in Malaysia ([source](#))

“The work wasn’t what I expected it to be. It was totally different. I would wake up to start cooking, then cleaning, washing clothes, and then cooking again. No rest, there was just no rest... Because she kept yelling, I cried and asked to go back to agency, but madam said “I already bought you”...”  
 --Farah S., a 23-year-old Indonesian domestic worker, Dubai ([source](#))

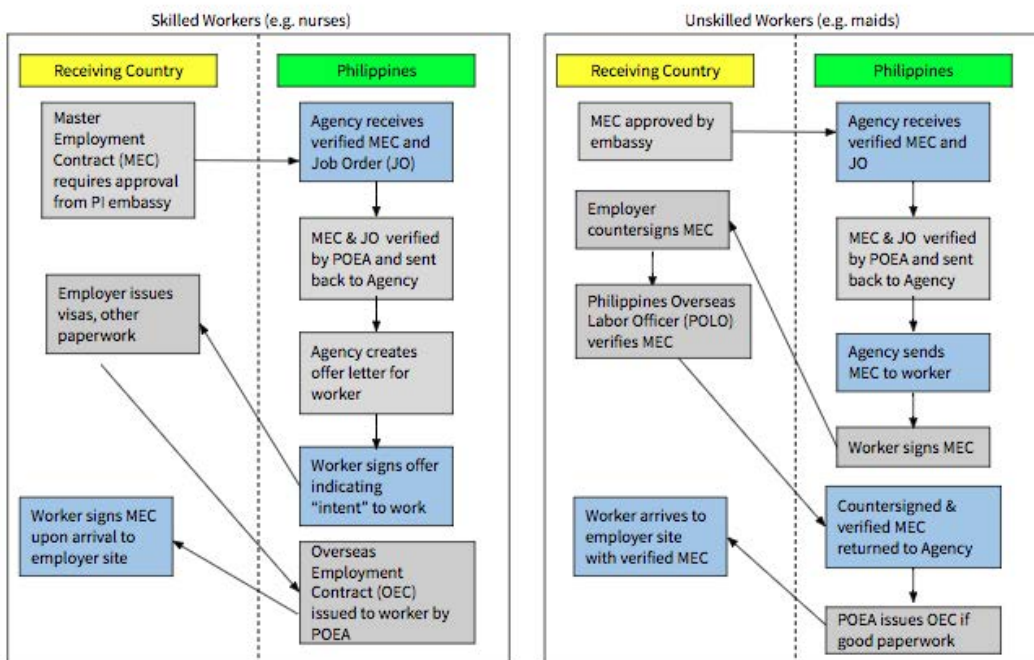
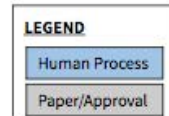
# The Migrant Worker Ecosystem

## Overview

Globally, there are currently 224 million migrant workers from developing countries to developed countries ([source](#)). These migrants produce \$4.1 trillion of economic benefit at the global level. In many cases, the sole intention of migrant workers is to support family back home, often sending nearly all of their paycheck home (source - Marc Capistrano, Staffhouse).

The current system in countries with mid to high infrastructure includes many steps where documents are mailed and approved by government agencies such as the POEA in the Philippines. Below is a table on the current system for getting a migrant worker contract approved in the Philippines:

- In the Philippines, current process involves paperwork and approvals between government agencies (POEA), recruitment agencies, and employers where original copies are required



## Players

### **Workers**

Work with agencies to find and travel to jobs abroad. They're often recruited at local job fairs or through 'sponsors' embedded in the community, or skilled workers will use online job boards such as [workabroad.ph](#). They'll often face few job prospects in their home country ([source](#)).

Women specifically sometimes choose to leave their home country with motivations that include a desire for independence and to escape a culture that doesn't allow them a lot of opportunities. The GABRIELA National Alliance of Women's Organizations in the Philippines reported receiving 1,670 complaints of violence against women, including domestic violence, rape, sexual harassment, sex trafficking, child sexual abuse, and discrimination in the workplace, from January 2010 to September 2012. ([source](#))

### **Agencies**

Agencies can range from full service (recruitment, medical exams, flights, visas) to basic contract processing. They handle the interaction with job order, contract and work visa approvals from migrant workers' home country, and are often reached out to directly by employers or other agencies in the country of work.

### **Governments**

Oversee and approve job orders and work contracts coming in and out of the country. Establish standards to encourage ethical recruitment of migrant workers, but enforcement is difficult because the contracts and jobs are taking place across borders and are centralized into small agencies and governments.

Examples of standards include intergovernmental bodies such as IOM, ILO, IHRB set standards such as "Employer Pays Principle", as well as anti-corruption and anti-bribery laws in U.S. and U.K. imposing strict frameworks.

### **Employers**

Employers work with agencies to bring migrant workers into their countries to fill jobs. Ethical employers in the space are trying to recruit workers in a way that respects their human rights, but may not have the monitoring tools to ensure the entire supply chain consists of agencies following ethical practices. Less ethical employers are driven by net profit and may work with agencies engaging in unethical behavior to get costs down (and may even receive kickbacks).

## Specific Case Study: The Philippines

Starting in the 1970's, under President Ferdinand Marco's policies as well as high unemployment and poor living standards combined with a government policy of emigration encouraged thousands of Filipinos to seek employment overseas ([source](#)). Today, there are 3,600 recruitment agencies in Philippines ([source](#)), but an unknown number of unlisted/illegal agencies which can range from 5-person sub-agent shops to trusted "elders" in a remote village. Out of those, there are currently only 10 ethical recruitment agencies who do not charge placement fees (Source Marc Capistrano, Staffhouse). In the Philippines, 2.4 million overseas Filipino workers (OFWs) generating \$28 billion remitted back to their GDP. The Philippine government remains increasingly reliant on remittances, close to ten per cent of the Philippine economy is reliant on the money sent home by OFWs, making it the single most important input of the Philippine economy. ([source](#))

The Philippines is a low infrastructure environment, which means agencies and companies building solutions for them face certain constraints. Our team built Handshake with certain assumptions around those constraints, including:

- There would only be 1 PC needed at the physical location of the recruitment agency.
- If that recruitment agency is the only agency accessible for workers in a 5-km radius, workers will physically go to that agency.
- The migrant worker we're reaching in Philippines may not have access to a smartphones, so recruitment agencies will establish registration process for uPort to candidates.

## Current Problems

Depending on the level of infrastructure and government involvement, migrant workers may be forced into a labor contract that is exploitative, dangerous, and lacking consideration of their human rights. The less skilled the migrant worker, the more likely corruption, exploitation and fees will be involved in the supply chain. These risks are exacerbated in low-infrastructure countries where a government at home doesn't have infrastructure and oversight around job orders and contracts coming in and out of the country.

A migrant domestic worker's relationship with his/her employer is often constructed as informal, with an imbalance of power that favours the employer. This creates the conditions for potential labour and human rights violations that can include:

- non-payment or underpayment of wages;
- excessive work hours with no overtime payment;
- forced confinement,
- food deprivation,
- denial of medical care and physical,

- sexual and verbal abuse
- Protection in domestic jobs is limited because, without check-ins through technology or other ways, police would need to show up at a private residence unannounced to make sure the law is being followed ([source](#))

In addition, migrant workers can face challenges and possible exploitation from agencies and around the contracts themselves, including:

- Agencies charging high recruitment fees to migrant workers
  - Workers facing high recruitment fees can face “debt bondage”
  - This population is extremely vulnerable since they are least likely to know their rights and proper recruitment processes
  - Agencies sometimes turn to unlicensed “sub-agents” who charge even higher fees
- Contract substitution from employers, where a migrant worker will sign one contract in their home country, and be presented with another one when they arrive at their place of work
- Labor contracts are difficult to understand and may not be translated into the migrant worker’s native language.
- Contracts on paper are able to not be upheld once payment is sent, and don’t have a way to check if content is unethical or unlawful

In addition, recruitment agencies, sub-agencies, and other middlemen can tamper with paper documents and/or centralized databases managed by government agencies that approve labor contracts. Blockchain removes trust required between:

- Employers & Government Agencies (e.g. POEA)
- Government Agencies & Recruitment Agencies

On Handshake, complaints and grievances from migrant workers are documented from origin to destination and do not pass through a filter imposed by a middleman or agency.

## Current Offerings

Current answers to the issues around migrant worker contracts are non-digital, disparate, often centralized in databases individual companies or governments maintain that aren’t accessible to or verified by other parties.

- Centralized Software Tools
  - Malaysia’s [Scicom](#)
  - Healthcare systems for migrant workers ([MiVIA](#))
- Intergovernmental Organization Standards
  - Establishment of ILO Convention concerning Decent Work for Domestic Workers (C189 2011)
- Non-Profits & NGOs
  - Advocate for migrant worker protection and rights in receiving countries

- Sending/Receiving Government Intervention
  - Agreements made between each country's ministry of labor
  - A Standard Employment Contract (SEC) for migrant workers introduced by Philippines, Malaysia, Hong Kong, Lebanon, and Jordan increases transparency
  - Some receiving country governments have instituted labor laws to protect migrant workers, but contract enforcement still remains an issue
    - SECs lack national labor law protection
    - Does not provide framework for redress in cases of contract violation

## The Handshake Solution

As discussed in the last section, employment contract processes and terms are subject to corruption, fraud, forgery, and delays resulting in exploitative work environments for international migrant workers.

Our solution is to create a standardized process for the creation and signing of contracts. The solution is broken up into two main components, one is the storage of contracts with a record of parties who have signed and employees and governments who have verified it saved on the Ethereum blockchain. The second part is the agency and migrant worker identities, also saved on the Ethereum blockchain. Agency identities are verified by international and local governments and other workers. Migrant worker identities are created on uPort and used to sign, manage and access contracts.

Handshake creates a safe and trustworthy way for a universal and standardized contract for migrant workers, and the benefits of that concept, even outside our system, are well-documented. They include the standardised nature of a universal contract will promote equal treatment amongst migrant domestic workers of different nationalities. Countries of origin have established different minimum wages and standards (or none) for their overseas workers in bilateral agreements with destination countries. This differentiation based on the nationality of domestic workers has led to inequality with some workers enjoying better living and working conditions than others despite doing the same work. Destination countries are able to exploit this difference and resist granting rights to migrant domestic workers. A standardised employment contract would universalise the right to fair terms and conditions for all migrant domestic workers ([source](#)).

Below is a breakdown of how this solution solves pain points at each stage of the current process.

Pain Point	Handshake's Value Proposition
<b>Employers</b>	
Committed to recruit migrant workers ethically but no system to track recruiting process.	All signatures are recorded on the blockchain resulting in a trail for employer to audit.
Existing auditing requires costly centralized systems or human auditors	Ethereum blockchain is less costly since signatures are verified and do not require 3rd-party auditors
Required to do on-site audits and in-person meetings overseas to verify agency is legitimate	Verified review system by the workers and government agencies assists with building digital reputation of recruitment agencies
Most organizations have a basic SQL database at best of agencies globally, but these are disparate and maintained in house, and in some cases no formal database exists.	By creating a self-sovereign identity on uPort, agency identity persists across all government agencies, employers and migrant workers who wish to view the agency's credentials.
<b>Migrant Workers</b>	
Low infrastructure in destination countries means no system for filing complaints and contract violations	Complaint is logged and verified via uPort to ensure complaint does not get censored or influenced by 3rd party (e.g. destination agency)
Little control over paperwork, contract, and resulting identity once in the application process	Contract signatures tied to uPort identity and controlled by the migrant worker (facilitated by recruitment agency)
Pay large recruitment fees	Receipts must be issued on the blockchain for agencies who charge fees so employer and government agency can track fee payments
Migrant domestic workers are frequently denied workers' rights due to contracts that do not state, specify or define minimum	Create 'error-checking' that doesn't allow a paper that ignores migrant worker rights. For example, the platform wouldn't allow a contract to be added that includes longer than an 8-hour workday.



labour standards in their provisions. For example: Most contracts contain unregulated working hours leading to frequent accusations that they condone working conditions akin to 'slavery'.	
Contract substitution, where upon arrival in the destination country terms and conditions of employment change from the contract originally signed	Give visibility to stakeholders (governments and related agencies) to be clear about the terms and conditions a migrant domestic worker is entitled to at work.
Sometimes unable to read and understand a contract in the language it is written.	Localized to areas where Handshake is rolled out, translation is available directly on the 'Contract' view of the app.
Employers can forge contracts	Contract terms digitized and cannot be forged (compared to paper contracts)
Migrant workers can have trouble knowing if an agency is historically fair to workers	Facilitates a digital reputation system for the agency that is not controlled by a government authority or private company
<b>Recruitment Agencies</b>	
Conforming to new and updated standards for ethical recruitment by IOM, ILO, etc.	Integration with IOM standards allows for digital certification tied to enterprise uPort identity
Want to prove their recruitment processes are ethical and legitimate	Provides a verifiable system for employers to audit

# Technical Details

## Prerequisites to use

### **The agency has to create an Ethereum address to use as their identity.**

Ethereum's public and private key features provide the simplest means for any entity to identify themselves and begin interacting with the Ethereum blockchain. As computation on Ethereum costs a small amount of the Ether cryptocurrency, a funded Ethereum address is needed to be able to perform operations that write or update data on the chain. This means that the following actions in the Handshake app cost a small amount of Ether and thus require a slightly funded Ethereum account:

- Creating an agency
- Creating a contract

Ethereum addresses being used alone to represent identity is problematic in the long-term, as the system is prone to Sybil attacks (agencies can generate new addresses as they wish, and thus there is no means of tracking their actions and reputation. In the future, the agency would also register a corporate identity with uPort in a process similar to the one for future employees described below.

### **The migrant worker has to create an identity with uPort**

Migrant workers are potentially the most important individual in the situation, as they are who Handshake are trying to protect. As such, in our v1 we have integrated with uPort - a complete self-sovereign identity platform.

uPort's current implementation is through a mobile app that workers can download on their smartphones and bind to a particular phone number. It essentially provides them with an Ethereum address bound to information about their identity - however, this information is only made available to applications or other parties that the identity owner allows to see. The Handshake application uses uPort for the following actions:

- Logging users into the application, in preparation for signing a labor contract
- 'Signing' a labor contract (sends a 'Sign' transaction to the smart contract from the logged-in user's uPort address)

These interactions occur by the Handshake application presenting a QR code to be scanned in the uPort mobile app. The uPort app will prompt the user whether they want to perform the action (give away credentials or call the Sign function) and then execute.

## The migrant worker and agency need to verify their identity using ID certificates

In the future, as part of the sign-up process that both the worker and the recruitment agencies go through via uPort, each would be required to tie their uPort identity to a real government-issued ID before they can start interacting with Handshake.

As the contracts are essentially signed by the uPort identities, even though the contracts are stored on the public chain, no private contact or identifying details are available publicly. Identifying credentials can be made visible only by the identity owner themselves. For any government body, agency or employer to retrieve information about a signee, for example, they would have to explicitly request it and the employee would have to allow this information to be transferred.

## Architecture

### Ethereum Smart Contracts

The smart contracts layer of the Handshake app is used to handle all of the processing and logic behind the application. The core of the application is handled by one smart contract, 'Handshake'. The details of the currently deployed 'Handshake' smart contract are shown below. Importantly, we have verified the entire source code on Etherscan so the application is open-source and agencies and their auditors can be aware of what they're signing up for.

Ethereum Network	Rinkeby
Address	0xb3a065cbd125636891bedf588a0550832923e6a5
Etherscan with Verified Source	<a href="https://rinkeby.etherscan.io/address/0xb3a065cbd125636891bedf588a0550832923e6a5">https://rinkeby.etherscan.io/address/0xb3a065cbd125636891bedf588a0550832923e6a5</a>

The Handshake smart contract manages the agency's identifying and contact information and allows these agencies to create new labor contracts which can then be signed. At present, when an agency signs up for the application, all of their information is serialised into JSON and stored as a string, mapped to their Ethereum address. This process will likely be updated in the future such that this identifying information will instead be associated with a uPort identity. Any extra information which is not bound to a uPort identity will be hashed and stored on IPFS. This way only the hash to the file location will be stored in Ethereum contract storage, drastically reducing the cost of both agency and labor contract creation.

Each labor contract is represented by a 'LaborContract' smart contract on the blockchain. It has its own Ethereum address and stores a JSON representation of the contract data in an immutable

string. It also has a 'sign()' function which allows users to send a transaction from their uPort identity, thus signing the deal. At the moment only the user's uPort address is stored via the 'sign()' function, but in the future, this could be updated to also record electronic signature file data, depending on the requirements of the local laws.

This implementation is valuable because it allows signatures to be made on a public blockchain, but allows the users to maintain anonymity and only reveal their identifying features when requested explicitly through the uPort app. Moreover, as uPort tracks interactions with smart contracts, the user already has a list of contracts they've signed within the uPort app.

### **uPort Integration**

Whilst uPort is currently only used to represent the identity of the worker, for the purposes of producing an MVP, eventually uPort will be used to represent the identities of all entities involved. These identities will be associated with the relevant ID certificates for that individual or company through the uPort app.

Furthermore, employers or agencies will be able to use the 2-way binding feature of uPort to associate their ID with their website/LinkedIn page etc. so that others can be certain of who they are signing the contract with.

In the current iteration of uPort, migrant workers can access and view all of the transactions to contracts they've made, so after signing they essentially have a list of contracts that they've signed. In the ultimate implementation, we would like to integrate with uPort to allow signees to see the details of all of the smart contracts they've signed and potentially use this interface to request aid and provide their details to any relevant bodies.

### **IPFS**

IPFS (Interplanetary File System) is a decentralized system for storing data. Future implementations of Handshake will utilise IPFS for the storage of larger data chunks. This includes agency details and information about any signees' uPort identity or digital signature. When this data is put on IPFS, the only data stored on the Ethereum blockchain will be the IPFS location - a hash of the data. By moving large chunks of data off the Ethereum blockchain, it will reduce the gas price of the required functions, setting up for real-world usability on the main Ethereum public chain when uPort is ready to do so.

Setting up an IPFS node unfortunately adds substantial complexity to the stack and given that uPort is not available on the main network yet anyhow, it was not included in version 1.

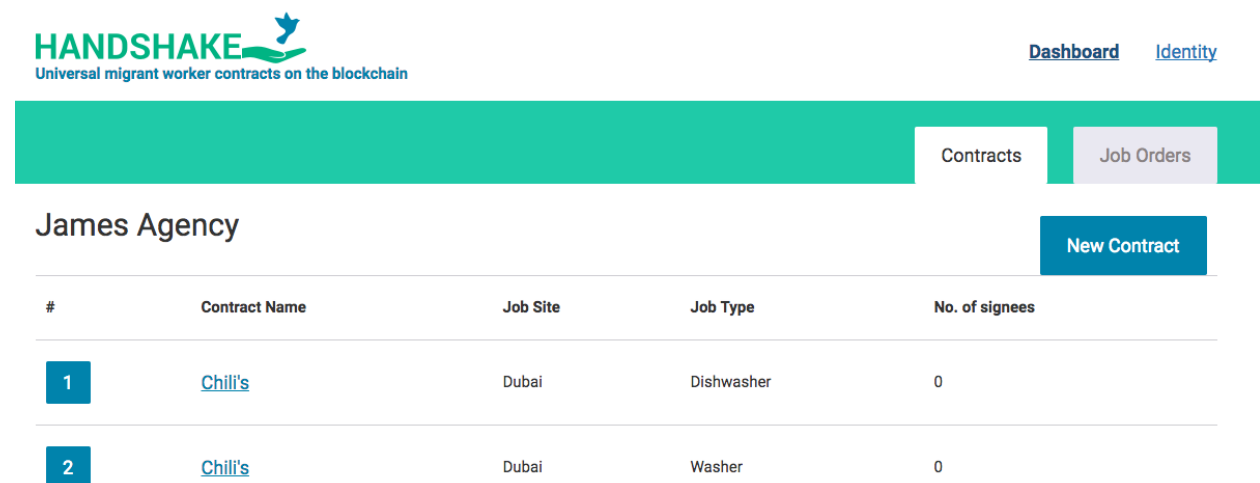
## User Interface

The application as a whole can be easily interfaced with using the web interface developed by the Handshake team (<https://handshake-dapp.herokuapp.com>). Note that it is (and should be) possible to interact with the Handshake smart contracts directly, outside of the interface, and so the application functions whilst being completely decentralised. The current interface is just a centralised web server serving static files. At a point when the interface is sufficiently refined, the frontend files (html, css and js) may be hosted on IPFS too to provide a decentralised interface to the Handshake app.

The front-end is built primarily in React using the Truffle React Box npm package. Given that it is currently well-supported and widely adopted, it is likely that the front-end stack will remain mostly the same, with the potential adoption of Redux and build tools such as gulp. React's automatic rendering of state updates also allows us to easily respond to the huge amount of events, updates and callbacks inherent in communication with all of the Ethereum blockchain, uPort and IPFS.

State updates in the Ethereum smart contracts are currently monitored and reflected in the interface entirely through web3's emitted events. This has allowed rapid iteration of prototypes, but would be changed in the long-term due to instability and scalability concerns. Instead, the application would likely use a hybrid approach (events and .call()-based) to reflect the contract state accurately.

Below are screenshots of the current interface, including viewing, creating and signing contracts, as well as viewing agency identity.



The screenshot shows the Handshake web interface. At the top left is the logo for "HANDSHAKE" with the tagline "Universal migrant worker contracts on the blockchain". To the right are links for "Dashboard" and "Identity". Below the header is a navigation bar with "Contracts" and "Job Orders" buttons. The main content area is titled "James Agency" and includes a "New Contract" button. A table lists two contracts:

#	Contract Name	Job Site	Job Type	No. of signees
1	<a href="#">Chilli's</a>	Dubai	Dishwasher	0
2	<a href="#">Chilli's</a>	Dubai	Washer	0

*List of contracts for agencies to manage and create new*

**Contract Details**

Contract Address: 0xeb33862e02ee91ff3af2d62ca701700726618dba  
 Position: Dishwasher  
 Site of Employment: Dubai  
 Contract Duration: 2 weeks  
 Monthly Salary: 10000 usd  
 Hours per Day (max): 5  
 Days per Week (max): 5


**Benefits**

Vacation Leave: 1 week  
 Sick Leave: 2 weeks  
 Termination Advence: 2 weeks  
 Insurance Details: sfs  
 Transport: Included  
 Food: Included  
 Housing: Not Included  
 Free Emergency Medical: Not Included  
 Free Emergency Dental: Not Included

Days per Week (max): 5

**Benefits**

Vacation Leave: 1 week  
 Sick Leave: 2 weeks  
 Termination Advence: 2 weeks  
 Insurance Details: sfs  
 Transport: Included  
 Food: Included  
 Housing: Not Included  
 Free Emergency Medical: Not Included  
 Free Emergency Dental: Not Included

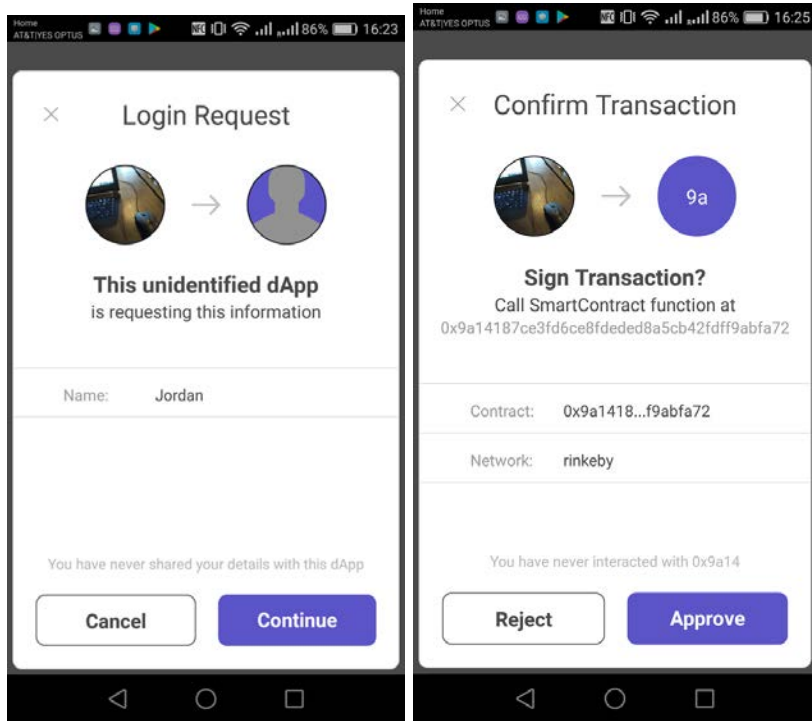


Please scan with uPort app

**Chili's - Sign**

Employee/Candidate (Origin):   
 Employer/Immigration (Destination):

*View & Sign Contracts with uPort*



*uPort Integration - Migrant workers provision certain aspects of identity to Handshake and employment contract signed on Rinkeby*

**Signees**

Name	uPort Address	Rinkeby Address
Jordan	0x9a07a8d91ae5e6a4423297b31573532515cf1f1d	0x9a07a8d91ae5e6a4423297b31573532515cf1f1d

---

**1 - Sign**

Logged in as:


Name: Jordan  
 uPort Address: 2orvGEyHK69YjKj6TKYbFRzu9RtPSyZFnmC  
 Rinkeby Address: 0x9a07a8d91ae5e6a4423297b31573532515cf1f1d  
 Sign this Contract: [Sign](#)

*Auditable Trail of Signees*

**HANDSHAKE**  
 Universal migrant worker contracts on the blockchain

[Dashboard](#) [Identity](#)

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**Staffhouse**

- ✓ verified by the POEA
- ✓ verified by the IOM as an **Ethical Organization**

[Add verification](#)

An 100% Filipino-owned corporation, Staffhouse International Resources has been recruiting top-level professionals since its inception in 1999. Within a mere few years, Staffhouse has become an industry leader, gaining the trust of both workforce candidates and the world's biggest companies.

0x8bdc88...

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- ☎ 695-434-3221
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**Assessments**

[IOM Gender Sensitivity](#) (not started)

*Agency Identity*

# Rollout

We've chosen the Philippines as our initial 'source country' to deploy and test our first prototype. Reasons to focus our initial rollout to the Philippines are that there is already a lot of governmental and policy infrastructure built around migrant workers, and it's possible to roll out an initial solution in English, one of their official languages. We're planning an initial rollout to start November 2017 and are speaking with both Staffhouse, an ethical recruitment agency in the Philippines and SAED, a large employer in Saudi Arabia to have a working pilot started by that time.

We've created and published a version 1 of Handshake that allows agencies to create contracts and access them, have migrant workers sign them and have contracts verified by governments and employees. **We plan to test this initial version of Handshake with ethical agencies in the Philippines**, as the origin country of the migrant workers we're reaching. The purpose for targeting ethical recruitment agencies:

- Ethical agencies are already relatively transparent compared to majority of unethical agencies who charge high fees and have opaque processes
- More receptive to new technologies
- Constantly adjusting their recruiting processes to abide by IOM and ILO standards
- Potential candidates physically go to agency, resulting in a collation of the candidate's visa, passport, and other necessary documents to build a digital identity

We've also spoken with 2 recruitment agencies in the Philippines, 2 in the Gulf, and demoed the prototype with 1 agency, getting initial feedback that we're incorporating into our first pilot and second version. Initial feedback centered around concerns of legal validity of digital signatures, and whether our solution will be integrated with broader intergovernmental associations.

Partners important to a successful implementation and initial and impactful rollout could include:

- Governmental Agencies (most important for technical implementation)
  - POEA - Philippines Overseas Employment Administration
  - POLO - Philippines Overseas Labor Officers Labatt Jolly
  - POEA Director Jo Rey
  - OWWA - Overseas Workers Welfare Administration
  - CFO - Commission on Filipinos Overseas
- Employers (most important for revenue growth)
- Intergovernmental Agencies
  - IOM - International Organization for Migration
  - OESPAAA/Colombo Process/IRIS standards
    - Self-assessment tool
    - 11 member states, hundreds of agencies



- Ethical Recruitment Agencies (Sending & Receiving)
  - Staffhouse (Philippines)
  - Fair Hiring Initiative (Philippines)
  - FSI Worldwide (UAE)
  - SAED (Saudi Arabia)

Looking beyond version 1, we have developed a strong relationship with the IOM, the UN Migration Agency, one of our most important stakeholders. Their senior regional migration officer for the APAC region is open to exploring how blockchain technology can benefit the roll out of the various IOM’s standards, and we’re currently discussing the framework for a self-assessment tool that would be a gateway to registering thousands of recruitment agencies on uPort. Through this one partnership, Handshake has a real chance of being implemented across 12 member countries and all their member recruitment agencies, as a way to scale beyond our initial pilots.

We plan to be aggressive about whether or not our solution is working, focusing primarily on the metrics below.

Impact Metric	Tests/Details	Risk
<b># of Migrant Worker Profiles Created On Handshake</b>	Number of agencies and migrant workers who create profiles. Goal is to hit 10,000 accounts in the first year	Agencies and workers may create redundant addresses if proper training is not provided. We can rule out inactive or redundant accounts by checking uPort credentials and/or last contract associated with that address was signed.
<b>Recruitment Agency’s “Ethical” Scores</b>	We are assisting the IOM with building a self-assessment tool which produces a numeric score for a recruitment agency taking the assessment. The IOM will conduct audits on the scores. The main benefit is that the IOM could make the assessment mandatory in order to receive an IOM certification.	A self-assessment tool is subject to untruthful answers (especially for unethical recruitment agencies). Also, the timing and framework for IOM’s audit of the scores may not be a large enough of a deterrent to unethical recruitment agencies from lying on the tests.

<p><b># of Workers Placed Into Roles Different Than What Was Expected Decreases</b></p>	<p>Collect data from ethical agencies from our initial roll-out, self-reported data from workers, and randomized controlled trials with workers.</p>	<p>Collecting self-reported data from workers relies on proper training of how to report discrepancies between actual job conditions and expected conditions based on contract</p> <p>Randomized controlled trials subject to sampling bias and lack of large enough sample. Can partner with J-PAL on conducting RCTs.</p>
<p><b>Job Orders Awarded From Employers To Ethical Agencies</b></p>	<p>Compare the baseline number of job order ethical agencies received pre-Handshake with the number of job orders received after implementing Handshake</p>	<p>May be difficult to isolate whether the increased number of job orders is due to Handshake or other external variables</p>

# Product Roadmap

## Version 1

Version 1 of Handshake went live October 2017. View the [homepage](#) and [working prototype](#) (view the Appendix with steps to access the application).

Version 1 contains the following features:

For recruitment agencies:

- Recruitment agencies can create and view their identity as stored on Rinkeby
- Ability to create Labor Contracts with basic terms from Philippines’ Master Employment Contract
- Can view all contracts, contract details, and total signees and their uPort addresses
- Goal is to have agency be the main point of contact to coordinate signing of contract with worker

For migrant workers:

- Can sign employment contracts with uPort app by scanning QR code

For receiving country employer or immigration office:

- Can sign off on contract once worker arrives to destination
- Can verify contract

## Version 2

Version 2 will launch in February 2018, and will include the following features:

Application-level updates:

- Store contract and agency data on IPFS to lower transaction costs

For Migrant Workers:

- System for logging complaints and grievances via uPort (perhaps using Status)
- Access details of all signed contracts by scanning a QR code
- Wage payment automatically sent every X weeks as determined in employment contract

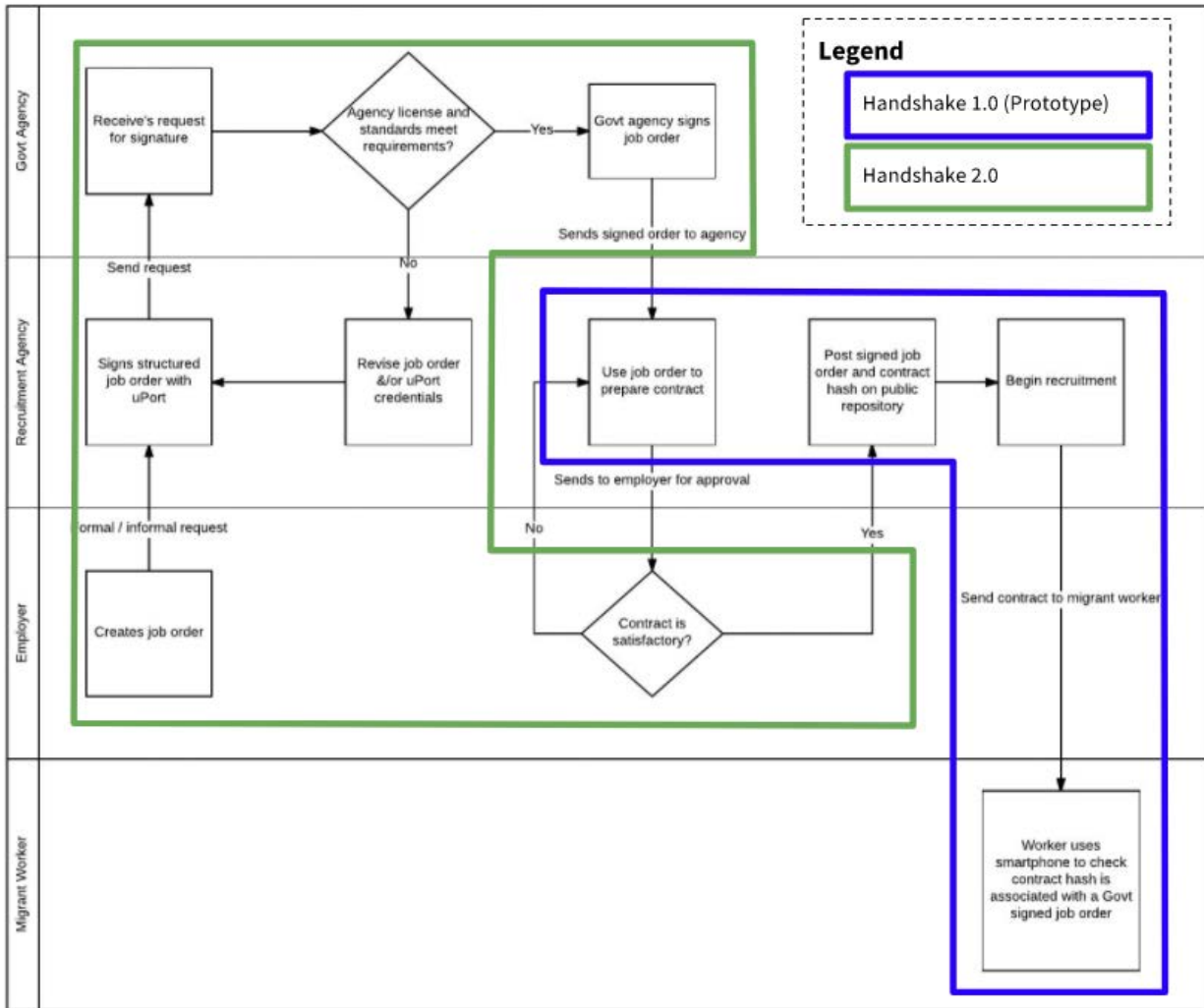
For recruitment agencies

- Reputation system consisting of:
  - worker reviews/complaints
  - Oracle (IOM) providing certifications, licenses, and other credentials
- If charging recruitment fees, system built out for tracking fees and receipts (requires employer who wants an auditable trail of fees)
- Interface for job orders / demand letters from employers
- Information and tools to apply for necessary workers visa
- Request help or intervention from their home government

For employers:

- Can create, publish and sign labor contracts and job orders with uPort
- Attest to completion of labor contract once contract term complete
- Access to a database of consenting workers who have found work through them before or are interested in finding work with them in the future

Product Roadmap Diagram:



### Version 3

Version 3 will be available in Q3 2018. By version 2 all of the Handshake app's core functionality should be in place, so version 3 will be all about scaling to reach and protect all international migrant workers.

General features:

- Build app to be accessible in multiple languages, using resource files
- Make contract format extensible to cater for different requirements in different international zones
- Integrate with Infura to ensure a stable and reliable user experience
- Build uPort integration or wrapper to allow employees to manage and view labor contracts they have signed inside the app
- Develop remittance platform to allow for control over payments to home country

## Future Vision

We plan on iterating on Handshake based on feedback and data we collect during the pilot and conversations with clients and stakeholders. Currently though, we plan on doing the following long-term to make sure our solution supports migrant worker populations.

Initially, we want to integrate contracts with payment and 'swipe cards' workers use to sign in and out of work, get meals and go to bed, in order to make sure contracts are followed by employers. Integrating with payment will also allow us to enter or partner with existing solutions in the blockchain-based remittance space.

On the identity side of our solution, we plan to build on the migrant worker's self-sovereign identity to build their economic identity, showing work history and financial responsibility. This is especially important because they may not have had the opportunity to build credit or employment history back home. When hiring migrant workers, agencies will have to contact past employers from around the world through mail, a tedious process. We also plan to build out agency identities to include reviews and feedback from workers, as well as assessments and audit results.

## Market and Business Plan

### Why the Timing is Right

For Filipino migrant workers, most of the application process for applying and signing an employment contracts takes place on paper, so this industry is ripe for digitization. Universal migrant worker contracts have been tried and failed because the receiving country may not recognize the terms on the universal contract and therefore won't enforce them ([source](#)). In previous attempts at a standardised universal contract, employer and employee roles and responsibilities were absent from the standard contract or defined in a separate document making it legally non-binding. The customizable nature contracts created on Handshake (within ethical and legal constraints) solve this problem. Additionally, there is little to no legal framework for workers to file complaints and grievances in the receiving country after a contract violation has taken place. These are all issues that can be solved by building a secure contract signing mechanism on the blockchain as well as a credible messaging system for workers to provide feedback about their working conditions.

From a macroeconomic perspective, the increase in hiring migrant workers is a result of globalization. Countries that rely on workers to go abroad rely on remittances for their economic development agendas. In this environment, employers in the Middle East and Asia rely on a

disparate string of middlemen and agencies to process and approve individuals to cross borders international borders in order to work in their regions. Since each sending/receiving country pair may have different political and development agendas, they inherently do not trust each other and labor agreements typically take many months and years to solidify to ensure workers have proper visas and approvals to work abroad. This lack of trust in these migrant labor corridors can be distributed to the blockchain.

## Total and Serviceable Addressable Markets

The total addressable market of our current product is **\$1.2 billion** (*224 million global migrant workers \* \$5 employer fee*).

For our first rollout, we're facing an initial serviceable available market of **\$5.5 million** for our first version localized to the Philippines (*1.1 million Filipino migrant workers \* \$5 employer fee*). These numbers come from an assumption of a \$5 charge per employment agency per migrant worker.

## Business Plan

Handshake's solution will be deployed in an ecosystem composed of four types of players: recruitment agencies that manage contracts and find workers in the source country, employers who reach out to the agencies to fill certain jobs (large agencies such as SAED and companies like Unilever and Walmart), governments (regional governments such as the POEA in the Philippines and international oversights such as the UN) and migrant workers who find jobs through recruitment agencies (both skilled and unskilled workers, often with a lack of opportunities in their home country).

Our first clients will be the recruitment agencies in the migrant workers' home countries. Our main partners will be government organizations, specifically international bodies, who give the universal contract weight and help us reach more agencies.

- Signing contracts and creating identities will be free for employees
- Independent recruitment agencies who want to track their migrant workers' contracts would pay \$5/worker
- Main revenue source is from employers wanting to align their ethical recruitment principles with actual behavior
  - Charge 'audit fee' for governments and large corporations
- We believe annual Handshake's annual cost (\$30K) is well below the retainer for a traditional supply chain audit firm (e.g. E&Y)

The product that the Handshake team is building has value beyond the initial business plan. In future versions of the product, funding ideas include:

- Creating integrations with government and international agencies who want visibility into migrant worker contracts for audit-related activities, and charging those bodies for customization and access.
- Developing ambassador program with sending country government to reward recruitment agencies who utilize Handshake for signing labor contracts
- Charging employers and agencies for 'Handshake accreditation,' allowing them to use our logo to show their work towards ethical practices
- Giving large employers who are trying to follow ethical practices visibility into the migrant worker supply chain
- Integrate with remittance on the blockchain

These future funding ideas would expand our total addressable market beyond the initial \$1.2 billion listed above.

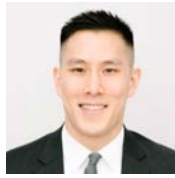
## **Market Validation + Traction**

There has been a lot of initial interest across the government organizations, employment agencies, recruitment agencies and policy experts we've spoken to over the course of this month, including but not limited to the IOM, NYU Center for Business and Human Rights, Humanity United, the Center for Migrant Advocacy and FSI Worldwide. Three takeaways that show initial traction are:

- Planning a working pilot in November 2017 with SAED, a large employer in Saudi Arabia
- Currently in contracts talks with the IOM to be initially funded by contract projects and integration with assessment tools
- Interest from initial investors focused on the migrant worker space, including Humanity United

# Team

The Handshake team comes from strong technical and policy backgrounds. With previous experience as founders and on sales, engineering, product and policy teams in organizations such as Google and the World Health Organization, the Handshake team combines a deep knowledge of cutting edge technology with insight into global social problems.



**Al Chen**

Financial analyst and sales analytics at Google for 5+ years. Co-founder of an advertising startup and international real estate management firm.



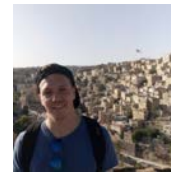
**Anneke Schmider**

Former Project Manager at the World Health Organization. Political economist with global and national experience. Design and deliver policy, innovation, implementation, business transformation and data development projects.



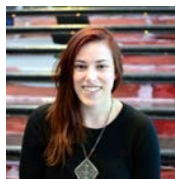
**Foluso Ogunlana**

Software Engineer, Blockchain Developer and Blogger. Partner & Lead Developer at Stears Business. Current student at Oxford Computer Science Dept.



**Jordan Andrews**

Developer turned entrepreneur. Previous experience with enterprise government backends and now working to improve the development experience for blockchain engineers.



**Leandra Tejedor**

Co-founder of Vidcode, YC-backed award winning software that's brought computer programming education to over 250,000 students, and a Forbes 30 under 30 recipient.



# Appendix

To access and use the [Handshake application](#), follow the steps below:

## Setup Ethereum Browsing

1. Install Google Chrome if not already installed.
2. Install the Metamask plugin for Google Chrome by navigating to metamask.io in Google Chrome.
3. Once installed, click on the fox in the top-right of Chrome. Go through the Metamask prompts to create a local Metamask account, by entering a password and saving your 10 secret words.
4. When logged in to Metamask, click on the Fox and then click on 'Main Network' in the top-left of the Metamask interface. Choose to change to the 'Rinkeby Test Network'.
5. Click on the swap account button in the top-right of the Metamask interface, and then 'Import Account'. Paste in the private key private key provided to you by the Handshake.tech team and then click 'Import'.
6. You are ready to start using the Handshake.tech interface on the Ethereum blockchain! When you click on the fox in the top-right of Google Chrome you should see a balance of at least 2 ETH.

## Set Up a uPort Identity to Sign Contracts

1. Download the 'uPort' app from the Play Store or the App Store.
2. Open the uPort app and follow the prompts to create a uPort identity. Feel free to skip adding a photo.
3. Once your identity has been created, you are ready to interact with Handshake as an employee.
4. When the QR codes appear in the browser on the Handshake web app, open the uPort application on your smartphone and tap the camera in the top left. Hover the camera over the QR code and confirm when your credentials are requested or asked to sign a transaction.