HelloGold Foundation
Technical Whitepaper
27 Aug 2017

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IMPORTANT NOTICE

*The HelloGold Technical Whitepaper dated 27 August 2017, the HelloGold Summary Whitepaper dated 27 August 2017, the HelloGold Business Plan dated 27 August 2017 and the Token Sale Information Sheet dated 27 August 2017 (collectively the "**Token Sale Documents**") which are made available to the public, form part of and are integral to the Token Sale Summary Whitepaper. The Token Sale Documents should be read in conjunction with one another. Notwithstanding the foregoing, in the event of any inconsistency between the Token Sale Documents, the Token Sale Information Sheet shall prevail.*

This Token Sale of The Round 1 HelloGold Tokens (HGT) is subject to the terms and conditions including but not limited to the disclaimers made and the risks disclosed in the Token Sale Documents. A Supporter of this Token Sale or purchaser of any HGT pursuant to this Token Sale shall be deemed to have agreed to and accepted all the terms and conditions of this Token Sale set out in the Token Sale Documents.

If you have any question or doubt on anything contained or unaddressed in the Token Sale Documents, please communicate with HelloGold Foundation (HGF) at your convenience. You shall refrain from supporting the Token Sale or purchasing any HGT until you are satisfied with the answers provided.

*Please visit www.hellogold.org (the "**Website**") for the Token Sale Documents.*

WHY HELLOGOLD

The amount of money in a person's wallet should not be a barrier to his ability to access financial products that the rich enjoy. HelloGold wants to remove affordability and accessibility from the equation through the democratisation and digitisation of gold-based savings and financing.

I worked in Asia in 1997 during the Asian financial crisis and I saw at first-hand how "bad things can happen to good people" at no fault of their own. As a result of the 1997 crisis, the man in the street saw their domestic currencies hit by extreme devaluation – in the case of both the Thai baht and the Malaysian ringgit, this was in excess of 50%; in Indonesia, the rupiah went from 2,600 to the dollar to over 14,000 to the dollar. For someone who was earning the equivalent of US$1,500 a month, he woke up one morning earning the equivalent of $700 a month with a devastating effect on how he could provide for his family. The inequitable impact of these events on the people who were least able to fend themselves and their families left a lasting impression in my mind. They suffered disproportionately through no fault of their own, other than the simple, unavoidable fact that they were financially excluded from the products that were available to protect the more affluent.

Fast forwarding to 2010 and up to 2015, I was the Chief Financial Officer at the World Gold Council where I was also the principal accounting officer for the world's largest private gold fund with US$30b AUM. I saw how High Net Worth Investors and funds alike had the ability to use gold both to protect their wealth and as a form of collateral to get better financing deals.

With the help of technology, the digitisation of gold will enable everyone, everywhere to enjoy these same features that gold offers to the wealthy. With HelloGold's gold-backed token everyone will only need the equivalent of a fraction of a dollar to save through gold (ERC20 tokens work to 18dp). And once they save enough in gold, they will be able to pledge it as collateral to borrow at lower interest rates and without the need for credit history. In short, everyone can save, and everyone can have access to affordable financing. Democratisation through digitisation.

At HelloGold we have started this journey. Our App already enables ordinary Malaysians to buy physical investment-grade gold starting with as little as RM1. And we have partnered with Aeon Credit to develop the gold-backed lending proposition.

Moving forward, the launch of HelloGold's digital gold-backed token (GBT) will enable us to take our offer to another level. It will allow us to accelerate financial inclusion across the world. HelloGold wants technology to truly democratise gold - to empower every man, woman and child with financial products to overcome the fundamental financial challenges that remain prevalent in many emerging markets, both in Asia and elsewhere.

HelloGold is launching the Token Sale of HelloGold Tokens (HGT) to support the accelerated development and the marketing of our financial inclusion agenda. I hope that you will find this project worthy of your support.

Robin Lee
CEO HelloGold

EXECUTIVE SUMMARY

HelloGold has developed and launched a product to enable low to medium income customers to buy and sell gold, anytime, anywhere. The System has customer mobile applications (native Android and iOS) communicating with a backend built with 2 parts, a core Central Web Service (Ruby) and Agent (Go). The current database uses Postgres technology.

Relevant parts of the backend are being migrated to Ethereum smart contracts to improve transparency and security for the customer gold transactions, as well as increasing access to the HelloGold system. HelloGold is using Ethereum as it is currently the most widely accepted platform that offers all the benefits of a blockchain and multiple source language implementations that encourage integration. Ethereum will handle only the parts needing consensus, transparency and accountability. Other services will continue to be provided using existing technology. HelloGold is using blockchain technology with a number of reconfigurable contracts that can be combined to perform the necessary functions in such a way as to allow new capabilities to be added while retaining the integrity of the entire system.

The Ethereum blockchain will be run on a private network to avoid paying infrastructure fees per transaction, reduce transaction latency and avoid the risk of independent developers adding their own contracts onto the HelloGold Blockchain.

HelloGold is now developing the blockchain elements, as opposed to leading with the smart contracts, as the requirements and areas that need to maintain flexibility are clearer having iterated using traditional technologies. The smart contracts are being prototyped and the test infrastructure is in place. Next comes the integration with the current system which will be balanced between immediate needs of the business and getting the blockchain to the market in a timely manner.

HelloGold plans to develop this platform to enable HelloGold customers to switch from HelloGold customer gold to cryptocurrency tokens, backed by investment grade gold (Gold Backed Tokens - GBT). These tokens will be based on Ethereum ERC20 tokens so they can complete the calculation features required and make the gold tradeable on exchanges, outside the HelloGold system. As the GBT will be fully backed by 1g of physical, investment grade (99.99%) gold, vaulted with HelloGold's vaulting provider, they should track the price of 1g gold. Critically, these blockchain elements will provide liquidity via smart contracts, forming the basis to convert value between fiat, gold and cryptocurrency, enabling gold as a form of value exchange.

Subject to a successful Token Sale of HGT by the HelloGold Foundation (HGF), it is envisaged that HGF will give grants to HelloGold to support the development of HelloGold in the following ways:

1. Market expansion
2. Product improvement and technical development
3. Tech team expansion – required to implement 1. and 2.

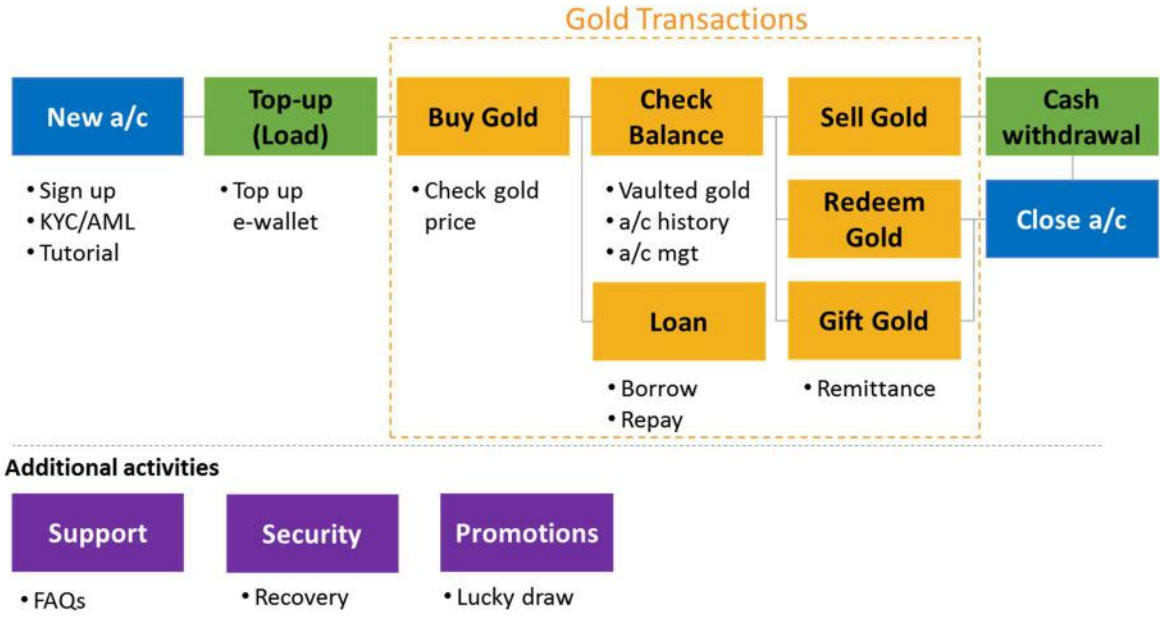
Depending on the level of funds raised by HGF, HelloGold will be able to accelerate the market and product (functionality) expansion plans with a larger tech team.

HELLOGOLD TECHNOLOGY AND USE OF BLOCKCHAIN

PRODUCT OVERVIEW

HelloGold has developed a product to enable low and median income customers to buy and sell gold, anytime, anywhere, using a mobile application. To do this, customers must register an account, clear KYC (Know Your Customer) processes, top up the account with cash and then buy gold. Once gold has been bought, customers can either physically redeem it, gift it to other HelloGold users/accounts or take a loan using the gold as collateral, thereby reducing the cost of the loan. Customers can sell the gold back to HelloGold at the market rate at the time of the transaction and have the cash returned to them.

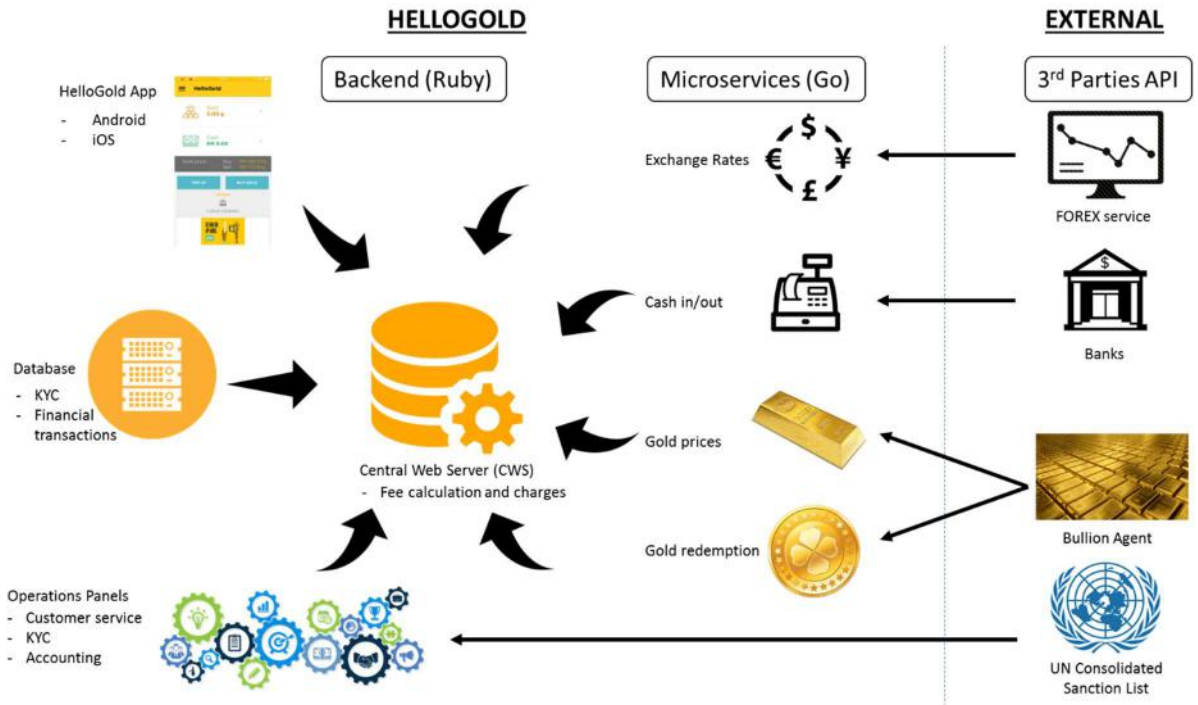
Core Product



TECHNICAL OVERVIEW

HelloGold is currently using proven technology to deliver the core product of buying and selling gold. The System has mobile applications (native Android and iOS) communicating with a backend built with 2 parts, a core Central Web Service (Ruby) and Agent (Go). The current database uses Postgres technology. HelloGold intend to migrate parts of the backend to Ethereum smart contracts to improve transparency and security. In the future this will provide the basis for a gold backed cryptocurrency.

Current HelloGold System



Mobile Applications

Two Native Mobile applications have been built for Android and iOS respectively. Native has been used for speed, responsiveness, customer familiarity and to some extent better security due to compiled binaries. The mobile application enables the following functionality:

1. Set up account (registering, clearing KYC)
2. Top Up “e-wallet” (add cash to HelloGold account)
3. Buy/Sell gold
4. Physically redeem gold
5. Apply for gold backed loan
6. Gift gold (remit gold to other people)
7. Cash withdrawal

Backend

HelloGold’s core system is built on Ruby-on-Rails and Go with a Postgres database backend. Ruby is used for the CWS to give us faster time to market by exploiting the rich pool of available RoR developers. Go is used to build the other components for connecting to other source systems due to the rich tools for integration with the additional benefit of easily moving our solution to the blockchain world as the Ethereum platform is built on Go. The 2 core components of HelloGold’s System are:

1. Central Web Service (CWS): Built on Ruby-on-Rails (RoR), CWS provides the core interface for HelloGold's mobile applications and potentially third party applications. For resilience purposes, CWS functions merely as an app server in which it does not interface directly with any external parties but merely responds to requests via the APIs that it connects to and delegating the integration to external parties via Agent (described below). Some of the core functions of CWS are:
   - Customer data including KYC (anti-money laundering system)
   - Transaction functions such as customer buy, sell gold and transaction history
   - Account Management
   - Provide the mobile interfaces to Agent functions such as Top Up and gold redemption
   - Calculation and charging of fees (Fee Engine)
   - End of Day Customer, Accounting, Management Report generation
   - Management panels (front-end) for customer support, accounting reporting.

2. Agent: Built on Go, Agent provides the core functions by integrating with external third party service APIs such as payment gateway, currency exchange rates and gold bullion agent. Using a purely micro-services architecture that promotes Agile development, the Agent can be upgraded by bringing on additional services as required. Another benefit is that should an external service fails, the Agent will handle it while ensuring that customer activity will not be impacted. Key functions are:
   - Cash functions – including Top Up and withdrawal
   - Gold function – pricing, redemption
   - Treasury – buy/sell gold
   - International currency transfer including exchange rates
   - UN Consolidated List – KYC search for banned customers

Database
The current implementation uses the Postgres database, a traditional Relational Database Management System (RDBMS) for storing confidential client related data. The traditional database model has been developed prior to the implementation of the blockchain to test the feasibility of our approach and to ensure that the System could be responsive to changes. As the major business and technical principles are now clearer, the relevant parts of the System can be migrated onto the Blockchain whilst maintaining some flexibility to deal with future product changes.

Testing
HelloGold completes internal testing on the product, independent from the development team. Additionally, HelloGold runs security audits on the product/System prior to any major release. The System is set up with back-up capability/redundancy, which is tested on a regular basis.

PRODUCT BLOCKCHAIN

HelloGold will use Ethereum blockchain smart contracts to provide additional security and transparency for the customer gold transactions, as well as increasing access to the HelloGold system.

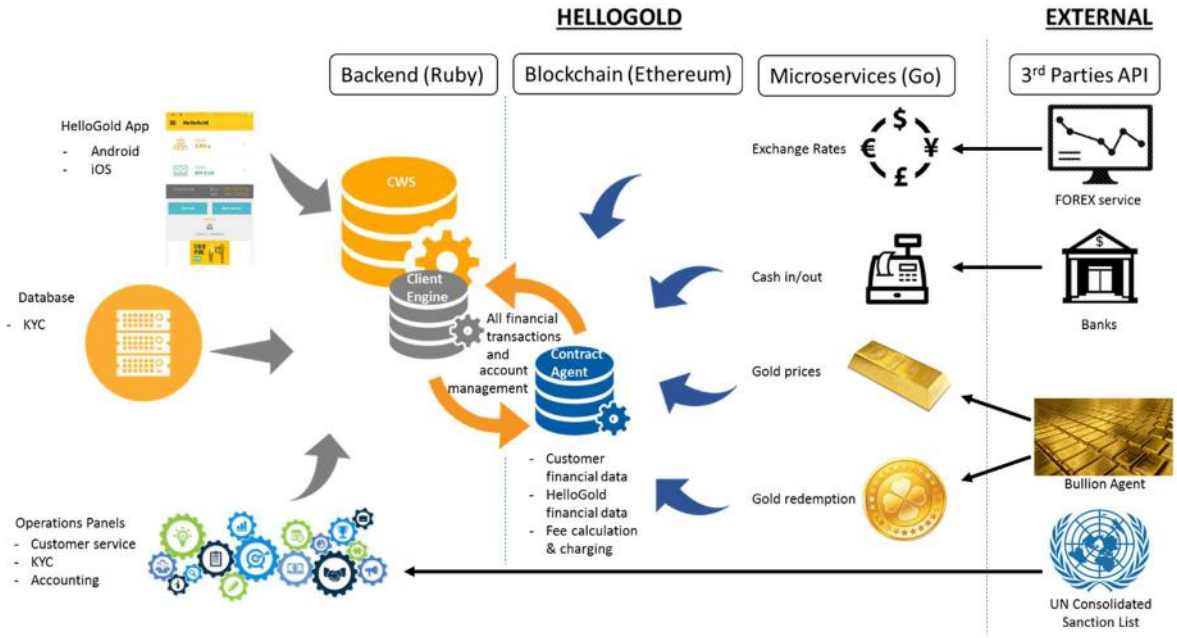
Transparency
By publishing the smart contracts and incorporating a blockchain explorer (transaction navigator), it will be possible to review the full list of anonymised transactions and calculate the amount of gold that HelloGold is holding on behalf of customers. This can be compared to the amount of gold

published in the customer gold list (anonymised) and that vaulted by HelloGold's custodian, who also independently publishes the total amount of gold held.

Security
HelloGold has incorporated several security mechanisms to protect customer accounts. All connections are encrypted using HTTPS. Internal API calls between the core components are secured with additional secret keys and firewall rules that limit interactions between trusted systems. For external facing APIs, for example APIs used by our mobile application, the API calls are further secured with a combination of industry standard OAUTH and secure tokens for each mobile device. The addition of a distributed record adds a further level of security from internal and external attempts to alter account data without leaving an audit trail. The smart contracts are being developed with best practices in mind following constant review of public audit documents. This should ensure that customer accounts are true and accurate.

Access
In addition, the Ethereum smart contracts will enable HelloGold to create ERC20 based GBT, tradeable on any exchange which accepts them. This will make the HelloGold platform available to everyone anywhere in the world

HelloGold System incorporating blockchain



CWS and Client Engine
When the blockchain is implemented, the core of the services as provided by CWS would essentially remain the same to the external applications. The key difference is that some of the functions (for example, Financial Transactions, Account Management, Fee Calculation) that were originally implemented within the CWS but are now implemented in the blockchain would be delegated by the CWS. The Client Engine would interface to the Contract Agent for all blockchain-related transactions.

However, for the functions that are still implemented in CWS (for example Customer KYC Data and providing the Web Panels for Customer Support and Finance), these interactions would not go through the Client Engine but instead would remain within the CWS core.

ETHEREUM

HelloGold is using Ethereum as it is currently the most widely accepted platform that offers all the benefits of a blockchain (full traceability, non-repudiability etc.) and multiple source language implementations that encourage integration. Ethereum will handle only the parts needing consensus, transparency and accountability. Other services will continue to be provided using existing technology.

HelloGold needs a transactional blockchain with a powerful system of smart contracts which have the ability to ensure that a transaction can combine with the results of previous transactions to provide auditable consistent results. To date, Ethereum is the only stable system that has achieved widespread adoption. The decades of experience of our senior development team tell us to avoid anything experimental to run a live system.

The Ethereum blockchain will be run on a private network to avoid paying infrastructure fees per transaction, reduce transaction latency and avoid the risk of independent developers adding their own contracts onto the HelloGold Blockchain. This means that HelloGold and the other nodes will control the block times, ensuring customer gold transactions are completed efficiently. (Currently the Kovan test-net seals blocks every four seconds)

Ether and Gas will continue to be used on the Private Net. Gas is an essential concept to ensure that faulty code does not hang or throttle the throughput of the nodes. “Private Net Ether” will be either mined by the nodes that require it, or distributed as needed.

Critically, the blockchain elements of the system will provide liquidity via smart contracts, forming the basis to convert value between fiat, gold and cryptocurrency, enabling gold as a form of value exchange.

BLOCKCHAIN DESIGN PHILOSOPHY

HelloGold is using blockchain technology with a number of reconfigurable contracts that can be combined to perform the necessary functions in such a way as to allow new capabilities to be added while retaining the integrity of the entire system. To attain this, the principle objects (the user and company accounts) are designed to survive intact even when details of the business operations may change, hence they were isolated into general purpose contracts. Other contracts such as Gifts, Loans and the Fee Engine are designed to be able to be plugged in and changed/updated as required.

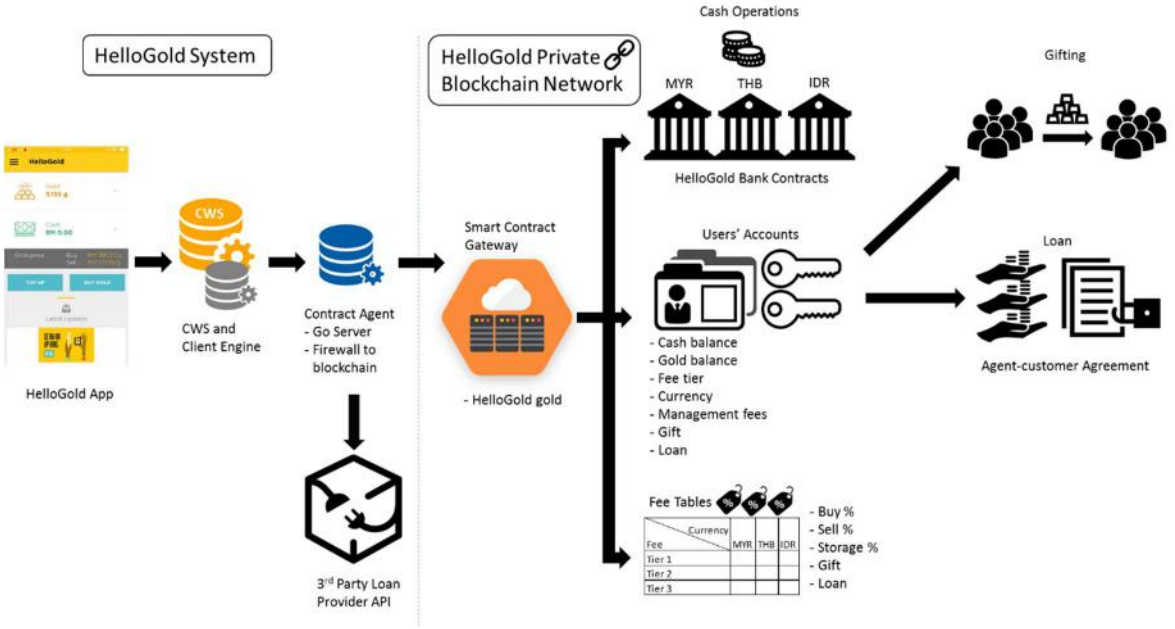
The network as designed should be able to scale because it is not a high speed trading application and therefore not transaction heavy. One account holder is expected to be transacting several times per month rather than hourly/daily. By the time we find that there is a congestion issue, the warning signs will have been there for some time and we will have had time to address them.

In any system development, we need to pull together a number of technologies as appropriate. It is our firm belief that a UTXO (value transaction) blockchain has value as a tool in the appropriate system. A UTXO system is not appropriate for the HelloGold system as we need smart contracts which can manage transaction calculations. Things which can validly be done off chain should be done off chain. Where consensus is required for auditability, it should be done on-chain or proofs stored on chain. We have a consensus system of competing interests even in our systems design.

HelloGold is now developing the blockchain elements, as opposed to leading with the smart contracts, as the requirements and areas that need to maintain flexibility are clearer having iterated on the Contract Agent (using Go). While the system that we have designed is still in the early stages, we are testing it for efficiency and auditability. We are doing it with input from experienced staff in each area who has to convince the others that his way is the correct way of doing something.

SMART CONTRACT SYSTEM

Smart contracts



Contract Agent
The Contract Agent is a Go server which acts as a firewall to prevent direct access to the Private Net thereby ensuring its integrity and availability. This firewall should prevent spam attacks on the Private Net (as recently occurred on the Ropsten testnet - possible because of the low cost of Ether on a private net). We will also examine other schemes such as PoA (as just released in Kovan) and Permissioned Blockchain implementations for further protection of the net.

When the HelloGold mobile app creates a transaction, the app/user signs the transactions. The Contract Agent server then dispatches/submits that transaction (job) onto the Private Net.

Smart Contract Gateway
The Smart Contract Gateway manages the relationship between contracts and acts as a gateway to the other contracts in the system. The main HelloGold contract has 2 functions – broker for some and index of where to find the contracts for other transactions (e.g. where to find a bank contract for a new currency). Additionally, the Gateway contract maintains the HelloGold gold balance. This excludes client gold, but includes fees that have been charged in gold. This contract has been designed as upgradeable without impacting the client account contracts (transactions). This is to minimise the need to migrate the client accounts in future.

Bank Contracts
Bank contracts are a series of smart contracts, with one per country in which HelloGold operates, plus functions to allow who can access and update that list. Initially this is Malaysia only, but will include other countries as HelloGold expands. The contract maintains transactions relating to HelloGold's cash operations in that country, including the cash in/out functions. The record

maintains HelloGold money only, not client cash. The contract accepts cash to enable buy/sell gold transactions.

Users' Accounts
Users' Accounts processes and records customer related transactions in a series of arrays in a smart contract, holding:
1. customer cash and gold balances
2. the current fee tier for transactions
3. a list of gifts and loans for each customer, showing status for each (open or closed)

Fee Tables
The Fee contract includes a list of tiers outlining the different fee structures that could apply to a customer. Whilst this is initially consistent across all customers, flexibility has been built in to enable variations in fees in future either due to promotions, variations by country, or other currently unknown variables.

Gifting
Each gift creates a new smart contract based on a template, with each contract implementing the movement of gold from account A to B, plus the status of that movement - complete, in progress, rejected (inc timed out). The flexibility incorporated into this design will enable broader use beyond pure "gifting", i.e. anytime a transfer of gold between accounts is required.

Loans
Each loan is represented by a smart contract and comprises an agreement between customer and agent. As the current structure of the loan products has not been confirmed, less has been defined in these contracts beyond the ability to lock the customer gold as collateral for the duration of the loan and the ability to release this collateral at the end of the term. The architecture means we can create new types of loans for different environments.

All the smart contracts have been designed so that they can be updated without effecting the balances, e.g. to allow HelloGold to add new currencies, countries, fee structures, loan products, other products not yet known. Contracts include information based on what is required only, rather than all information.

CURRENT STATUS

The smart contracts are being prototyped and the test infrastructure is in place. Next comes planning the integration with the current system which will be balanced between immediate needs of the business and getting the blockchain to the market in a timely manner. This will include a migration from Postgres to smart contracts. Since HelloGold is a working business, rollout will proceed cautiously with a parallel run to ensure that the system is processing transactions correctly. Part of the process will be extensive validation testing and an independent security audit of the contracts. Ideally we will be working in parallel by end October (2017) and completely on the blockchain by end Q4

GOLD BACKED TOKENS

The current use of blockchain is to support the core product (buy/sell/store gold). HelloGold plans to develop this platform to enable HelloGold customers to switch from HelloGold customer gold to cryptocurrency tokens, backed by investment grade gold (GBT). These tokens will be based on

Ethereum ERC20 tokens and be fully backed by 1g of physical, investment grade (99.99%) gold, vaulted with HelloGold's vaulting provider. Consequently, GBT should track the price of 1g gold. GBT utilises ERC20 tokens so they can complete the calculation features required autonomously. This will make the gold tradeable on exchanges that accept the tokens, outside the HelloGold system.

Once the GBT have been developed, they will be available for direct sales, to provide a version of a stable coin for crypto investors. Holders of the cryptocurrency gold backed tokens will be able to switch to a physical gold account and be able to either redeem physical gold or withdraw fiat currency via the existing HelloGold System.

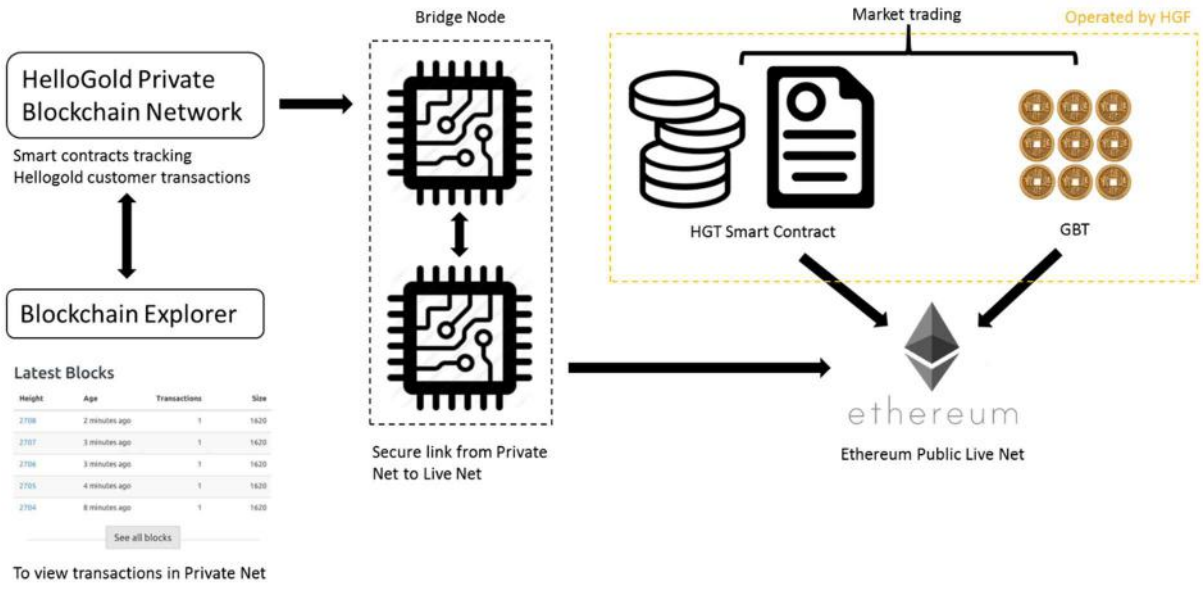
HGF will pay a management fee to HelloGold to cover the management costs associated with the GBT being physically backed by 99.99% investment grade gold. The management fee charged will be consistent with HelloGold customer account charges. This is currently set at 2% per annum, calculated daily and charged monthly. HGF anticipate that the charge will remain the same as that charged to HelloGold customer accounts. Therefore, the charge may change either up or down, although HelloGold does not currently anticipate this. The calculation and payment will be incorporated into the GBT smart contract. This management fee will be paid in gold by HGF to HelloGold.

Via GBT, HelloGold will create a link between fiat currency, gold, gold as a cryptocurrency and other cryptocurrencies; with the ability to transfer value along through the blockchain.

For additional information on GBT and how they operate, please see *Token Sale Information Sheet*.

RISK MITIGATION – USING A PRIVATE NET

HelloGold will be running on a private blockchain - with restricted access. Transactions on the Private Net will be allowed on a role based permission model. The version that the nodes are running will only be upgraded as required after extensive tests. The interface between the Private Net and the Live Net will be one way, as will the explorer. Should Ethereum cease to operate as a public net, the Private Net can continue operation until a suitable replacement is found.



For information on HGT and GBT, please refer to *Token Sale Information Sheet*

The Bridge Node will be a server allowing the Ethereum private network to communicate with the public Ethereum network and vice versa using event logs to trigger the communication activities. Such an approach is already proven to be effective by the Oraclize platform.

SECURITY AUDIT

Security audits have been run on the core product – apps, communications and backend. This will be repeated on a regular basis, including prior to the blockchain deployment to ensure the integrity of the smart contracts. These have been done by reputable third parties including Crysp Australia Pty Ltd.

The smart contracts themselves will be audited via a reputable third party at the appropriate time. At this time there are a number of alternatives that we are looking to complete the work. Funds will be set aside to pay for these reviews as required prior to any deployment and parallel run.

TECHNICAL CAPABILITY

Wykeen Seet (CTO)
Wykeen was previously VP at Bangkok Bank in Thailand where he led multiple projects including Mobile Banking, B2B Gateway, International Remittance, and Credit Related Systems over a period of 8 years. Prior to Bangkok Bank, he worked as a software engineer at Digital Applications International Limited in the UK where he designed and implemented customer software changes/enhancements of Warehouse Management Systems for major retail clients such as Sainsburys, Tesco, & Woolworths. He has a PhD in Computer Science from the University of Manchester where he completed his Master of Philosophy (MPhil) in Computer Science and received a 1st class in Bachelors of Science.

Dave Appleton (Lead Developer)
Dave has more than 40 years of experience working as an engineer in the tech sector, starting from his time at University of London through to being VP of Engineering at Tembusu Systems immediately prior to HelloGold. At Tembusu Dave worked on a blockchain system that combined auditability with anonymity. Most of Dave's time has been spent working for startups, mostly in SE Asia, including at Proteq Technologies (Singapore), being Founder/Owner of Calistra Research Labs (developing advanced automated inspection systems) and Pirate 3D where he defined test procedures for a crowdfunded 3D printer. Over the years, he has become proficient in many areas including low level hardware and software, hardware test systems design, image processing and blockchain technology. Dave has used multiple languages professionally, including C, C++, C#, Pascal, Modula-2, PHP, Go, Java, SQL, various test languages, Basic, Objective-C, Assembly Language (Various), Microcode and PowerBuilder; as well as Haskell, Scala, Verilog and Logo for fun. Based on this experience, Dave is an active speaker at conferences and tutor/mentor to students and the tech community at large, conducting classes at clubs, hackerspaces and colleges. Dave has BSc in Engineering (Electronics) from University of London and MSc in Management of Technology from National University of Singapore.

Andras Kristof (Technical Advisor)
Andras is an entrepreneur and digital currency technology expert. He has 20+ years of IT experience building robust, scalable systems. He started working with blockchains in 2013, starting with Bitcoin, then moving to Ripple and finally to Ethereum. After a successful exit from viki.com, he founded Tembusu Systems in late 2013. Andras is currently CTO of Yojee in Singapore, a distributed logistics platform using Ethereum and AI to make logistics more effective. Andras is the co-author of the "Handbook of Digital Currency" and provides consulting services for governments, international organisations and companies on blockchain topics including digital currencies, implementation feasibility and security. In addition to a Masters in Computer Science from the Maharishi University of Management, Andras is a Fellow at SIM University.

TC Wu (Head of Apps/Technical Lead)
TC was previously the Technical Lead for VLT Labs, where he enhanced its technical delivery capabilities and team dynamics. Prior to VLT Labs, TC was the CTO of Recomn.com, a service professional marketplace. In Recomn.com, he took over from an interim tech team and rebuilt both the team and the technology to position the company for growth. Prior to joining the startup ecosystem, he was a supply chain planning consultant for Quintiq, where he worked on the product development team for demand planning, strategic planning, operations planning and workforce planning. He has a Bachelor of Engineering in Electrical and Computer Systems engineering from Monash University. TC is experienced in multiple modern programming languages including Ruby, Python, Java, Javascript, Swift, C# and R. He is also experienced and proficient in technology frameworks like Rails, Django, Scipy, Cocoa, Android and Node.

Zulh Zainudin (Developer)
Zulh was previously a Full-Stack Web Developer at a software house in Kuala Lumpur. He was involved in fast development sprint cycles; managing development across a wide range of industries for international customers. Before that, he was a freelance designer and front-end developer where he designed user-centric web application interfaces for businesses. Other than being deeply into development, he also enjoys working in digital marketing, DevOps, infrastructure scaling & serverless topics and is involved in many local community talks, conferences, and tech workshops. He is a mentor, trainer and organiser for RailsGirls KL and TechLadies KL teams; building and empowering woman software engineers.

Dan Boey (Developer)
Dan completed his BSc in Sound Engineering with 1st Class Honours from London Metropolitan University. He then went on to complete his MSc in Computing Science at Imperial College London, to which he was awarded a departmental scholarship. He has since worked as a Technical Consultant for Lombard Risk in London where he helped in the design and installation of regulatory reporting software for UK and international banks. Before joining HelloGold he worked for BBD Labs, a Kuala Lumpur based Ruby on Rails development house, where he was lead engineer on a number of projects. He has experience with Python, C++ and Java, though his current focus is on Go and Ruby-on-Rails.

Zaim Ramlan (Developer)
Zaim was previously a freelance Full-Stack Web and Mobile App Developer where he designed and developed full-fledged, user-centric web and mobile applications for businesses and individuals. Being very keen on how technology works and his constant exploration through the realm made him the overall Gold Winner for his university's Computer Science Final Year Project. Apart from project development, he enjoys working with User Interface and User Experience (UI/UX), performance optimisation, scaling application infrastructure & building Internet of Things (IoT) and is involved in tech workshops, conferences and community talks. He is also a mentor and trainer for RailsGirls KL; pursuing his quest to contribute his knowledge back to the community.

EXPANSION PLANS

DEVELOPMENT ROADMAP

BUSINESS PLAN

Once the core gold buy/sell/store/transfer mechanism is in place, and scale achieved (thereby reducing marginal costs), there are many uses for the core functionality. The HelloGold team have built a strategy to utilise the core technology and to expand its use in different markets, segments, assets, products with different partners, as well as expand the types of technology used as required.

Not least, this includes expanding the traditional world operations to support the gold backed tokens in the cryptocurrency market. HelloGold are able to immediately adapt the solutions used for the core product (app) and apply these to the crypto market in conjunction with Ethereum smart contracts and ERC20 tokens.

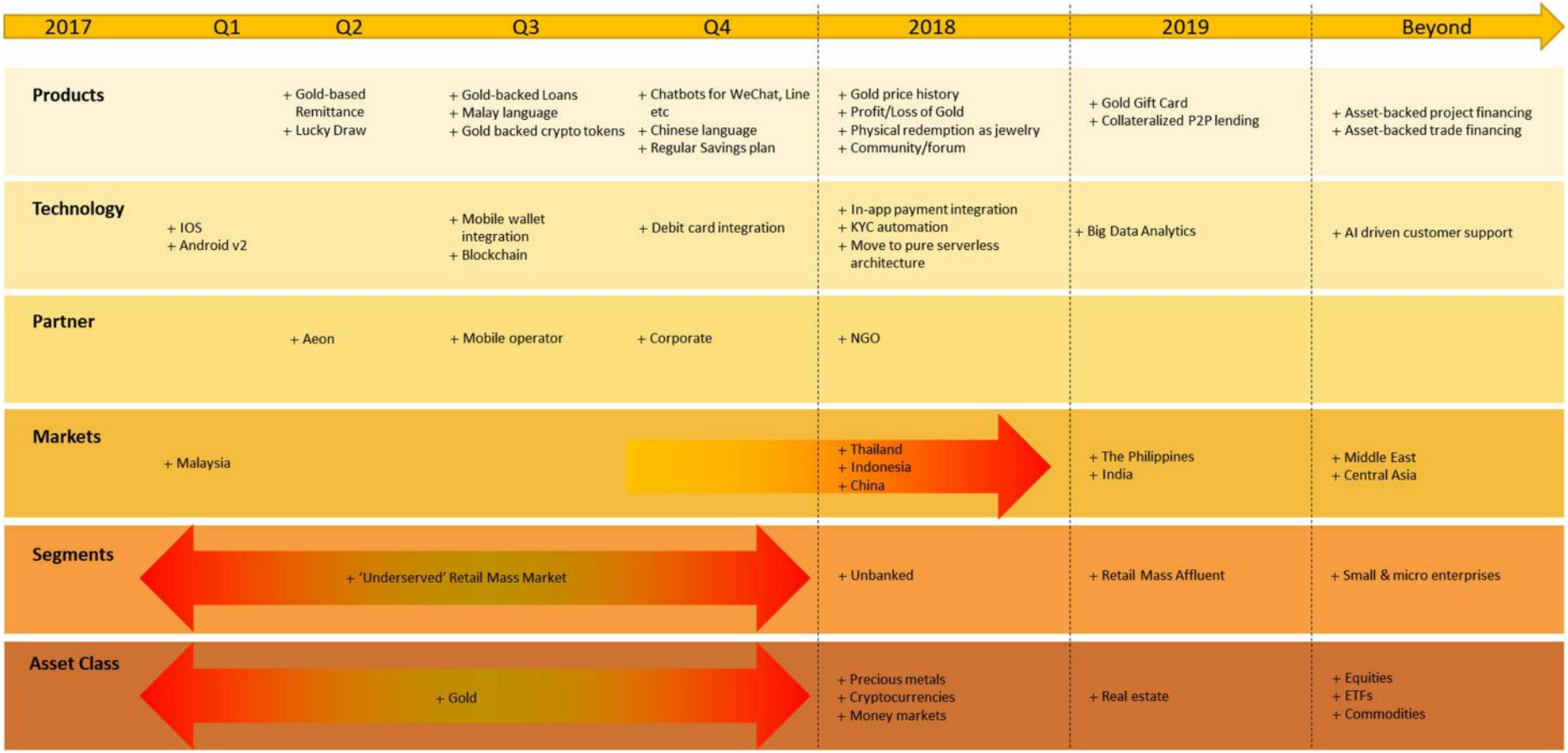
See next page for business roadmap

TECHNICAL DEVELOPMENT PLAN

To support the business roadmap, HelloGold has a high-level technical development plan:

	Stage	**Description**	**Status**
1.	Ideation	Conceptualisation and proof of concept; create architecture, solve key technical problems, set up and interactions	Complete
2.	Beta version development	Android v1 developed with supporting backend for soft (test) launch	Complete
3.	Launch: a. Soft launch b. Full customer launch	*Soft launch* designed to test usability, operational processes, find bugs. *Customer launch* by wave, ensuring scalability of tech and operations	a. Complete b. In progress
4.	Blockchain development	Blockchain 1.0 smart contracts to replace transaction records and some elements of processing	In testing
5.	Iteration and core development	Continuous improvement and development to create better core product, including new functionality, e.g. Android v2 and iOS v1 launched based on feedback/bugs identified during soft launch	In progress
6.	Expansion a. Geographic b. Product	Add product features/functionality and make changes to allow geographical expansion	Not started
7.	Increased automation of development processes and more innovative product features	Adopt more automated product development processes and add new product features that uses more AI, machine learning to optimise app usability and functions	Not started

Business Roadmap



DEVELOPMENT FUNDS

Subject to a successful Token Sale of HGT by HGF, it is envisaged that HGF will give grants to HelloGold to support the development of HelloGold in the following ways:

1. Market expansion
2. Product improvement and technical development
3. Tech team expansion – required to implement 1. and 2.

1. MARKET EXPANSION

The key drivers of HelloGold AUM are number of customers and amount of gold held by each customer. The best way to increase the number of active customers is via expansion into new geographic markets. The grants received from HGF (if any) will determine which markets can be entered, and accelerate the entry into these markets.

Market expansion will require spend in 4 key areas:

1. **In country teams** – Set up and run in-country operations, including local customer service and marketing (language driven)
2. **Tech team** – Scale up the tech team to get in-house specialists and the ability to respond to the challenges of both development and operating in multiple countries. This will include creating versions of the app for different countries (internationalisation inc. language, country specific payment systems, changes caused by different regulatory environments, different cultures, partner requirements etc)
3. **Marketing** – Due to the mass market nature of the product, country specific marketing (style, content, language) is critical to creating product acceptance and take up. Expanding into different countries will require additional headcount for digital marketing (inc social media management in local languages)
4. **Additional overhead**, particularly working capital required for a larger gold float (gold available for sale)

Note: HelloGold's expansion has costs in base/local currency (not crypto) and therefore the ability to accelerate our expansion and grow AUM is determined by the base currency amount raised/equivalent when ETH is released.

HelloGold has a plan to build out the functionality by sectors.

Year 1

Functionality	**Min functionality**	**Max functionality**
App	Existing Native apps	- Redesign for better UX - Greater internationalisation/localisation (parallel development for multiple countries) - Increased security features - More streamlined processes such as account recovery, KYC, etc - More product features - Greater automation (e.g. KYC, redemption and chatbots)
System/Backend	Scale increase only	- Increased security - Additional development to support regional expansion such as: • Integration to regional financial systems/regulations • Region specific currency, gold unit and fee structures, if required • Other region-specific product features - Code/System refactoring for purposes of optimisations and reducing technical debt as required - More process automation of design, build, test and deployment tasks
Blockchain	- v1.0 smart contracts - Gold backed cryptocurrency (GBT)	- Explore use of alternate blockchains, or modifications to Ethereum to improve response times (Private Net) - Development of document blockchain to store data (user/customer data blockchain) (Private blockchain) - Explore the use of private side-chains for accountability
Infrastructure	Scale increase only	- Improved redundancy - Reduced latency - Improved security - Servers running across a number of independent service providers, e.g. Azure/AWS/Google cloud etc. - More automation for better QC and coordination of feature rollout across different regions
Customer/Product Features	- Regular saver plan - Payment options* - Loan product - Lucky draw - Remittance	- Recoverable wallets (vs current recreation of keys and migration of funds) - Big Data Analytics to support Machine Learning to better tune our product offering

	- Gold leasing - Under 18 savings	for users and for other detection algorithms such as fraud detection, etc.
Testing	Raw testing tools only for smart contracts	- In-house automated testing functionality inc. contract testing - Publication of smart contract testing tools
Support/Resilience	Support provided by Dev team	- Round the clock support teams that monitor and provide first-line support of common issues - High Availability active-active nodes that provide maximum uptime - Self-diagnostic health check system with the ability to provide early warning alerts of potential problems

*Extended payment options include debit card, bank payment systems, tenpay, alipay, mobile wallet and crypto-currency exchange integration.

Year 2 and 3
The focus for 2018 and 2019 will be as per the *Business Roadmap*, with a focus on expanding into new markets (Indonesia, China, Philippines) and new products.

HelloGold will develop a detailed 'use of funds' prior to undertaking any new financing, including but not limited to the receipt of any future grants from HGF.

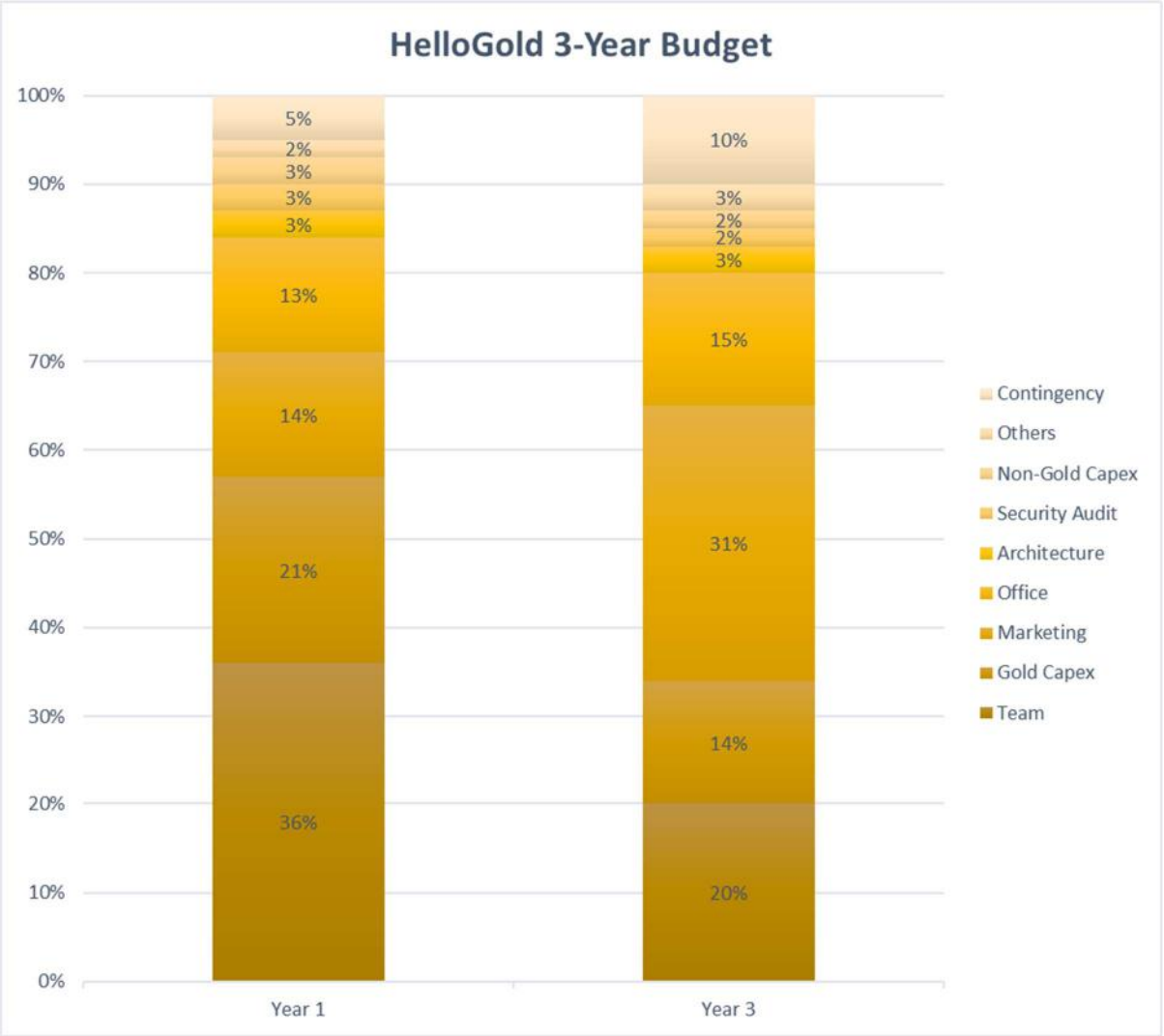
3. TEAM EXPANSION

HelloGold would like to be able to expand the technical team to support the development roadmap both in terms of markets entered, technical features and product functions. Currently the team are technical generalists who are applied to solve all the technical problems HelloGold encounters. Ideally we would like to bring more capability in-house, to increase responsiveness/speed to market and control/quality, and get specialists (to ensure best practice):

1. In house app developers, both Android and iOS
2. Systems engineers for core Ruby and Go infrastructure
3. Blockchain team – reduce key man risk and have ongoing smart contract development
4. Specialist technical in-house testing, including ability to write automated test scripts as well as manual testing. Security testing would remain an outsourced function
5. Dev Ops to manage the transition from development to operations
6. Tech Ops team to support product operations/customer service, reducing the time/distraction on developers (both app and systems engineers)
7. Business Analyst, Product Development Lead, Technical Architects and Technical Writers to provide more streamlined development and better documentation of common architecture/processes.
8. Technical marketing support. As marketing becomes increasingly technical (e.g. in app analytics tools, push notifications, tracking, social media etc), the skill set required for marketing becomes more technical. Rather than relying on the development team (or even Tech Ops) to provide this technical support, HelloGold would like to build a team of technical marketing specialists to drive the growth in AUM.

HelloGold has produced an expected operating budget based on anticipated Year 1 and Year 3 spend.

HelloGold 3-Year Budget



The change in percentage of each segment between Year 1 and Year 3 reflects the relative costs of expanding into new markets.

Team covers employment (staff) costs. HelloGold will expand our tech team and set up operational and marketing staff in new markets. The team cost as a portion of total reduces over time, as HelloGold will be able to benefit from scale.
Gold Capex is the working capital cost of buying and storing gold reserves. With increased scale, the gold reserves will make up a smaller portion of total costs compared to setting up operations in new markets.
Marketing covers direct to market activities, supporting integration with business partners, and promotions. As HelloGold enters new, larger markets we will increase our marketing spend accordingly.

Office includes expenses used to run HelloGold offices and related administrative costs, more people in more locations leads to increased spend.
Architecture refers to the cost of maintaining and improving tech systems, including mobile development and web services.
Security Audit means third party auditing of HelloGold systems.
Non-Gold Capex covers fixed assets including computer and mobile phone hardware.
Other captures all other third party fees including legal services, Shariah advisory and licensing.
Contingency is calculated as a percentage of the total budget. Over time, HelloGold will allocate more finances towards this fund (up to 10%) as the bigger expansion plan will have greater uncertainty and more "unknown unknowns" which may require funds.

USE OF FUNDS

Depending on the funds raised by HGF, HelloGold will be able to accelerate the market and product (functionality) expansion plans with a larger tech team.

Funds Raised	Min Cap: ~USD 1,000,000	USD 5,000,000	Max Cap: ~USD 9,600,000
Market			
Thailand	Q1 2018	Q1 2018	Q1 2018
China	Q1 2019	Q1 2019	Q1 2018
Indonesia	Q1 2021	Q1 2020	Q1 2019
Philippines	Q1 2021	Q1 2020	Q1 2019
Functionality			
App	• Existing native apps	• Redesigned native apps for better UX • Greater localisation in each market • Increased security features • More product features	• Redesigned native apps for better UX • Greater localisation in each market • Increased security features • Even more product features • More streamlined processes (e.g. KYC, account recovery) • Greater automation (e.g. KYC, redemption and chatbots)
System	• Increased security • Scale increase only	• Increased security • Integration to regional financial systems/ regulations • Region specific currency, gold unit and fee structures, if required	• Increased security • Integration to regional financial systems/regulations • Region specific currency, gold unit, fee structures and other product features, if required • Code/System refactoring

Funds Raised	Min Cap: ~USD 1,000,000	USD 5,000,000	Max Cap: ~USD 9,600,000
			• More process automation of design, build, test and deployment tasks
Blockchain	• v1.0 smart contracts • Gold backed cryptocurrency (GBT) • Development of document blockchain to store data (user/customer data blockchain) (Private blockchain)	• v1.0 smart contracts • Gold backed cryptocurrency (GBT) • Development of document blockchain to store data (user/customer data blockchain) (Private blockchain)	• v1.0 smart contracts • Gold backed cryptocurrency (GBT) • Development of document blockchain to store data (user/customer data blockchain) (Private blockchain) • Explore use of alternate blockchains, or modifications to Ethereum to improve response times (Private Net) • Explore the use of private side-chains for accountability
Infrastructure	• Improved redundancy • Improved security • Scale increase	• Improved redundancy • Reduced latency • Improved security	• Improved redundancy • Reduced latency • Improved security • Servers running across independent service providers (e.g. Azure, AWS, Google cloud) • More automation for better QC and coordination of feature rollout across different regions
Product features	• Regular saver plan • Loan product • Lucky draw • Remittance • Gold leasing • Under 18 savings	• Regular saver plan • Loan product • Lucky draw • Remittance • Gold leasing • Under 18 savings • Recoverable wallets (vs current recreation of keys and migration of funds) • Chatbots •	• Regular saver plan • Loan product • Lucky draw • Remittance • Gold leasing • Under 18 savings • Recoverable wallets (vs current recreation of keys and migration of funds) • Chatbots • Big Data Analytics/ Machine Learning

Funds Raised	Min Cap: ~USD 1,000,000	USD 5,000,000	Max Cap: ~USD 9,600,000
			• Gold gift cards • Jewelry redemption • P2P lending
Testing	• Raw testing tools only for smart contracts	• In-house automated testing functionality inc. contract testing	• In-house automated testing functionality inc. contract testing • Publication of smart contract testing tools
Support	• Support provided by Dev team	• Round the clock support teams that monitor and provide first-line support of common issues • High Availability active-active nodes that provide maximum uptime	• Round the clock support teams that monitor and provide first-line support of common issues • High Availability active-active nodes that provide maximum uptime • Self-diagnostic health check system with the ability to provide early warning alerts of potential problems
Team	• Blockchain developers • App developers	• Blockchain developers • App developers • System engineers • Technical marketing specialists • Technical testing specialists	• Blockchain developers • App developers • System engineers • Technical marketing specialists • Technical testing specialists • Dev ops • Tech ops • Business analysts • Product development • Technical architect and writer

Community Support

As part of the Token Sale, HGF has set aside some tokens as a community fund to say thank you to some of the people running unpaid services, who put in large amounts of time that the rest of the community don't see, and the rest of us taking them for granted. This will be distributed to causes determined by HGF membership after the Token Sale.

REPORTING

Project Plan
HelloGold intends to produce a written update on each fortnight on progress towards the expansion goals outlined in the 'Development Funds', and announce when significant milestones are reached. This will be in the form of a blog on Medium, covering both technical and business issues.

AUM reporting
The key metric required to measure success is AUM held by HelloGold. As outlined in the *Token Sale Information Sheet*, it will be possible to view the amount of AUM held by HelloGold via multiple mechanisms, including the publication on HelloGold website showing anonymised customer balances and gold held in storage by HelloGold on behalf of customers. This information is automatically updated each day and can be found at https://www.hellogold.com/how-it-works/ (scroll down to Security). Once the smart contracts are live and the blockchain explorer in place (securely) this will enable further direct, real time verification. Additionally, HGF will publish supporting material each month to show the calculation behind endowment level and the GBT released that month.

These updates (or links to the source) will be posted on the Token Sale channels listed below.

FURTHER INFORMATION AND CONTACT DETAILS

HGF/Token Sale channels
HGF can be contacted directly via the following public channels relating to Token Sale:

Slack channel	https://myhellogold.slack.com (Primary channel)
Medium	https://www.medium.com/hellogold
HelloGold Foundation	http://www.hellogold.org
Email	Foundation@hellogold.org

HelloGold product channels
HelloGold company marketing channels can also be viewed via the following links:

HelloGold website	https://www.hellogold.com/
LinkedIn	https://www.linkedin.com/company/hellogold
Facebook	https://www.facebook.com/myhellogold/
Twitter	https://twitter.com/myhellogold
Instagram	https://www.instagram.com/hellogold.my/
YouTube	https://www.youtube.com/channel/UCnRFwb_BSJJQQiAifJJ_6dw/

Technology review
Additionally, draft smart contracts can be reviewed here:
https://github.com/myHelloGold/Foundation

Android and iOS apps are available in the Play/App store respectively. Due to the KYC/AML take on process, the HelloGold app currently requires a Malaysian MyKad for identity verification and entry to use the app functionality. For non-Malaysians who would like to view a demo version of the app, an Android version can be https://www.hellogold.org/code-review.html including instructions on how to clear the verification steps. Please note that the demo app has test accounts only and include automated elements; no real cash/gold will be transacted. For iOS users, please use an Android simulator on your laptop to view this APK.

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