MOJALOOP PI-18 WRAP UP

Thank you to everyone who was able to participate in our last day of interactive sessions and wrap up our PI-18 Mojaloop Community Event.
We greatly appreciate all the organizers, sponsors, speakers, and participants who made this a very successful and first-ever HYBRID event!

Below are the cumulative Meeting Notes & Wrap-up

Link Reminder

- Presentations: https://github.com/mojaloop/documentation-artifacts/tree/master/presentations/pi_18_april_2022/presentations *(also included as hyperlinks below)*
- Slack Discussion: https://mojaloop.io/slack

Planning and Mojaloop History

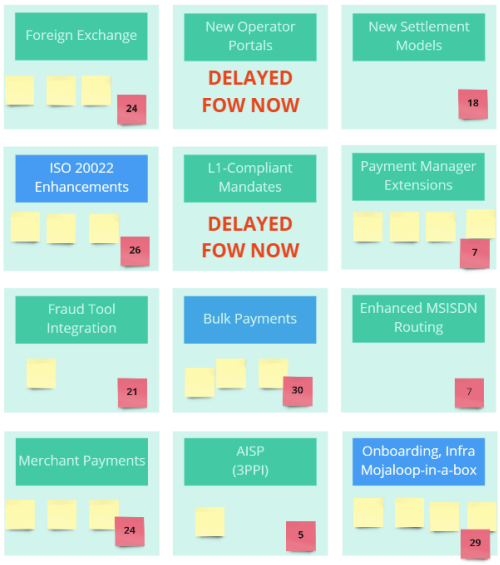
- **Kim Walters**
- ***Save the dates for our upcoming Community Events:***
  - PI 19: July 26th, 27th & 28th, 2022 (3 days 11:00 – 17:00 UTC) Remote
  - PI 20: October 24th, 25th, 26th & 27th 2022 (4 days 10:00 – 17:00 EAT/07:00 – 14:00 UTC) Zanzibar, Tanzania & Remote
- Timeline/Background
  - The LevelOneProject engineering effort kicked off in Seattle in Q3 2016
    - Sponsored by the Bill & Melinda Gates Foundations
    - Participants included: Dwolla, The Software Group, Ripple, ModusBox, Crosslake
  - Mojaloop Branding in Q3 2017
- Approach to Planning & Development
  - Run as Scaled Agile Framework (SAFe)
  - PI = Program Increment
    - Meet quarterly for planning
    - Spend the next 13 weeks business requirements (user stories), development, testing, documentation
- Why Open Source?
  - Open source licensing encourages innovation through collaboration.
  - Open Source (w/ the right community is):
    - Cost Effective
    - Highly Reliable
    - Scalability
    - Secure
    - High Quality
  - Without it, many of the technologies we take for granted today would never have developed

Roadmapping

- **Paul Makin**
- Roadmap Discussion Items:

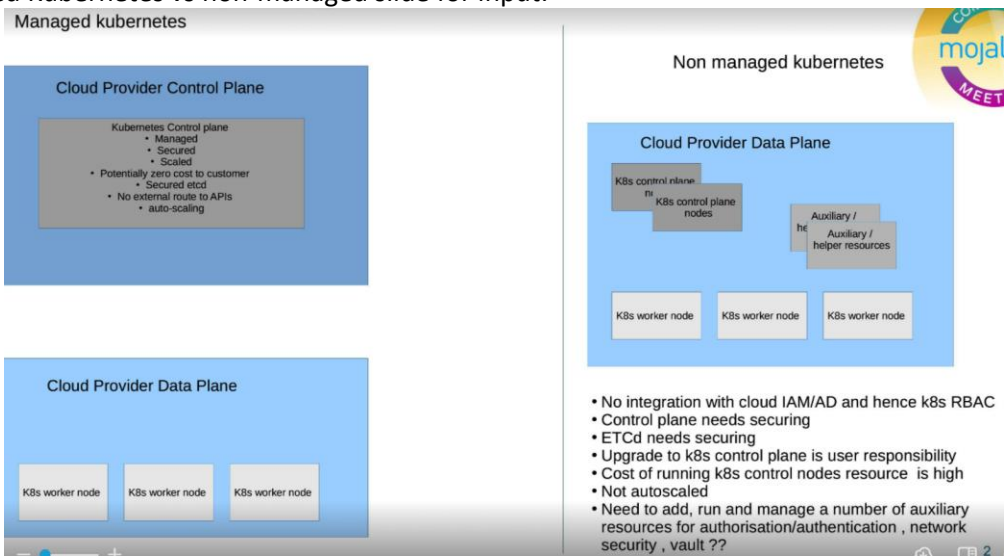
- Foreign Exchange Support - *agreement*
- ISO 20022 Enhancements - *agreement*
- Fraud Tool Integration – *discussion of why this should be open source, and moved to backlog*
- Merchant Payments - *agreement*
- Enhanced MSISDN Routing - *agreement*
- New Operator Portals – ***delay, not a priority right now***
- L1-Compliant Mandates – ***delay, not a priority right now***
- Bulk Payments – *agreement and add support G2P/ECT potentially*
- PISP (AISP) - *agreement*
- New Settlement Models- *agreement*
- Payment Manager Extensions - *agreement*
- Onboarding, Infra & DevOps (Mojaloop-in-a-box/MiniLoop) - *agreement*

Voting Results:

- Miro Board: https://miro.com/app/board/uXjVOV9bp-I=/?share_link_id=352493844440
  - 

Workstream Reportouts

- Top Three
  - ISO 20022 (Michael)
    - Objectives:
      - Proposed the Formation of an interest group
      - Clear statement what the business justification for a specialized set of messages
        - Productive working group
        - Produce sufficient material that ensures the business justification has approval from the Mojaloop Foundation and from a wide variety of interested and expert parties
      - A detailed review of messages and deltas
        - Look at definitions of individual message
        - Implications of message structure, authentication, etc..

        - Confidence Vote = 4
    - Bulk Payments (Sam)
        - Objectives:
            - Implement bulk support – short term strategy
            - Disaggregate bulks at PM or switch - Design decision (functionality designed)
            - PCO, G2P, ECT
            - Gather requirements: Bulk payment portal for FSPs:
                - ALS Lookup
                - ALS Registration
        - Risks: Support from the community, funding
        - Confidence Vote = 4.5
    - Onboarding (Lewis)
        - Objectives:
            - Local one click install - For developers, disposable, kick the tires, 8GB ram
            - Functionality matrix for each type of environment
            - Clear statement from the business group of whats needed
        - Risks: Resources, scope creep
        - Confidence vote: 4.5
    - Managed Kubernetes vs non-managed slide for input:
        - 

- What Next
    - Deeper PI-Planning next week
    - **Get involved in the workstreams! Review SLACK Channels!**
        - Bulk Payments – Paul Makin paul.makin@modusbox.com
        - Onboarding – Lewis Daly lewisd@crosslaketech.com
        - ISO 20022 - Michael Richards michael.richards@modusbox.com
        - Reference architect / v-next - Pedro Barreto PedroB@crosslaketech.com
        - 3PPI - Samuel Kummary sam@modusbox.com
        - Foreign Exchange – Paul Makin paul.makin@modusbox.com
        - Merchant Payments – Paul Makin paul.makin@modusbox.com
        - Other questions - Kim Walters KimW@crosslaketech.com

Awards & Closing

- **Simeon Oriko**
- Mojaloop Community
    - Mojaloop total participants – 2294
    - Active Participants – 1,196 (up 75%)
    - Active Users:
        - GitHub, Slack, Discourse
    - Orbits – how we view our Community
        - Orbit 0: Team (Simeon/Megan)
        - Orbit 1: Builders (very high love for the community, known to the members, lead large groups/workstream)
        - Orbit 2: Contributors (higher impact roles, giving talks, advocating for Mojaloop)
        - Orbit 3: Participants (onboarded, established a track record, writing documentation)
        - Orbit 4: Explorers (read blogs, attend meetings, passively interested)
    - Q1 2022 Orbits:
        - Builders: 20 (increase of 66%)
        - Contributors: 36 (increase of 78%)
        - Participants: 93 (increase of 74%)
- Awards & Congratulations
    - Active Community Members
        - **Miguel de Barros**
        - **Kevin Leyow**
        - **Samuel Kummary**
        - Vijay Guthi Kumari
        - Michael Wagener
        - Michael Richards
        - Shashikant Hirugade
        - Lewis Daly
        - David Fry
        - Pedro Barreto
    - New & Promising Team Members
        - **Donald Bartlett**
        - **Wintei**
        - **Emmanuel (Re Konnect)**
        - Mohammed Alnozili
        - Sam George
        - Maha Abdulaziz
        - Patrick Delcroix
        - Chtourou Khaldoun
        - Musa Ndow
        - Dushime Renez Fabrice

Thank you!!

Kim Walters

Mojaloop Engineering Director

mojaloop foundation

From: Kim Walters <KimW@crosslaketech.com>
Sent: Wednesday, April 27, 2022 9:15 PM
Subject: Mojaloop PI-18: Day #3 Wrap-up

Thank you for another exciting and productive day in Arusha and online. Please join us for our last day at 10am and come ready to discuss your business and technical requirements for Mojaloop and help plan the next phase of the Mojaloop Open Source project.

Mojaloop Releases & Core Maintenance

- **Sam Kummary, Miguel de Barros**
- Goal: publish Mojaloop releases v13.1.0 and v14.0.0 with major changes packaged; support contributions to Mojaloop
    - Mojaloop v13 published - completed
    - Mojaloop v14 published – in progress
    - Define release cadence, document upgrade strategty - done
- Release notes: https://github.com/mojaloop/helm/releases
    - Release v13.1.0 Release · mojaloop/helm · GitHub
    - Release v13.1.1 Release · mojaloop/helm · GitHub
- TTK update
    - MTP TTK course ✅ [Feedback welcome]
    - TTK GP collections support CGS, DMLNS ✅ (used to be separate)
    - TTK variables parameterized ✅
    - TTK 3PPI tests - validated ✅
    - Support for teams that have adopted TTK (or in the process of adopting) ✅
    - Feature to support 'async' APIs to be onboarded through UI ✅
    - Minor issues in callbacks, UI fixed ✅
    - Option to break a test-case in case of error ✅
    - Check-box to disable requests

Infrustucture as Code (IAC)

- **David Fry**
- Different Use Cases: Developer, mini loop, sandbox, vendors, etc
- IaC History:
    - Sandbox has evolved
    - Started w/ AWS but goal is to be cloud agnostic
- Iac Principles
    - Open Source, Cloud Agnostic
    - Sandbox, Fit for purpose
    - Pluggable arch to achieve multi-cloud capability including bare-metal
    - Lower resource requirements

    - Elimination of manual steps (95% automation goal)
    - Provide upgrade path for components
- Components: bootstrap provides tenancy components for base networking; Environmental IaC is layered terraform modules that builds VMs; afterward, the cloud agnostic components include
    - Hashicorp Vault, Certificate Mgr, External DNS, WS02 ISKM and API (moving to keycloak and ambassador/ORY), Nginx Ingress Controller, HAProzy, Connection Mgr, Bizops Framework (leveraging ORY)
- Status:
    - Creation of Stateful Resources separate from the helm releases that make use of them. a. Kafka b. MySQL c. MongoDB
    - Full removal of manual certificate and DNS provisioning, completed move to a. External DNS b. Cert Manager (using LetsEncrypt and Vault issuers)
    - Moved off of EFK to use Loki along with Grafana stack
- Next Steps
    - Make cloud provider choice pluggable
    - Move from WSO2 ISKM to Keycloak
    - Move from WSO2 APIM to Ambassador
    - Convert ESP to make use of grafana stac

Helm Charts v14

- **Tom Daly**
- Goals:
    - Take full advantage of Helm's capabilities
    - Separate backend services from Mojaloop charts
        - Best-practice Alignment to Mojaloop's Upgrade Strategy Guide: https://bit.ly/38hfe0q
        - Blog post - Helm & Configuration to Resolve External Dependencies &
    - Improve Upgradability in Mojaloop v14: https://bit.ly/3rOxoO9Mojaloop deployments to support k8s versions beyond 1.21
        - Support latest/future k8s APIs
        - Support for Docker and Containers
    - Cleaner Helm charts and configurations
        - Common templates
        - Flatter more intutitve file structure
    - Alignment to Reference Architectural standards
        - Chart standards: https://bit.ly/3Kb5ulB
        - Charts structures and names are aligned to Ref Architecture
- Status
    - Established charts repo
    - CircleCI pipeline updated
    - BOP charges and account-lookup-service have been added
- Next Steps
    - Migrate charts that support testing capabilities (e.g. testing-toolkit, simulators…)
    - Migrate minimum core-services (e.g. ledger, adapters, quotes…) charts that can be functionally verified using Helm Test

    - Integrate Helm Test verifications into CI-CD (CircleCI) pipeline to ensure chart(s) work against multiple k8s version
    - Complete migration of remaining core-services charts (e.g. settlements…)
    - Complete migration of remaining charts (e.g. bulk, pisp…)

Code Quality and Security

- **Godfrey Kutumela**
- Objectives
    - Continuously improve the Trust (reliability, transparency, privacy, compliance, quality and security) of the Mojaloop Platform and transform our approach to quality and security in line with L1P principle on data privacy and emerging technological trends.
- Delivery Model:
    - Supports both functional and non-functional requirements of the project, working alongside with other workstreams & various governance committees on a shared responsibility Model.
- Approach:
    - Standards and Control Centric – Define and maintain Mojaloop software quality and security standards and guidelines – In certain areas we provide reference implementation whereas for other areas we require certain policies or standards to be adhered to.
    - Risk Centric – Perform risk assessments and threat modelling to identify, validate, classify & prioritize security requirements.
- PI-18 Objectives
    - Fraud and risk management system (FRMS) security review and validation - completed
    - Vulnerability management and DevSecOps process/tool enhancements – on going effort
    - Perform a quarterly open-source software (OSS) scan – completed requiring mitigations
- Planned Enhancements for PI 19
    - Approve the code security standard
    - Implement the code integrity assurance solution on helm charts
    - Implement Github secret scanning and Code QL SAST - as per approved code security standard
    - Document the improved DevSecOps framework for implementors to adopt

OSS FRMS Solution (Actio)

- **Justus Ortlepp, Johannes Foley, Kyle Vorster**
- Actio: An OSS Anti-Financial Crime and Risk Management Solution
    - Actio is an Open Source real-time transaction monitoring platform that can ingest transaction messages in ISO20022 format and evaluate transactions for fraud and money-laundering behavior using 35 pre-configured rules that support 31 pre-defined typologies.
- Actio Context
    - Mojaloop does not intend to interdict a transaction, but a direct route to a DFSP can be provided that can interdict, and faster.
    - Architecture primarily focused on Mojaloop scale, but needs to cope with a small DFSP as well.

    - Data related to the transaction that is required for transaction monitoring is assumed to be supplied within the hub transaction messages.
    - Data that is not available in the hub transaction message, we have architected and tested the ability to collect additional required information from other sources, including the payer and payee DFSPs.
- Delivery Updates
    - Typologies (2 existing + 29 new)
    - Rules (9 existing + 26 new)
    - Entity resolution
    - Data model extension
    - Performance improvements
    - Whitesource scanning
    - Deployment automation
- Project Summary
    - 3 month PoC + 15 months to build
    - 1060 epics, user stories and tasks
    - 5 SMEs
    - 4 architects
    - 2 DevOps engineers
    - 11 developers

Update on Mojaloop on Azure (Microsoft)

- **Greg McCormick, Jason Gregory, Mark Ihimoyan**
- Why is Mojaloop on Azure critical?
    - We will reach a lot more people
    - A lot more options.
    - We get to do a lot of validation and artifacts, paid for by Microsoft.
- A project to make Mojaloop a First-Class Citizen on Microsoft Azure • Microsoft Marketplace • Microsoft Azure Stack
    - A hybrid cloud solution that allows cloud management but uses local resources and therefore meets a countries data residency rules
    - The goal is to optimize performance • Ease of installation and management • ARM Templates for multiple purposes to be created • Leverage Azure Management Portal • Deployment • Active management • Alerting and reporting
- Progress/Completed
    - Pure OSS Baseline Setup in Azure Kubernetes Service (AKS)
    - Stateful components
        - To reduce admin overhead for a switch operator all stateful components will make use of Azure managed platform services. Kafka will be removed from the AKS cluster and services will be updated to make use of either HDInsight or Event Hubs with the later being a far more cost- effective method. • Percona Mysql being replaced by Azure databases for Mysql
    - Scripting Phase 1
        - In the first phase of scripting the components in use so far, will need to commissioned and decommissioned rapidly to not exhaust the project's azure spend budget
    - API Management

    - Scripting Phase 2
    - DFSP Authentication
- In progress
    - Testing Toolkit
    - Scripting Phase 3
    - Documentation
    - Application insights
- Working with the Community
    - The work is well underway
    - Welcome community involvement
    - The intention is not to do anything that will create a fork.
- Motivation
    - Reduce costs
    - Ease deployments
    - Reduce Regulatory constraints

Increasing Demand of L1P and IIPS in the HiPipo Community; Case of Mojaloop, How We Move Forward?

- **Innocent Kawooya, Camillus Namata, Damali Ssali**
- HiPipo (*pronounced Hi People*) is a leading digital age organization with operations covering Digital Innovation, Financial Inclusion, Inclusive finance, Events, Awards and Music.
    - Promote secure digital financial services because of their vital role in promoting financial inclusion.
    - Spearheads financial inclusion advocacy in Africa under the Include Everyone Program. We organize the famous all-inclusive, life-changing initiatives such as; 40 Days 40 FinTechs, the FinTech Landscape Exhibition, Women In FinTech Hackathon, Women In FinTech Summit, HiPipo Music Awards, Digital Impact Awards Africa and the Digital and Financial Inclusion Summit with generous support from the Gates Foundation and other partners.
    - Advocate for digital innovation, #FinTech and #FinancialInclusion.
    - https://www.HiPipo.org/about
- Private Sector Foundation Uganda (PSFU)
    - Founded in 1995 with a vision to enhance business growth and competitiveness for sustainable wealth creation and shared value.
    - Mission: to champion inclusive and sustainable private sector development.
        - Uganda's private sector is the apex and umbrella body, mandated by the government to facilitate private public dialogue and advocate for the private sector.
        - Has over 2million business members represented by 298 business associations, corporate bodies and public sector agencies
        - Local representative of the East African Community (EAC) Business Council and the Common Market for Eastern and Southern Africa (COMESA) Business Council.
    -

Mojaloop Deployment Experience in Myanmar

- **Thynn Win**
- About ThitsaWorks
    - Fin-tech founded in 2016
    - Based in Myanmar, Singapore (SFA certified)
    - 45+ members
    - 3 international partners (Modusbox, Musoni and Mifos)
- Our mission is to power financial inclusion. We would like to be one of the forces that transform the societies where many of them have limited or no access to credits or financial literacy to break the vicious cycle and empower them to rise out of poverty.
- Solutions
    - Microfinance Credit Information Exchange
    - WynePay
    - Digital learning platform & apps
    - Core banking software & support service
- WaynePay Journey
    - Friendly User Testing
    - Closed User Group
    - Live
- Deep dive on the Implementation Journey
- Next Steps
    - Closed User Group (CUG)
        - Harden security; Spread the knowledge; Stabilize the infrastructure; Additional scenarios (bulk disbursements, electronic cash transfers (ect)
    - Live - Full scale launch;
        - Develop DFSP portal; Implement fee settlement, Integrate with settlement bank, Streamline report generation process
        - Additional Scenario: P2P
- Suggestions
    - Stabilize and drive adoption
    - Test for live
    - Involve Users
    - Share knowledge

Myanmar Mojaloop Deployment (Hub Operator's Perspective).

- **Pyae Phyo Lwin**
- Preparation for Deployment
    - Hub Ops Team Preparation
        - Setting up organization structure
        - Preparation of JDs
        - Recruitment
        - Training
    - Initial phase: Project kickoff meeting, Set up weekly calls, Discuss business flows, Explain Mojaloop APIs
    - Development: Try out DFSP APIs, Map data fields, Produce specification doc, Set up VPN connection, Develop core connector, Create test plans
    - UAT & Go-live: Set DFSP users with PM4ML accounts, Provide training on PM4ML, Conduct integrated testing, Conduct end-to-end testing

- Preparation for Settlement
    - Prepare Settlement process work flow
    - Arrange a meeting with DFSP to explain Settlement process
    - Support DFSP to open the liquidity account at Settlement bank
    - Request the contact information of DFSP
    - Create the user account in Document Management System for keeping the settlement reports
    - Open a communication channel with each DFSP as well as Settlement bank (Skype or Viber is most commonly used)
- Preparation for Customer Support
    - Develop Support Service Workflow (SLA agreement, support flow diagram, support level etc.,)
    - Develop Dispute Management Process (Dispute principals, scenarios etc.,)
    - Prepare Dispute Report Specification and Format
    - Develop Risk Management document
    - Create Service Desk
    - Prepare Service Desk User Guide
    - Train DFSPs how to use Service Desk
    - Open communication channel with DFSPs (Skype)
- Lessons learned from FUT
    - Onboarding lessons learned:
        - Failed transactions deduct money (loan or fees/charges or both)
        - Some wallet cannot show third-party error message and difficult to trace the root cause
        - VPN configuration issue due to the current situation in Myanmar
        - Some wallet account creation can be difficult and complicated
    - Settlement lessons learned (Finance Portal)
        - Need to analyze and finalize report format before development to avoid manual processes.
        - Need to check if DFSP liquidity account details are included in the settlement bank report.
        - Settlement bank must inform the hub operator if there are any changes in liquidity balance (adding or withdrawing).
        - Avoid deleting “Manager” role for user access. If there is no other user as “Manager”, then the permission need to be added via backend to reclaim the access
    - Customer Service lessons learned
        - Most issues are “Refund cases” and refund process must be clarified with each DFSP
        - Wallet Specifications
        - NDC (Net Debit Cap) issue – insuffient liquidy balance
        - Bad Request issue - Certificate expired
        - Communication with Clients (MFIs)
- Next steps
    - Currently, only repayment use case. Disbursement and P2P use cases must be prioritized.
    - Report generation must be simplified with one click to push relevant reports to respective DFSPs as well as to settlement bank(s)

    - Document management system used by WynePay should be replaced by DFSP portal
    - API integration with Settlement bank(s)
    - Proper Dispute management system to solve dispute more efficiently

Payment Hub EE

- **Ed Cable, Istvan Molnar**
- Mifos Payment Hub Updates: Enabling Upstream Innovation on an Open Payment Orchestration Engine
    - Open Source Building Blocks for Core Banking & Payment Orchestration
    - End to End Open Source Architecture for DFS
        - OS Payment Switch - Mojaloop | OS Bridge – Payment Hub
        - OS Account ManaĀement - Mifos/Fineract | OS Reference Mobile Apps - Mobile Wallet/Banking
- Payment Hub
    - Integration
        - Ease of integration & Connects Financial Institution channels (Mobile, Internet, Branch, Callcenter, ATM, POS, API Gateways) ○ Account Management Systems (AMS / Core banking platform), optionally fraud monitoring tools ○ Payment Schemes, such as Mojaloop
    - Orchestration
    - Operational Controls
    - Analytics
- Benefits: Extensible, Scalable, Configurable, Practical
- Accelerates DFSP adoption
- Payment Hub EE Architecture
    - Built on proven open source technology:
    - Java, SpringBoot, Kafka, Elasticsearch, Apache Camel, Camunda Zeebe, Kubernetes Logical structure: ● Realtime engine, with microservices, and microservice orchestration for stateful process management ● Asynchronously separated audit log collection, and operations UI for payment operators manual intervention and automated reconciliation
    - Support multiple deployment modes
- Changes
    - New deployments
    - Demonstrating production-grade readiness
    - Enhancements to Operations UI
    - Message gateway support
    - Monitoring Dashboards via Kibana
    - Improved Deployability via Helm Charts
    - Bulk Payment Pre-Processing
    - Additional Payment Connectors
- Roadmap
    - Integrate with FARM service at DFSP level
    - Mojaloop Bulk Payment API Integration
    - Mojaloop PISP API Integration
    - Developer other payment and core banking system connectors
    - Advance other use cases in Africa

    - Stand-in Capabilities
- Links:
    - Browse the Docs: https://mifos.gitbook.io/docs/payment-hub-ee
    - Explore the Code: https://github.com/openMF?q=ph-ee
    - Discuss on Slack: https://bit.ly/3eMoVS1
    - Request Access to the Lab: https://mifos.gitbook.io/docs/payment-hub-ee/overview/lab-environment

Offline Transactions: Introducing Payala and how to integrate with Mojaloop

- **Julian Finn**
- Who are we?
    - Financial Empowerment Partners • US-Based private sector company • We're experts in cybersecurity, finance, public policy • We have real world operational experience • We developed Payala
- Payala Overview
    - Peer to Peer Payment system. Secure, resilient, inclusive • Works in intermittently offline scenarios • Designed for challenging environments • Designed to help ease liquidity availability problems • Designed for low cost and light infrastructure footprint
- How Payala works
    - Every user holds a smart card
    - Smartphones act as terminals / transport layers
    - Three different transaction modes, depending on connectivity (Remote • Local and Online • Local and Offline)
- Integrating with Mojaloop:
    - Right now: Closed policy. • Payala should stay that way, but attach to Mojaloop • Monies need to be kept separate
- Financial Integration
    - Money Separation • Offline Transfers and Eventual Sync • Cashing Out
- Money Separation
    - Mint funds: Monies reserved by FSP until loaded onto Smartcards • Funds minted into Payala are held in escrow accounts • Ensure offline transfers never result in a negative balance
- Offline Transfers and Sync
    - Transfers made offline are stored on payer and payee smartcards • Opportunistically synced once connectivity restored • Limited Use Keys prevent duplicate spend • Offline amounts can be constrained
- Cashing OUT – reverse w/ fixed fees and auto-accepted transactions
- Our Ask
    - Open to discuss: julian.finn@financialempowermentpartners.com
    - Pilot in Timor-Leste w/ great results
    - Looking for partnerships

From: Kim Walters
Sent: Tuesday, April 26, 2022 5:51 PM
Subject: Mojaloop PI-18: Day #2 Wrap-up

Day #2 of the **Mojaloop Open Source Community Event** was another success.
Thank you for the participation of everyone in Arusha and online. We look forward to seeing you again tomorrow at 10am EST.
The links and wrap-up for today are below:

Links:

- PI-18 Agenda: https://mojaloop.io/decks
- Presentations: https://github.com/mojaloop/documentation-artifacts/tree/master/presentations/pi_18_april_2022/presentations

Community Reflections and Directions

- **Simeon Oriko**
- Community Mgmt
  - Growth, Governance, Engagement and Strategy
- 2020 Community Council (CoCo) Objectives
  - Transition from funded development to open source
  - Mojaloop vNext
  - Incentive and Recognition
- Directions
  - Infrastructure – resolve bottlenecks/issues – Get Mojaloop on Azure
  - Payments Mgr – need ongoing resources for support
  - Vanilla Mojaloop – help to define and support
- Get Involved!!!
  - Simeon Oriko soriko@mojaloop.io – Community Manager
  - Samuel Kummary sam@modusbox.com – Community Council (CoCo) Co-Chair and CCB Convener
  - Michael Richards michael.richards@modusbox.com – Change Control Board (CCB) Chair & Design Authority (DA) Chair

vNext Build Progress Update

- **Pedro Barreto**
- Reference Arch Documentation Updates
  - Last PI we released the Reference Architecture Documentation
  - Currently working on fixes and improvements (diagrams replaced with higher quality updated snapshots)
- VNext Build Progress Updates
  - vNext Build initiative is the programming of the future Mojaloop generation, which incorporates the learnings and design of the Reference Architecture exercise.
  - Alpha release
    - Internal release for developers
    - Stable interfaces
    - Happy path only
    - Fully testable
    - Requires load tests, but no optimization
- Phases:

    - Design phase - designed the structure of the implementation in accordance to the reference architecture – a significant part of this was done already during the reference architecture sessions. (***done***)
    - Build phase - The building of the foundation and the cross cutting concerns (***in progress – almost finished***)
        - Setup of repositories, preparing the infrastructure and the CI/CD pipelines.
        - Build of the cross-cutting concerns, this is the stage we currently finishing.
    - Testing phase – Develop the happy path code for the main use cases. That's transfers, accounts and balances, participant lifecycle management, quotes, the interop API, etc. (***not started)***
- How does vNext Work?
    - Platform configuration
        - Central configuration management for the platform
        - Each application will register what it needs to run, and a central mechanism allows authorized operators to see the operational values and make changes.
    - Bootstrap
        - When a new version of a Mojaolop app or service is released - it sends to the central service a schema that identifies all the configurable the application needs
        - This schema includes configuration descriptions and defaults, and configurable items can be parameters, feature flags and secrets
        - Once this schema is received, the central platform configuration is able to expose the configurable for an operator to adjust via a UI or directly through the API...
    - Operator Changes
        - When configurations change, an event is published, so interested applications can apply the new configuration.
        - Each configuration change triggers a generation number, that is monotonic and can be used to track changes
    - Application Start
        - This mechanism allows' operators to have a single place for all configuration changes and a place to see all current and past configurations.
        - It is also for developers, who can easily build new applications and modules using these services and client libraries.
    - Event of RPC based logging/auditing
        - Logging captures the details of how something happened, not the what, but the how (Logs are only interesting for programmers and system operators)
        - Auditing is about who did what and when. It's useful to auditors or anyone interested in knowing domain facts or events, such as that a transaction happened or a participant change was approved
    - Create reminders - allows applications to register time based reminders centrally. One shot or recuring.
    - Trigger reminder – the scheduling service will send an http request or publish event with payload
    - Authentication – JWT with: Access token + refresh token (claims, metadata, payload)
        - Complex design with access, permission, groups and roles.
- **Links**
    - Official Ref Arch Doc Page: here

    - Ref Arch Working Doc: here
    - Ref Arch Miro Board: here
    - Next version build plan working doc: here
- **We STILL need developers willing to work on this effort**
    - Reach out to Pedro Barreto PedroB@crosslaketech.com to volunteer or learn more

Business Operations Framework

- **Paul Baker**
- What is the BizOps Framework?
    - A structure that promotes community collaboration in building experience layers and best operational practices, and a model for building out UX for Hub operators
- Supporting remote development
    - Extend IaC (Infrastructure as Code) to deploy public and private reports
    - Report developer environment
    - Report Developer Guide | Mojaloop Hub Operations Framework Documentation
    - Added helm tests to test the reports
    - Extend IaC to run helm test from a pipeline
- Supporting WynePay CUG (close user group
    - Validated the framework to get a MVP (minimum viable product) for a scheme and made it work for the WynePay CUG
    - Included UI/report extensions, experience layer for audits, settlement account audits, participants' lifecycle audits
- Framework maturity and standardization
    - RBAC deployment helm tests
    - IaC and deployment testing integrations
    - CI/CD functional automated testing
    - IaC integrations
- Roadmap:
    - PI17: Reaching MVP, Maturity and Standardization, Report dev guide - completed
    - PI18: Settlement BC, Payments Mgr (report integration), Maturity and standardization

An ISO 20022 Version of Mojaloop

- **Michael Richards**
- ISO 20022 is an emerging standard for electronic data interchange between financial institutions.
    - It describes a metadata repository containing descriptions of messages and business processes, and a maintenance process for the repository content.
- ISO 20022 Objectives:
    - “To enable communication interoperability between financial institutions, their market infrastructures and their end-user communities.”
    - … and to offer a “single standardization approach (methodology, process, repository) to be used by all financial standards initiatives.”
- Differences/Challenges:
    - ISO 20022 data modeling assumes that institutions will interact with images of themselves.

    - Mojaloop wants to provide services that alleviate the burdens of interacting with very different types of institutions.
- Progress
    - Mojaloop has been accepted as an active member of the ISO 20022 community.
    - Provided initial analysis of the current ISO 20022 message catalog in the context of Mojaloop's requirements
        - Some message types are missing entirely. Message types are superficially appropriate, but have a very different semantic context, which rules them out for our purposes. Message types provide part of the functionality which Mojaloop requires in a particular area, but are deficient overall. Message types where we would like to align, but which present semantic problems.
    - Proposed a set of messages which were closely aligned with the existing FSPIOP API (and its family)
- An ISO 20022 Business Justification
    - If accepted – followed by an evaluation period
    - The results of the evaluation are reviewed and (hopefully) approved by the appropriate Standards Evaluation Group(s) and by the Registration Management Group.
- Market Practice Document
    - A self-published document
    - Describes how to execute use cases in an ISO 20022 Mojaloop – which messages to use and needs to be complete
    - Ideally, we will create a ***template*** Mojaloop Market Practice Document
- Develop a different working group
    - Need expertise with interoperable payments experience but it needs to be independent from the Mojaloop effort
    - If there is anyone interested in taking part in the evaluation process for this business area (which we're currently defining as "Instant Payments for Financial Inclusion"), then please get in touch with (Michael.Richards@ModusBox.com)
- Ideal Scenarios/Outputs
    - Anyone should be able to use an ISO 20022 message set to transfer funds from a bank in Los Angeles to a relative in Mbuye, Rwanda.
    - The bank shouldn't need to know what kind of institution holds a relatives (actually, it's MTN) … or that it will be communicating with MTN via a Mojaloop scheme.
    - There is nothing in the message about:Address resolution, Settlement & Routing
- ISO messages are a *monologue*; **Mojaloop messages are a *dialogue*.**
    - Mojaloop messages are *connected* with each other; It's one of our principles that each message should contain all the information the recipient needs to act on it…
- Potential Changes
    - Changes to the data model
    - Using the Supplementary Data structure
    - The Market Practice Document
- Next Steps
    - Re-submitted the business justification
        - Link: https://docs.google.com/document/d/1XpUM3rct713gG-md_fVnMDAiGE3u12r0/edit
    - Teaching out to other potentially interested parties to talk about what a IPFI standards evaluation group might look like.

    - Evaluate what a Mojaloop message based on an existing ISO message might look like.

Mojaloop 3PPI Enablement

- **Sammuel Kummary, Lewis Daly, Michael Richards**
- PISP - Payment Initiation Service Provider integration with Mojaloop
- General Information/Links
    - Mojaloop sandbox/demo for exploring 3p functionality: https://sandbox.mojaloop.io/
    - 3PPI demo (15:50): https://www.youtube.com/watch?v=RvLoP4Tj8q8
    - 3PPI overview: https://github.com/mojaloop/pisp-project
    - Third-party API spec: https://github.com/mojaloop/mojaloop-specification/tree/master/thirdparty-api
    - API snippets (Mojaloop APIs): https://github.com/mojaloop/api-snippets
    - PISP project issues: https://github.com/mojaloop/project/issues#workspaces/mojaloop-project-59edee71d1407922110cf083/board?labels=oss-pisp&repos=116650553
- Status
    - 3PPI API v1.0 published ✅
    - 3PPI services initial implementation & end-to-end tests ✅
    - 3PPI services integrated with Mojaloop releases (v13.1.0) ✅
    - Productionize and profile 3PPI services ✅
    - Design for Google standard Payments (GSP) adapter ✅
    - 3P API adapter (GSP API) implementation ⚙️
- API Snippets
    - *Reusable yaml definition code snippets & autogenerated Typescript interfaces*
        - it is the set of basic Mojaloop Data Transfer Object Interfaces - YAML & Typescript
        - one source of truth - common type system
        - compact template definitions files for microservices
        - tooling for Typescript interfaces generation
        - Swagger UI online browser: https://mojaloop.github.io/api-snippets/
- 3PPI Goals/Proposed roadmap
    - Goal: Mojaloop 3PPI services adopted by 1 3PPI implementer & 1 FST (in testing/QA)
    - Objectives: Google standard payment API adapter (open source) developed and released;

Merchant Scheme Extension in QR Support

- **Paul Makin**
- Learnings
    - Initially focussed on interoperable merchant payments in a complex customer environment
    - For now, customer-initiated; merchantinitiated (MRTP) and fintech/app initiated (PISP/3PPI) are further down the roadmap
    - Customer uses either static QR or USSD: Merchant receives payment “instantly”, releases the goods
    - Interoperable across all connected DFSPs (banks, MFIs, MMOs, SACCOs etc)
- Status
    - Merchant Payments

        - Developing customer-initiated merchant payments infrastructure as a modular extension around a Mojaloop Hub
    - Underlying Concepts
        - Using a merchant registry and merchant IDs to support fraud/ML detection
        - Independent of front-end tech; initially to support USSD and QR Codes (static and dynamic)
- Principles – built on Mojaloop P2B instant payments; Expose merchant payment details, but "anonymize" them using merchant IDs, Require merchant registration, so we can (1) support merchant IDs, and (2) identify and control fraudulent activity, Develop an approach that supports multiple customer payment initiation methods, as appropriate to each customer (QR Code obviously, but also app, USSD)
- Lessons Learned - Separate Rails from Services • Interoperability – business, as well as technical • Make it free • Make sure customers can use it
- **Merchant QR Code - Proof of Concept Demo:**
- **Lewis Daly**
    - Simple Static QR Code demo payment flow: Customer → Scan QR Code → Enter Price → Pay Merchant → Release Goods Assumptions: - Pre generated static QR code that encodes a Merchant ID - No Merchant Registry: just reuse our existing oracle

Bulk Payment Enhancement

- **Paul Makin**
- Challenges:
    - Mojaloop Bulk Payment service operates in a manner that doesn't match market expectations
        - Payers just want to hand over a list; Mojaloop wants a series of sorted lists, one per payee DFSP
    - Payee DFSPs vary in their capabilities; some can accept a bulk payments list, others cannot
- Potential Solutions:
    - Short Term Solution: Accept a bulk payments list from a DFSP, and deal with them as though they're individual transactions:
        - Process them one by one (discover, agree, transfer)
        - Assemble a single bulk transfer response and return it to the sender
    - Medium Term Solution: Accept a bulk payments list from a DFSP, and sort it into individual lists (one per payee DFSP):
        - Process each list as a Mojaloop Bulk Payment • For some Payee DFSPs, it will be necessary to break up the list at the "receive" end and process as individual transactions
        - Assemble a single bulk transfer response and return it to the sender
- Progress:
    - Have a design; been reviewed by the dev teams, and All of the user stories have been documented
        - Sized, acceptance criteria defined, tests defined, etc. Implementation has begun, and will be completed this PI

        - During the design process, it became clear that the most straightforward route to implementation included the upgrade of the oracle to support P2P transactions

Mini Loop Update

- **Tom Daly**
- What is it?
    - Automation of the Mojaloop getting started document
    - A tool to enable a "successful out of the box experience"
    - A tool to enable easy fast, repeatable deploy and test :-
        - different k8s engines, versions, architectures, environments
        - Local (on laptop) and remote
- Mini-loop
    - https://docs.mojaloop.io/legacy/deployment-guide/local-setup-linux.html
    - Install.sh
        - git clone mojaloop helm repo
        - cd ./helm/install
        - ./ml_install.sh -k <engine> -u <user> -m <ml version> -d <directory> -f <value files>
- Research ML on ARM64
    - Git clone mini-loop
    - Git clone mojaloop helm repo 13.1.x
    - do-arm64.sh -m build_images -c convert_to_containerd -u ubuntu
    - ./package.sh; helm install ml ./mojaloop # install from local
- Benefits
    - Best possible OOTB experience
    - Local or in-cloud or even cloud vendor k8s engine
    - Lower the mojaloop-help slack channel burden/experience
    - Quick repeatable install enables testing/dev
        - Enable users to create own sandbox
        - Testing across multiple engines/releases (e.g. v14)
        - Research tool
- Next Steps
    - Further Converge with the Sandbox Environment:
        - Developer Portal (sandbox.mojaloop.io page)
        - Seed Environment (Oracles, Participants, Parties, simulators)
        - Auto setup ttks
        - Regression test + automated golden path tests

Mojaloop - TigerBeetle Integration

- **Jason Bruwer, Matseliso Thabane**
- Progress
    - Objectives: Implement & test integration into Central-Ledger. & Complete the design documentation.
    - Documentation
        - Chart of Accounts for use-case subset [draft ready]
        - Solution Design Document [80%]

    - Development
        - Implement & test the NodeJS Interface [75%]
        - Integrate & test NodeJS client [75%]
        - Finalise performance test suite [95%]
- TigerBeetle Overview
    - A financial accounting database designed for mission critical safety and performance to power the future of financial services.
    - https://github.com/coilhq/tigerbeetle/blob/main/README.md
- Components
    - TigerBeetle Clients
        - Native client (Zig)
        - C used to integrate language platform mappings
        - Clients in NodeJS & Golang
    - TigerBeetle NodeJS Interface
        - Configuration file (default.json)
        - Data Mapping
        - Protocol Translation
        - Orchestrating interactions with TigerBeetle
- Upcoming Focus
    - TigerBeetle NodeJS Interface
    - Configuration file (default.json)
    - Data Mapping
    - Protocol Translation
    - Orchestrating interactions with TigerBeetle

Thanks, Kim

From: Kim Walters <KimW@crosslaketech.com>
Sent: Monday, April 25, 2022 8:41 PM
Subject: Mojaloop PI-18: Day #1 Wrap-up

TO: Mojaloop Attendees (BCC'ed)

Thank you to everyone who attended Day #1 of the Mojaloop Community PI-18 sessions in Arusha and online. It was a fabulous first day and wonderful to see everyone in person and over zoom. Thank you to all the presenters and organizers.

Below are the links, notes, and information on COVID testing. We look forward to seeing everyone tomorrow; the first session will start promptly at 10 am local time.

Important Links

- PI-18 Agenda: https://mojaloop.io/decks
- Presentations: https://github.com/mojaloop/documentation-artifacts/tree/master/presentations/pi_18_april_2022/presentations *(also included as hyperlinks below)*
- Slack Discussion: https://mojaloop.io/slack

Welcome and Introduction

- **Simeon Oriko & Paula Hunter**
- Introductions and welcome to our first HYBRID event from Arusha and online
- The purpose is to enable Inclusive, Interoperable, Real-time Payments
- Mojaloop Foundation wants to maintain the Open Source and ensure the Community is always available for everyone
- Africa is a critical focus – but happy to engage in other countries
- Mojaloop Foundation Priorities
    - Increase Adoption of Mojaloop Foundation
    - Identify Grants / Funding for Deployments and Projects
    - Expand Community Engagement
- Mojaloop Business Directory Registration: https://mojaloop.io/mojaloop-business-directory/
- What are your long-term priorities? Let us know
    - https://www.surveymonkey.com/r/FBT8LL7

Importance of Realtime Interoperable Payments in Tanzania

- **Innocent Ephraim**
- Panel Included:
    - **Isack Nchunda** – Airtel Money
    - **Miller Abel** – Bill & Melinda Gates Foundation
    - **Benjamin Dotto** – e-Government Agency
- Discussed the importance of Financial Inclusion
    - Reviewed the beginning of Mojaloop and Level One Principals
- Challenges include:
    - Cross-Border
    - Central Bank Digital Currency (simplifying settlement)
    - Ensure a sustainable working business model, bringing efficiency to bring on new growth without disrupting the current players
    - Allowing a woman in a remote village to have low-cost access to any bank anywhere
- Questions
    - What has Mobile Network Operators (MNO) done to educate? Govt is establishing online channels; MNOs are working on training and educating customers that have needs or informing them on new products
    - Learnings about Interopablity and Lending. Building products that are changing lives by allowing lending online.

Digital Public Goods

- **Steve Haley & Michael Richards**
- Overview

    - DGP – Digital Public Goods
    - DPI – Digital Public Infrastructure
- Benefits of Collaboration
    - Joint Advocacy, Educating governments and ecosystems, Sharing technical resources, Ensuring interoperability across systems, Security best practices, Avoid duplication and (inefficient) competition
- Challenges
    - Different stages of development, Different OS governance structures and implementation modalities, Resource competition, Similar donor pool, Cross ministry collaboration
- Case Study – OpenIMIS
    - The goal is to improve health financing operations by offering a seamless exchange of data related to patients, health service providers and payers for health care.
    - Uses OpenHIM as a middleware component to mediate between the Health Management System and the Payment System
- Get Involved:
    - #dpg-collab in slack
    - Steve Haley – shaley@mojaloop.io
    - Ed Cable – edcable@mifos.org
    - Michael Richards – Michael.richards@modusbox.com

Bridging Mojaloop with the Rest of the World

- **Damien Dugauquier & Michael Richards**
- The importance of digital remittances for low and middle income countries
- The role of iPiD in the infrastructure of global payments
    - Founded by experienced payments and technology professionals
- Linking it back to the Mojaloop roadmap to interconnect with the rest of the world
    - Payments based on a proxy from cross-border
- Remittances are critical for economic growth in emerging markets
- Goals/iPiD wants to accelerate digitalization and lower fees
    - Improve user experience
    - Reduce operational costs
    - Enable cross-border interoperability
    - Improve data security

Capacity building experience on open-source real time payment systems in Tanzania

- **Paul Damocha**
- UNCDF –vision is to promote digital economies that leave no one behind
- Four building blocks
    - Policy & Regulation
    - Open Digital Payments Ecosystem
    - Inclusive Innovation
    - Skills
- 1 year program: results – deployed a sandbox for training on the interoperable payments technology component
    - 21 financial service providers

    - 2 system integrators fully integrated and supported to play the role of local capacity builders
    - 11 DFSPs fully integrated
    - 6 DFSPs joined a multi-tenant solution
- Learnings
    - Technical: changed the PM4ML to a single instance rather than for each DFSP level
    - Business: Customized support geared towards Tier 2 and 3 DFSPs
    - Business: investments in and around digitization as a foundational element
- Panel Discussion with System Integrators
- Technology Constraints
- MFIs digital transformation

Fraud Management Business Scenarios

- **Charity Elkins**
- Workstream Overview / Objectives: Develop business requirements for best-in-class fraud mgmt.
    - Scope: Sub-saharan geographies, e-money providers
    - Partnerships: Bankserv/Africa, JoPACC, Montran, Sybrin & Industry Experts
- Deliverables & Outputs
    - High-level requirements
    - Personas Definitions
    - Opportunity Gaps
    - Business Requirements
- Five workstreams
    - Financial crime, hub operator, end-user, central bank, dfsp banks
    - 20 personas across the 5 workstreams

DFS Fraud Mitigation

- **Mercy Buku**
- Digital Financial Services Fraud Mitigation Strategies
- Innovation in Mobile Money: What Are the Risks? (cgap.org)
- DFS Categories:
    - Payments, Asset Mgmt, Alternative Finance, Others (internet base)
- Consumer Risks
    - Phishing, Pharming, Spyware, SIM Card swap, Profiling, Hacking
- Mobile Financial Services – state of the industry- https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2021/03/GSMA_State-of-the-Industry-Report-on-Mobile-Money-2021_Full-report.pdf
- Vulnerabilities of Mobile Networks to Signaling Attacks - Technical-report-on-the-SS7-vulnerabilities-and-their-impact-on-DFS-transactions_f-1-1.pdf (itu.int)
- Financial Service Frauds: Consumer Affecting, Agent, Provider Affecting
    - Mitigation Programs include: KYC/CDD (know your customer), Training and Awareness (know your procedures), Complaints Resource Channels, Product Risk Assessments (know your products), Agent Mgmt (know your agents), Compliance monitoring/risk mgmt. (know your procedures), Investigation and Enforcement, Reporting, Industry/Stakeholder Cooperations

- GSMA Recommendations: https://www.gsma.com/membership/wp-content/uploads/2018/07/SS7_Vulnerability_2017_A4.ENG_.0003.03.pdf and GSMA | FS.21 Interconnect Signalling Security Recommendations - Security

Business Models with Mojaloop:

- **Steve Haley, Nyi Aye**
- Setting up a scheme that matches all stakeholders' business models: Hard lessons from Myanmar.
    - Project: MMD w/ co-founders UNCDF, ThitsaWorks, ModusBox
    - Purpose: expand the digital payment ecosystem in Myanmar by connecting the dots
- Path to Sustainability
    - Keep costs down, Keep revenue up, Maintain cash flow
- Challenges:
    - Costs – w/ new technologies there is many unknown costs
    - Revenue – focus and have a strong financial model for the future
    - Cash Flow – revenue will not come until later. Building a hub is high risk.
- Setting Priorities - Use Case Prioritization Criteria
- Changing Personalities – At the: regulator, scheme, DFSP

Exploratory Paper: Open Regulated Global Payments Network

- **Arunjay Katakam**
- Sending money should be as easy as sending email
- An open regulated global payment inter-network will allow any regulated service provider to send money to anyone, anywhere on the internal-network
    - Phase 1: account addressing
        - Global distributed directory – connect existing FSPs, return the legal entity identifier, not store data
    - Phase 2: tokenized compliance
        - KYC and compliance performed locally multiple times
    - Phase 3: instant clearing and settlement
        - Funds leverage 3 models
            - net settlement was leveraged – leading to long lead times
            - Pre-funded transactions are expensive
- Next Steps
    - Connect one global network
    - Share paper and have a workshop in July – included in the G20 roadmap
- Summary
    - Speed up total interoperability
    - Allow users to use and easy to remember proxy alias
    - Reduce costs by improving compliance and liquidity

Payment System Pricing Tool

- **Cici Northup, Elizabeth McQuerry**
- Comparing Thin platform FOUR approaches
    - Vendor licensed platform
    - Propriety build platform
    - Mojaloop platform leveraging OSS - Leveraged from vendor

    - Mojaloop platform leveraging OSS - Using an in-house teams
- Illustrative Output
    - Reflection of true market data on 10-year timescale
    - Implementation Cost:
        - OSS/Mojaloop implementation requires the lowest initial investment (>5M) and lowest ongoing investment (~1M) w/ incremental investment fluctuations of (+1M) as needed for upgrades, etc..
    - GO-live Estimation
        - Vendor Procured - year two go-live
        - Propriety build - year four go-live
        - Mojaloop OSS Vendor procured – year two go-live
        - Mojaloop OSS Proprietary build – year three go-live

Covid Testing:

How to get a PCR Covid Test in Arusha:

1. Book your test at least 48 hours before you need to travel here: https://pimacovid.moh.go.tz/
    a. Select “Arusha Region”
    b. Select “Mt. Meru Regional Referral Hospital”
    c. Fill out all other details.
1. After making the booking, you will receive an email with details on how to make payment via Mobile Money. If you need assistance with this, please contact Desire Kachenje (dkachenje@mojaloop.io)
2. Let Simeon Oriko (soriko@mojaloop.io) know when you’d like to get tested (Tuesday through Friday 8:30 am to 9:00 am). The sample will be collected at the Mt. Meru Hotel. It will cost TShs 50,000. Please have this in cash on you at time of sample collection.
3. You should get your results via e-mail within 24 to 48 hours of sample collection.

Thank you, Kim
Mojaloop Engineering Director

mojaloop foundation

CROSSLAKE

Kim Walters
Senior Managing Director

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