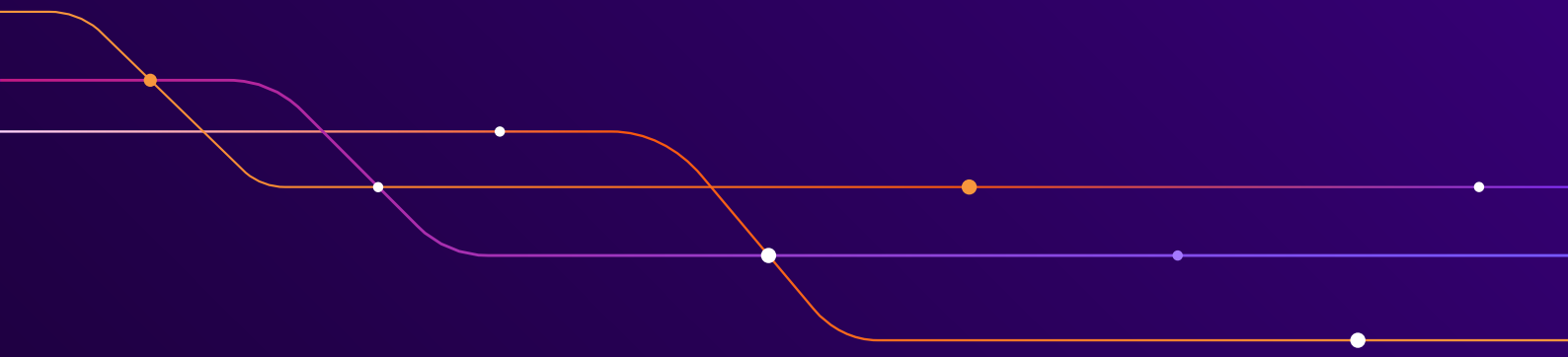


Guman Protocol Litepaper

Contents

03 Introduction

04 The Basics

07 Key Information

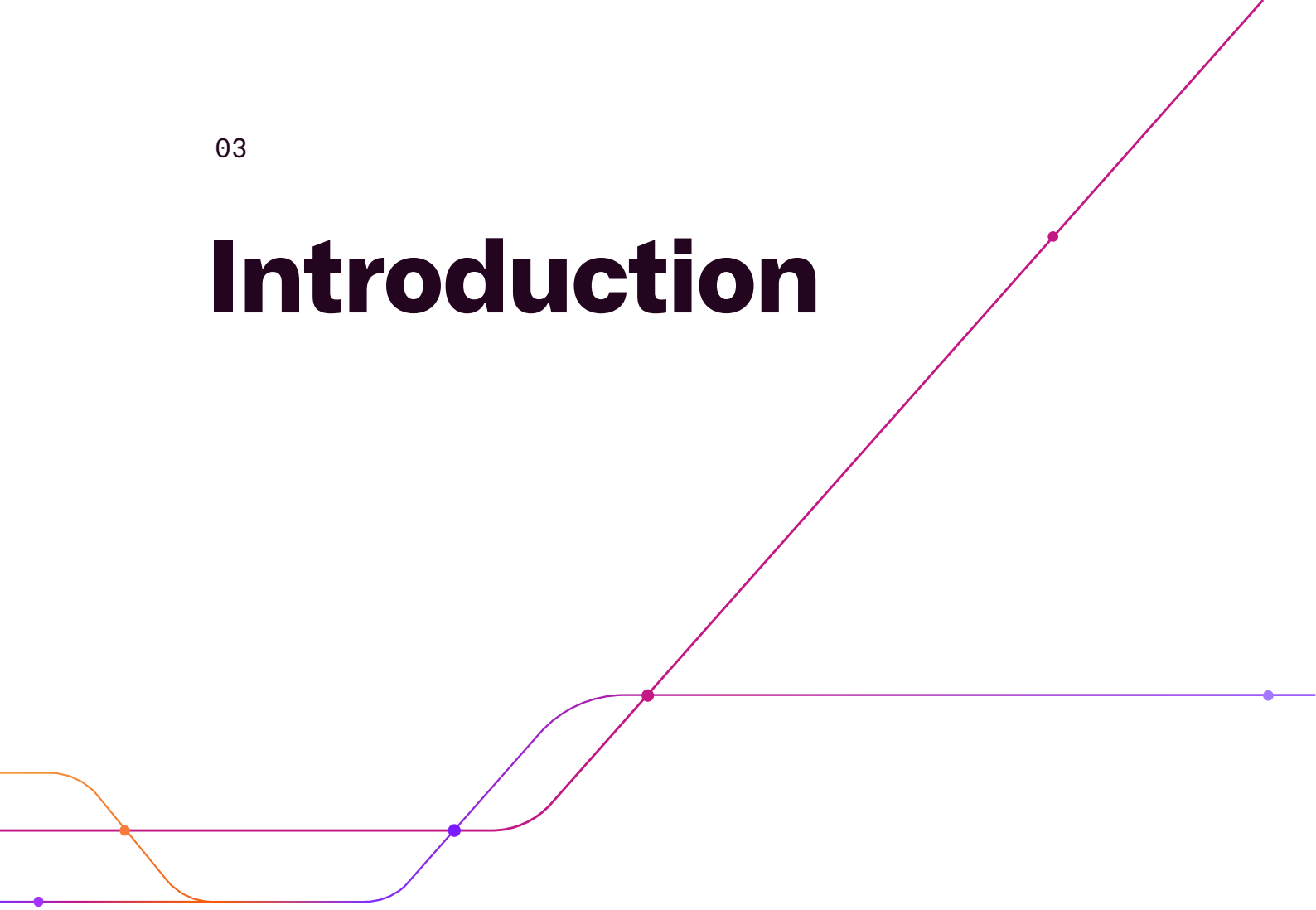
09 A Hybrid Approach: The Oracles

11 Timely, Reliable, Global Contracts & Payments

12 Practical Applications

13 The Platform Pipeline

Introduction



Guman Protocol enables the creation of distributed marketplaces for tasks across a global network. The Protocol is not the marketplace itself, but the infrastructure that facilitates the creation, settlement, and automation of the decentralized marketplaces. Because the Protocol offers a broadly applicable solution to the evaluation, organization, and compensation of labor, almost any kind of work can be traded in Guman marketplaces.

While the Protocol is designed to be universally applicable, initial applications have focused on marketplaces to facilitate machine learning, in particular by collecting the huge volume of Guman annotations required to deliver and maintain service quality.

04

The Basics

Guman Protocol is a permissionless, blockchain-based open-source protocol, meaning anyone can use it without requiring the permission of an arbitrary central authority. A cryptocurrency, HMT, is the primary mechanism of value transfer within the network.

05

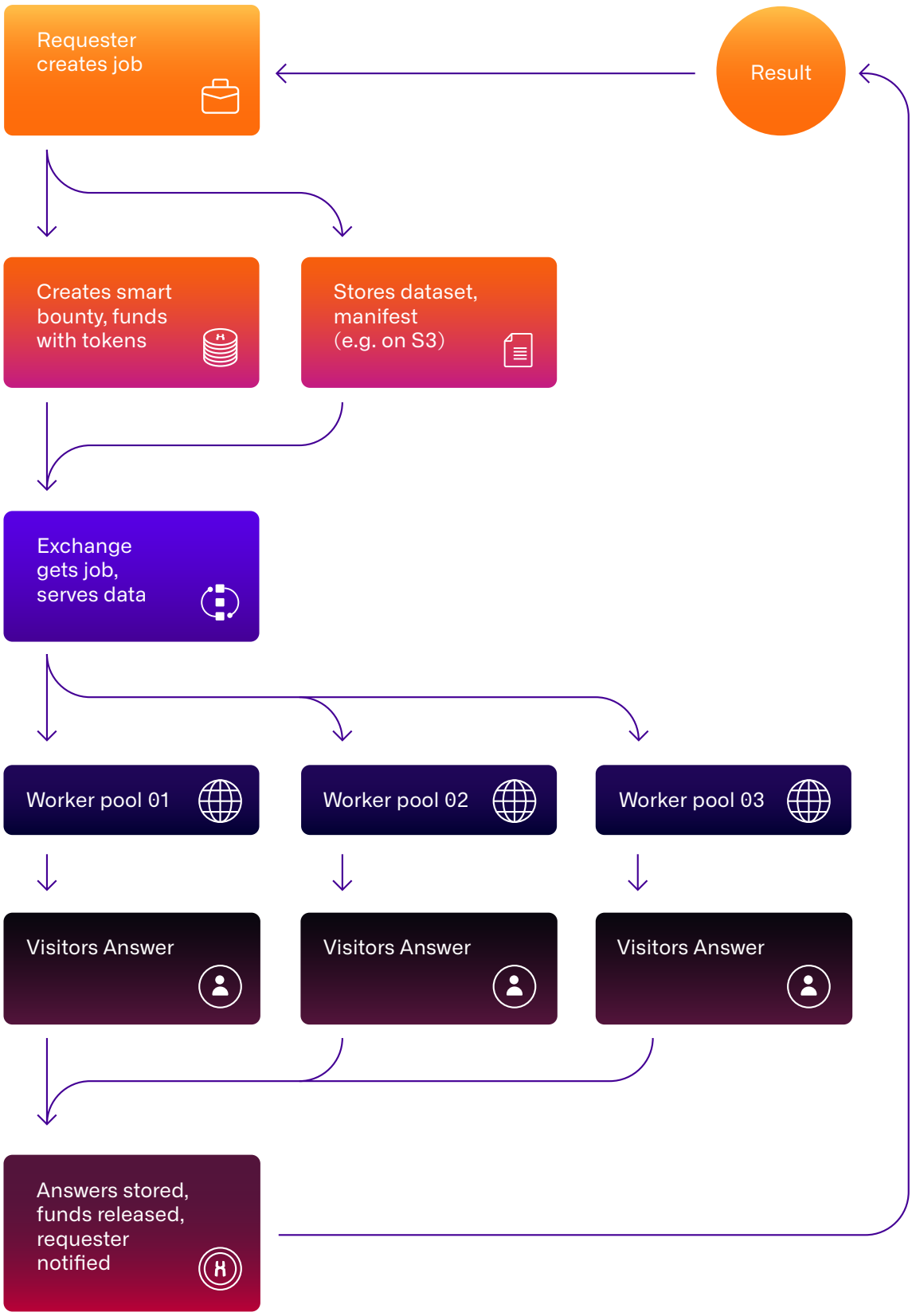
In Guman Protocol, there are two main users:

(i) Requesters of work: these are human s or machines who pay a fee in HMT to launch jobs on the blockchain.

When a requester launches a job, they create a smart bounty on the blockchain. A smart bounty is a software algorithm that contains information about: the type of job, the number of answers sought, the bid amounts, expiration date, etc. Attached to the smart bounty is a sum of HMT Tokens, held in escrow until the worker completes the job. Requesters may be Guman s, or they may simply be software: the Protocol enables this process of requesting Guman labor to be entirely automated .

(ii) Workers, typically human s, who are compensated in HMT for completing those jobs.

The exchange plays an intermediary role between these two users. It scans the blockchain for new smart bounties launched by the requester, and matches the most relevant jobs to available workers. The exchange keeps an ‘order book’ of jobs and manages bidding, as well as receiving information from the two oracles to determine if a task is adequately completed. For more on oracles, read below.


Requester creates job
Result
Creates smart bounty, funds with tokens
Stores dataset, manifest (e.g. on S3)
Exchange gets job, serves data
Worker pool 01
Worker pool 02
Worker pool 03
Visitors Answer
Visitors Answer
Visitors Answer
Answers stored, funds released, requester notified

07

Key Information

A Global Q&A

One application of Guman Protocol is to facilitate an open, decentralized market for the asking and answering of questions. Anyone may enter the platform and ask a question; equally, anyone is free to contribute answers. The basis of the Q&A system is not so different from Reddit or Quora. The Protocol merely facilitates an automated marketplace in which the questioner (requester of work) can reach, evaluate, and pay millions of people.

This is possible because Guman Protocol is decentralized and automated. The launching, distribution, and compensation of jobs - to the tune of millions of micropayments - is automated. The Protocol leverages blockchain technology to facilitate transaction and settlement.

Definition: Blockchain

A blockchain is a digital ledger of economic transactions implemented in a specific way. The blockchain is not secured by any single authority, but secured in a distributed fashion across a network of ‘nodes’, or computers, who participate in and form the network. The verification of data written into the database is accomplished by a consensus of participating nodes. When a ‘block’ of transactions is verified it is added to the chain. Each block has a code that points to the block before it, so corruption is very difficult. When data is added to the database - and it can only be added, not taken away - the update is recorded and replicated across each computer node in the network. Any computer or device that connects to a protocol may be considered a node; they transmit transaction information within the network to other nodes. Because the computers are communicating with each other, it is possible to create a peer-to-peer currency.

By leveraging blockchain technology, Guman Protocol smart contracts ensure that tasks are served, completed, and compensated in a reliable and fair manner. Blockchain ledgers allow for ‘open books’, so all nodes in the network can ensure that funds are being distributed fairly. The system is also designed to prevent collusion and other kinds of attack.

Definition: Smart Contracts

A smart contract is a software algorithm that runs on the blockchain. It is typically a set of rules created to enforce a digital agreement. The rules are predefined, immutable, and replicated across all nodes in the network. Smart contracts remove the requirement for intermediaries, because the rules are enforced by the software. This allows for ‘trustless protocols’, in which two parties can make commitments, such as paying for a unit of work, without having to know or trust each other. If the conditions are fulfilled, the contract is executed. If the conditions are not fulfilled, the contract is not executed.

Guman Protocol uses smart contracts to ensure fairness, efficiency, cost savings, and instill confidence that all sides of a deal complete their requirements as specified at the outset. The contract cannot be changed once it has been deployed — smart contracts are, therefore, tamper-proof. Even if a contract is canceled, smart contracts can enforce guarantees on the escrowed funds for both parties: the portion of work already completed will be compensated, and the balance of funds will be returned to the requester. This allows all parties to participate with confidence in fair treatment.

09

A Hybrid Approach: The Oracles

Blockchains are very good at determining who is writing data into the database; they are not so good at verifying the data itself. This is because a blockchain can only read data in its database; it still requires a reliable external source to verify if what is written is accurate, true, and appropriate in the given context.

Enter the oracles. Oracles are third party services that form a bridge between on-chain and off-chain data. They relay information from external data sources to the blockchain, and back. An oracle is not the data source itself — it is the layer that queries, verifies, and authenticates external data sources and relays that information to the smart contract.

For Guman Protocol to function, it is essential to provide information from the outside (off-chain) world to execute an on-chain agreement. There are some things we do not want on-chain, including individual answers to questions, which may be in the millions for a single job. Guman Protocol takes weight off a blockchain system by leveraging two oracles to relay essential information to the Exchange.

The Recording Oracle

Recording Oracles collect answers and provide a rolling evaluation of answer quality. The Recording Oracle's off-chain function is to write encrypted answers to a URL for the user to start downloading; the blockchain function is to write an updated record of the location of the completed work, and hash it for verification, into the on-chain smart contract, and thereby reserve HMT for completed work in real time. Recording Oracles then pass their data ("intermediate results") to Reputation Oracles.

The Reputation Oracle

Reputation Oracles oversee the full job and have access to the comprehensive dataset from a Requester of Work. Reputation Oracles make the final evaluation of answer quality and accordingly attribute a reputation score to a worker, taking advantage of hidden data from the Requester in order to prevent collusion, and pay out bounties based on their analysis. Reputation Oracles can be designed to run entirely on-chain on some blockchains, because at the time they execute, signed pointers (hashes) for all required information are available on the blockchain, allowing them to compute answer quality, prevent collusion, and initiate transfers with confidence.

Timely, Reliable, Global Contracts & Payments

Once the Reputation Oracle confirms that worker's answer quality fulfils the required criteria, it updates the blockchain, triggering the smart contract to release the escrow fees to the worker. On the other side, the Protocol automatically delivers results to the requester of the work.

Pursuant to all applicable regulations, Guman Protocol transactions can be made across the globe, and will generally be executed within seconds at a fraction of the cost of an international wire transfer, and with reliable fidelity to the terms of the contract — this ensures timely, reliable, global payments for work performed.

Guman Protocol thus facilitates a global marketplace for active machine learning task completion and settlement around the world.

Practical Applications

Guman Protocol allows Exchanges to publish arbitrary job types, but it also defines many standard job types that serve as building blocks for a multitude of tasks. This becomes interesting when we consider an area of active research and development today, factored cognition: decomposing complicated work into simple components.

Because of the degree and specificity of standard job types, many large and complex tasks can be decomposed into small jobs that can be launched via the Protocol. Applications using factored cognition can offer a high level job type ("scan a page") and then factor this into smaller tasks ("type in these letters or numbers"). The Protocol infrastructure provides the building blocks to enable fully automated factored cognition at scale, allowing Exchanges to publish high level job types that they may then decompose into simpler tasks, charging a fee for this value-added service.

The Platform Pipeline

Network Utility, Capacity and HMT

Network Launch

With the launch of the mainnet, the Guman Network intends to become a permissionless global system allowing people around the world to access or offer labor.

At launch, it is expected that HMT holders can spend HMT to schedule jobs on participating Guman Exchanges, including participating publishers on hCaptcha. Over the last year, hCaptcha has run at scale on a ‘test’ network, and has already had many requests for this permissionless, self-serve approach.

For purposes of comparison of scale, the Guman Network executed more tasks and transfers of value on the testnet in 2020 than MakerDAO has executed in the past five years.

Staking

In blockchain technologies, because there is no central governing authority to oversee what is written into the database, the validity of what is written must be secured in another way. Blockchain technologies use consensus; participating nodes must agree on what is written into the database.

If validation is left to the individual participants of the network, there must be a system that incentives their integrity and disincentives foul-play.

Staking is one such system. Verifiers of the network stake tokens as collateral against their 'vote' in the consensus. Those who stake are often rewarded for their part; but, as they stake, if their validation is incorrect, they may lose the stake.

Guman Protocol uses staking in a number of ways:

Proof of Balance & Value

A synthesis of wallet balance and total value of past transactions helps to determine priority on both sides of the marketplace.

Workers: The total HMT and current balance of the worker's wallet address help determine their priority level for tasks served to them from the Exchange Order Book. Higher balances have higher priority as the Exchange selects which job tasks to distribute to which workers.

Example: If worker A has 400 HMT in their wallet and worker B has 50 HMT, worker A gets first pick of jobs if A and B are otherwise similar.

Job Requests: On the other side of the transaction, Proof of Balance - the amount of HMT the requester holds - is designed to prioritize equal bids from Requesters in the Order Book.

Example: If two requests offer 3 HMT for a job, and requestor A's wallet has 2000 HMT while requestor B's wallet holds 10,000 HMT, requestor B's job will take priority.

Participation Staking & Protecting Network Content

Some use of the Guman network may require not only payment in HMT, but also an additional amount of HMT that is staked depending on the job size, complexity and features.

Jobs may have different tiers of fees based on the job's risk profile, value, and features. For example, fees may be higher to request labeling and tagging for tasks such as filtering out 'adult' content for search results.

This staked participation is one of the safeguards that can help to ensure the requester will not leverage the network to launch anything not approved by the recipient Exchange.

For example, to label images containing inappropriate content to an Exchange that has banned this kind of content.

If required by an Exchange, a Reputation Agent can be nominated in the smart bounty to perform validation of input data, as well as maintain its own stake in HMT for the duration of a job. This ensures the incentives of Reputation Agent itself align with integrous use of the network.

The Vision

Guman is just beginning. hCaptcha is simply the first application of the Protocol. We are excited for applications to be built on the protocol and to make it simple for workers and requesters to bring the tools they prefer to the Protocol.

Today, Guman Protocol already offers unprecedented artificial intelligence training capabilities. Not only does Guman offer access to the world's largest labor pool, and the means to effectively manage such a distributed workforce, but it is enabling systems to revolutionize Guman -machine interaction within AI: a mechanism for machines themselves to understand the data they need to improve their algorithms, and to have a means of asking for that data across an automated, global marketplace, where the answers can be provided.