Jeshka Documentation

Release 1.0

Jeshka

Dec 17, 2018

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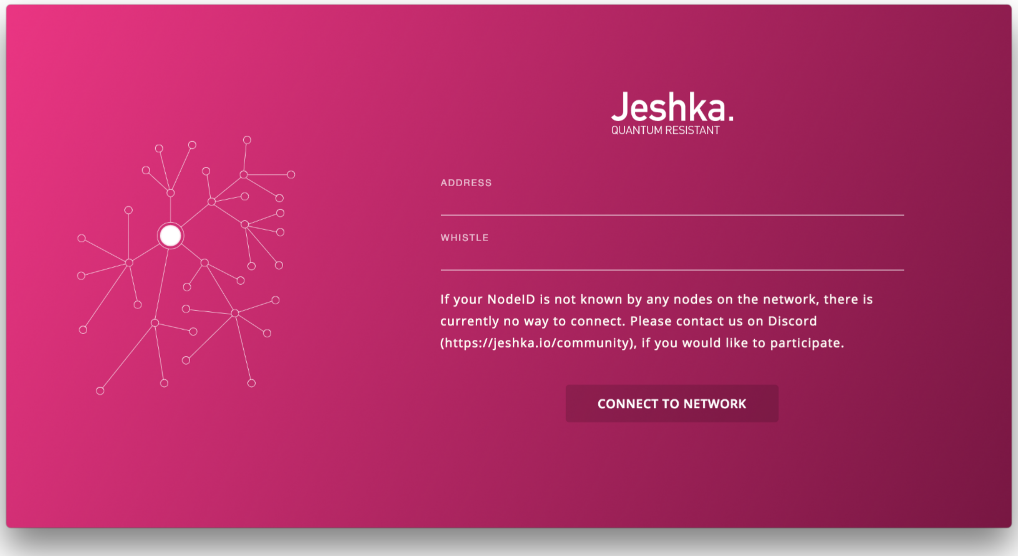
CHAPTER 1

Applications

1.1 Jeshka Desktop

1.1.1 Getting Started



If your NodeID is not known by any nodes on the network, there is currently no way to connect. Please contact us on Discord (https://jeshka.io/community), if you would like to participate.

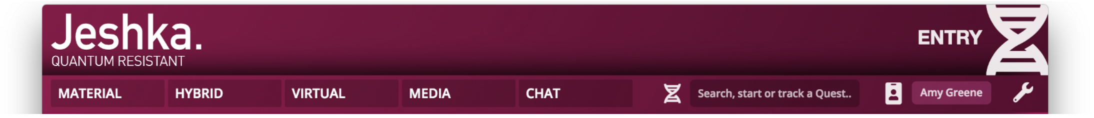
Jeshka Desktop is an interactive experience for all resources available to us in the network. The application seeks to deliver a fresh perspective on life, no matter where you're coming from.

The application is highly gamified, all aspects of life are abstracted to a decentralized and distributed digital consciousness. You can choose to encrypt your interactions.

The entry into the application creates a fictional situation where the user keeps forgetting that life used to be very different with an advanced version of Jeshka, but there was a terrible global disaster and almost all of Jeshka was removed from the knowledge of humanity. Now it's on us, the population of the planet, to rebuild it. The participants only saved a piece of paper with their address and whistle from the disaster.

Release: December 1st, 2018

1.1.2 Control Center



We can skip to other plugins and apps from here. We can start, search or track Quests. We can change account and application preferences and settings.

1.1.3 Quest Machine

Every piece of information that leaves our devices is wrapped up in something we call a Quest. This can be a simple text message, a financial transaction or references to an extremely complicated problem with many different moving parts that you are looking to get solved. Not just theoretical problems that is, we can even start Quests to build and furnish houses! Imagine a Quest like a box with a set of instructions and in some cases with many different (financial) rewards that whoever helps to resolve this Quest or parts of it will be able to remove from my box. Well, maybe this example is not the best. If you can think of a better one, please let me know! ;-)

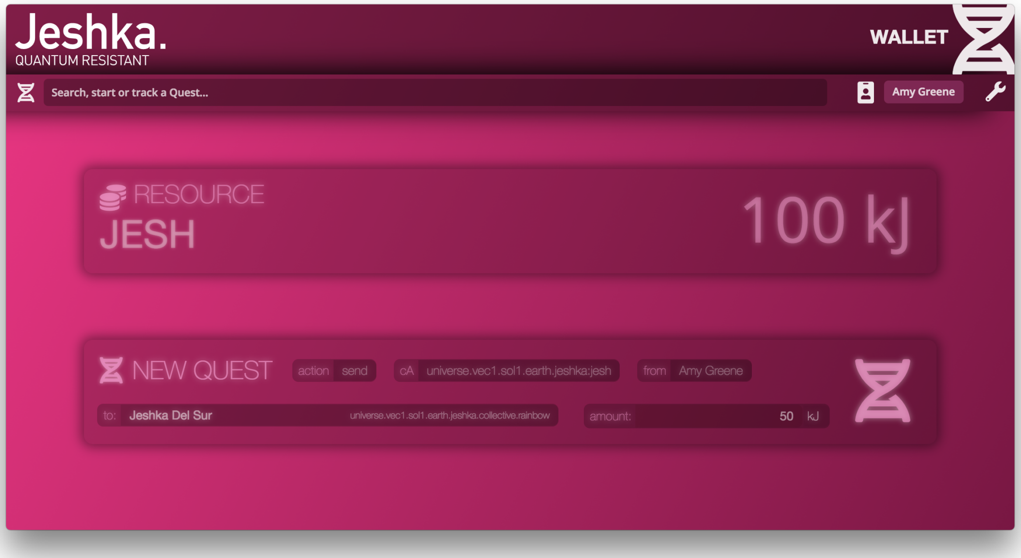
The Quest Machine is a Jeshka Desktop App feature that interactively allows peers to start Quests on the network. It's the core functionality that all the other functionality on Jeshka seeks to support.

The Quest Machine covers the entire flow of dialogs for the creation and management of Quests. It includes the Quest Manager and the Quest Explorer to hunt after unresolving Quests.

1.1.4 Multi Wallet

This feature is an easy to use space that shows our full balances for *all currencies* that we have registered on Jeshka. Internally manages the resource type / contract group **finc** and emits audiovisual events on changes.

This feature is available on almost every screen of the App in some shape or form.

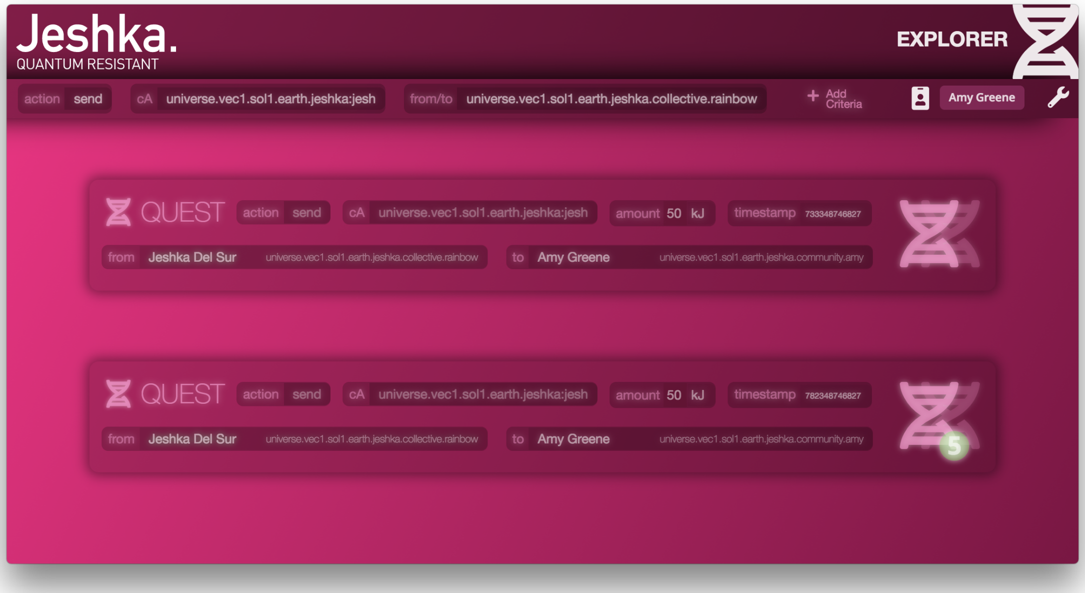


RESOURCE
JESH
100 kJ

NEW QUEST
action send
cA universe.vec1.sol1.earth.jeshka:jesh
from Amy Greene
to: Jeshka Del Sur universe.vec1.sol1.earth.jeshka.collective.rainbow
amount: 50 kJ

1.1.5 Jeshka Quest Explorer

Search and track Quests, check on their status, location, explore streams in certain channels, etc.



action send
cA universe.vec1.sol1.earth.jeshka:jesh
from/to universe.vec1.sol1.earth.jeshka.collective.rainbow

QUEST
action send
cA universe.vec1.sol1.earth.jeshka:jesh
amount 50 kJ
timestamp 733348746827
from Jeshka Del Sur universe.vec1.sol1.earth.jeshka.collective.rainbow
to Amy Greene universe.vec1.sol1.earth.jeshka.community.amy

QUEST
action send
cA universe.vec1.sol1.earth.jeshka:jesh
amount 50 kJ
timestamp 782348746827
from Jeshka Del Sur universe.vec1.sol1.earth.jeshka.collective.rainbow
to Amy Greene universe.vec1.sol1.earth.jeshka.community.amy

1.1.6 Text Channels

Decentralized IRC chat, we can import channel specific plugins. Domains can choose Roles for specific addresses and group their channels.

Internally manages the resource type **text** and emits audiovisual events on changes.

The main Jeshka Desktop App uses components to group user activity. This feature is available on almost every screen of the App.

1.1.7 Media Browser

For streaming and archived media objects, images, video, audio.

1.1.8 Consensus Module

Front End qManager

We can use the consensus plugin for a variety of Assembly activities. As a component, it is visible across the application.

1.1.9 Research Center

We can use Jeshka to power our research projects.

1.2 Jeshka Desktop Plugins

While the plugins and libraries might seem isolated, they all contact each other and exchange information within your system. So every part of the Jeshka application knows exactly what's relevant for them.

Unlocking achievements of multiple achievements together can create meta combinations of achievements.

1.2.1 Sponsorships

Sponsor projects on the network with rewards you don't need. Think decentralized crowdfund.

1.2.2 Distributed Git Explorer and Editor

1.2.3 Virtual Space

The virtual **Reward Space** allows most virtual interactions, for example streaming of oracles, unlocking achievements for particular resources, inter-human communication, etc.

Plugin enters with earth view of live network activity.

There are no old-timey prices on Jeshka, we have Rewards in our system the total amount of which is the equivalent to the total estimated energy that is needed to resolve all Quests on the network in a given timeframe. The rewards are calculated by assemblies and all relevant peers on the network, they keep changing.

1.2.4 Material Space

A multi-purpose open space for new and past physical objects (including grocery items) that as part of the specific Quest can also be physically delivered to us. Achievements of individual resources can be autonomously unlocked by the Quest Machine if needed for another Quest.

The nature of the Quests behind these interactions dictates that you can not set old-timey prices to individual goods, you can set a minimum conversation result, but the final exchange rate will be a consensus result with everyone who is offering the same resource under the same conditions and the relevant people who are interested in achieving/unlocking this resource!

1.2.5 Capabilities

An interactive explorer for our currently calculated individual capabilities, which leads to a portal to the Jeshka University module, where we can expand our capabilities while resolving Quests on the Quest Machine.

1.2.6 Combinations

An interactive explorer for combinations of the above, these are meta types and no actual resources, they're for example being used for a Quest that would read "Get me from here to here in less than 20 minutes."

1.2.7 JesHub

A simple platform for sharing of physical spaces. A JesHub domain keeps track of details about their location, their devices and such, also offers JesHub internal encrypted text message channels.

We get dialogs for Quests from others who are looking either to visit or stay at a JesHub or who need storage space, we can set our Jeshka domain to decide about matters in this domain on a detailed level or in full consensus with all peers in this domain.

Internally a JesHub is a resource.

1.2.8 Health

An interactive space for health related subjects. All features currently undisclosed.

1.3 Headless JDK Node

Currently only serves assembly functions. Contact the community if you are interested in this project.

1.4 Network Management

1.4.1 QManager

1.5 Libraries

1.5.1 Jeshka JS Lib

Release Date: December 1st, 2018.

If you want to build an app for Jeshka, don't think twice! We're maintaining a JavaScript library that enables you to start a Quest in 5 easy steps. Just use:

jeshka = new JeshkaNode(); jeshka.startQManager(); jeshka.unlockWallet(seed Whistle); quest = new JeshkaQuest(); and put together your quest with easy setters and getters.

When you're ready, let Jeshka whistle it jeshka.whistle(quest) for you, if you use this method, Jeshka will automatically sign and distribute the Quest. Jeshka is asynchronous, you can await jeshka.whistle(quest). You can also build a Quest that listens to a resource (stream) on the network!

Jeshka is non-profit and makes life hard for commercial enterprises. Jeshka is a non-profit organization; we're currently in the process of registering Jeshka as a Foundation in the Netherlands. All parts of Jeshka are released under the AGPL v3.0 license, that means any service that uses Jeshka has to publish the relevant source code.

Jeshka JavaScript Library on npm.

Jeshka JavaScript Library on GitHub.

CHAPTER 2

Devices

2.1 Jeshka Mesh Router

The Jeshka Mesh Router creates an access point to the Jeshka Quest Network, routes and resolves incoming Quests.

Build yourself or order from https://store.jeshka.io/jmr-1

2.2 Jeshka Smart Card

Use the Jeshka Smart Card to store your whistle(s).

Build yourself or order from https://store.jeshka.io/jsc-1

2.3 Jeshka Whistle Chip

Opt in for the fabulous Jeshka Whistle Chip to store your whistle(s).

Warning: Chip implants could cause infections or reactions in the body’s immune system.

Build yourself or order from https://store.jeshka.io/jw-1

2.4 Jeshka Animal Chip

Build yourself or order from https://store.jeshka.io/ja-1

CHAPTER 3

Protocol

This proposed solution makes use of peer to peer networking, cryptographic capabilities and machine learning technologies to create a feeless, trustless and fully decentralized ecosystem of services that enables optimal fragmentation and reuse of work performed by humans and machines across projects and departments. While providing a constantly optimized incentive for fair compensation, allowing for voluntarily unpaid participation and embedded learning experiences. The computer can be used as a tool to teach and reward people, rather than to exploit them.

3.1 Quest

Every piece of information that leaves our devices is wrapped up in something we call a Quest. This can be a simple text message, a financial transaction or references to an extremely complicated problem with many different moving parts that you are looking to get solved. Not just theoretical problems that is, we can even start Quests to build and furnish houses! Imagine a Quest like a box with a set of instructions and in some cases with many different (financial) rewards that whoever helps to resolve this Quest or parts of it will be able to remove from my box. Well, maybe this example is not that great. If you can think of a better one, please let me know! ;-)

A regular financial transaction on Jeshka, “bring this amount of this currency that I own to this other person” is always a Quest signed with a unique one time whistle and your unique and permanent address.

We call the entire existence of information that gets passed on to other peers in a single call ***a Quest Bundle***.

Representatives should check if the quest will get resolved, i.e. if we have permission to listen on a certain channel, request a certain type of information or commit a certain transaction into a channel before routing our quest. It guards the other domains from spam traffic, requesting information that’s not available. If a representative doesn’t check and blindly forwards the request, the representative in the other domain might tell all the representatives on our domain that he is not doing his job and our representative might lose its representative role on the network.

3.1.1 The five-second rule.

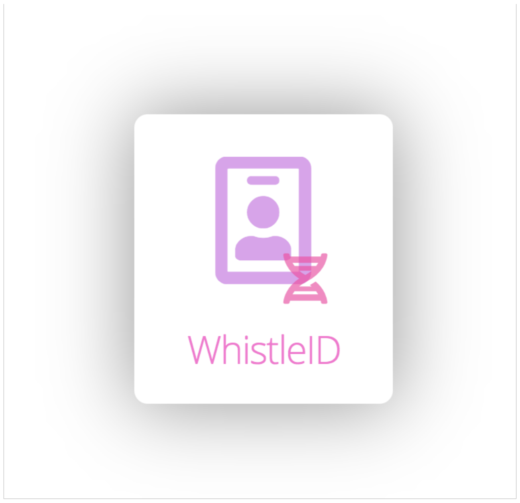
If you start a Quest with a target that’s accessible within your economic cluster/domain, and a financial transaction or text message hasn’t resolved (is not confirmed) within 5 seconds*, we consider it failed or rejected. With a modern laptop, a Quest for a financial transaction usually resolves within 500–2500ms within a given domain/economic cluster.

** refers to the timeframe during which a Quest is considered hot. A Quest is considered hot, starting when it has reached the first peer we connect to. We expect simple Quests to resolve within a maximum of 5000ms from now. Once a Quest has resolved anywhere on the Quest Network it is considered resolved and the countdown stops. It may still take some time until we are informed that it was resolved.*

If for some reason a Basic Quest keeps getting rejected because it exceeds the five seconds, please contact us, this is likely a bug.

3.2 Whistles

3.2.1 WhistleID



Our WhistleID is a collection of important data about us. It is connected to all the whistles we generate to sign Quests on network. While we interact on Jeshka, we collect signatures that prove our WhistleID is indeed ours. The most important piece of data in our WhistleID is our unique and human readable permanent address.

Our address inherently describes how we can be found if someone loses sight of us and helps to verify our unique one time whistle. Our addresses start with a list of all the parent domains down to our Home Domain from left to right.

3.2.2 Seed Whistle

Our signature scheme is inspired by the way dolphins identify each other. Whistles are the core for authentication and authorization on Jeshka. We all have different seed whistles that nobody else in this universe can ever forge. A seed whistle on Jeshka is a 174 character string of random letters A-Z and the number 9. We can derive everything we'll ever need to participate in the network from this seed whistle. For instance, we sign Quests with quest specific private whistles that we derive from our original seed whistle. It is the first thing we do to prove to everyone in the universe that our signatures are authentic and that by consensus on the network the author of the Quest has to be the WhistleID connected to our permanent address, i.e. us. We can also derive whistles that help us decrypt messages and files. The seed whistle is in the same format as IOTA seeds, so the first 81 characters can just be my IOTA seed, etc, etc. Literally every key we'll ever need can be derived from this seed whistle.

174 chars:

128 chars crypto seed 6 chars pin 28 chars my aes pass (for example to decrypt my ssl whistles for other domains that we gave to our individual home domains) 12 chars home whistle (to get ssl keys from home domain)

3.2.3 Private Whistle

Quests are signed with unique asymmetric one time private whistles that we derive from our seed whistle.

3.2.4 qWhistle

Quests contain a field to announce one upcoming unique asymmetric one time public quest whistle. It is the public counterpart of the private whistle that is used to sign a Quest/transaction.

It can be used to verify the authenticity and origin of an upcoming Quest.

If a Quest is signed with a whistle/key that hasn't been announced in a qWhistle field before, it's invalid.

In other words, the qWhistle field contains the public whistle (key) that has to be used to verify the next or another upcoming Quest in this specific channel or zone.

3.2.5 Home Whistle

A home whistle is used by members of a given domain to roughly identify the origin of an incoming connection, of course this home whistle can be intercepted and used by others, who will then be rejected by the server, because they can't produce the right public whistles. It serves as a good first gateway mechanism, helps others to get a rough idea of who we are and can be changed per our request. For example if it has gotten compromised.

3.2.6 SSL Whistle

OTP to establish SSL connections.

3.2.7 Join Whistle

When connecting to a new flow, we tell our swarm that we are joining this new flow with a Join Quest. If anyone asks around in our swarm, our Join Whistle holds a public whistle as content that other flows are asking about. If unsuccessful the logical conclusion is that the public whistle in combination with the address does not exist, very likely that the particular Quest Bundle is a forgery.

3.3 Addresses

We all identify with a unique permanent address and a unique one time whistle that changes with every Quest. Our address describes how we can be found if someone loses sight of us and helps to verify our unique one time whistle. Our addresses start with a list of all the parent domains down to our Home Domain from left to right. For me this is:

jeshka://universe.vec1.sol1.earth.jeshka.collective.rainbow

and since we are all on the same planet here, most Jeshka apps allow a shorthand version and internally compute the full address, like so: jeshka.collective.rainbow or rainbow@jeshka.collective

This is my receiving address for all Quests directed at me. So people can send anything from encrypted text messages, financial transactions to terabytes of data to my address. It's not to be mixed up with old-timey email addresses.

protocol part jeshka://

home domain part universe.vec1.sol1.earth.jeshka.collective

peer part .rainbow

To identify resources, for example in the cA field we see addresses that refer to resources more than individuals, let's say we're looking up the currency JESH, the full address would be jeshka://universe.vec1.sol1.earth.jeshka:jesh.

Whistleid addresses are relative in places like these, so if I want to look up my balance, I have to: jeshka://universe.vec1.sol1.earth.jeshka:jesh/collective.rainbow (/relative whistle id address)

If we want to look up all balances for JESH, we have to look up the peer map: jeshka://universe.vec1.sol1.earth.jeshka:jesh.p

If we want to look up a specific Quest in a specific channel, we have to look up: jeshka://universe.vec1.sol1.earth.jeshka:jesh::7382e3a8932eb (::qHash)

If we want to look up all Quests in a specific channel, we have to go through the Quest log: jeshka://universe.vec1.sol1.earth.jeshka:jesh.qlog

3.4 Domains

Domains can only be upper and lowercase characters. Minimum 5 Characters. 4 Characters reserved for network functionalities. Once a domain is registered on the network, it's yours.

Domains can also keep track of their resources and respond to Quests automatically, manually or let Jeshka decide on a detailed level, i.e. we can request a collection of Jeshka domains to make certain decisions, we can choose our own software to come to individual certain decisions for resources in our domain or we can even manually handle *all* Quests ourselves.

3.4.1 Domain Peers

A peer in a given domain connects to their domain assembly.

Their domain assembly will relay all the information from the domain they represent through the JeshkaNet and the Internet.

When a peer connects to its domain representatives through the internet, they have to trust that behind the https address they find current representative

3.5 Consensus

Every domain can choose their own consensus strategies for different resources and change them over time.

Strong Consistency: Strong consistency means that the transactions in a given resource channel are only considered confirmed, once every representative confirmed them.

In centralized networks the central authority owns or controls all representatives.

3.6 Assemblies

How do peers on Jeshka reach consensus? While Jeshka allows us to establish blazing fast and highly secure peer to peer connections that can not be intercepted, a Quest is never resolved by just one person. We want to make sure the result is what we wanted, that our Quest hasn't been altered and that nobody is trying to remove a reward from the box without having done their part correctly. Some people are better at some things than others and for some parts of our specific Quest, AI may be more suitable. If it doesn't take the entire reward to resolve our Quest, we're always happy to get some back and if the result exceeds all of our expectations, we're free to tip the remainder to the people who did the best job on the entire Quest.

For all of that Jeshka uses Assemblies. The dictionary definition of an Assembly is "a group of people gathered together in one place for a common purpose." and that's just what an Assembly is on Jeshka. An Assembly is a very diverse group of participants, some who are proven to be very good at what they are doing, some have just started out and are resolving parts of our Quest as they are advancing on their learning curve. A Quest can be resolved by different Assemblies for different parts of it or if it involves moving objects across a large geographical distance, for different legs of the journey. An Assembly is a group of people, who are helping us assemble whatever our Quest is about on whichever network is the most suitable.

Every domain and resource has their own quorum strategy and is represented by a series of quorum decisions. The domain assemblies are usually elected from the pool of all peers in a given domain.

A domain representative has to keep records of all of the domain's and it's subdomains and peers resources.

The representatives can choose their own software to connect to the network as long as they follow the communication and encryption protocols.

3.7 Load Balancing

If we are not invited to open connection channels with the representatives in a domain, we are accessing the resources of, we can ask our domain representatives to relay the information for us. They will for example listen on all changes there and update us and all the others who are listening from them about a given resource. These representatives are usually the members of a dynamically formed Assembly for this purpose.

3.8 Connection Channels

Jeshka is available on the internet, to establish a trusted connection, the Jeshka node uses a list of sources (that we can edit) to achieve consensus over who is representative for what domain at the moment.

3.8.1 Initialization

We connect to all the representatives in our home domain, requesting our SSL Whistle keychain, using our peer address and the Home Whistle. The keychain is an aes encrypted JSON Object that holds all of our personal SSL Whistles for different domains. It's on us to keep it updated.

Port 442

3.8.2 Keychain Access

If we have the fitting SSL Whistle, we can use it to establish a direct connection channel with either the representatives of a given domain we are trying to access or with the representatives from our home domain.

3.9 Distributed Gateways

If a given resource domain or domain is not available for us to connect to directly, we ask a dynamically formed assembly of peers to relay the information for us.

What we want these representatives to route to a different network, we call a *Quest*.

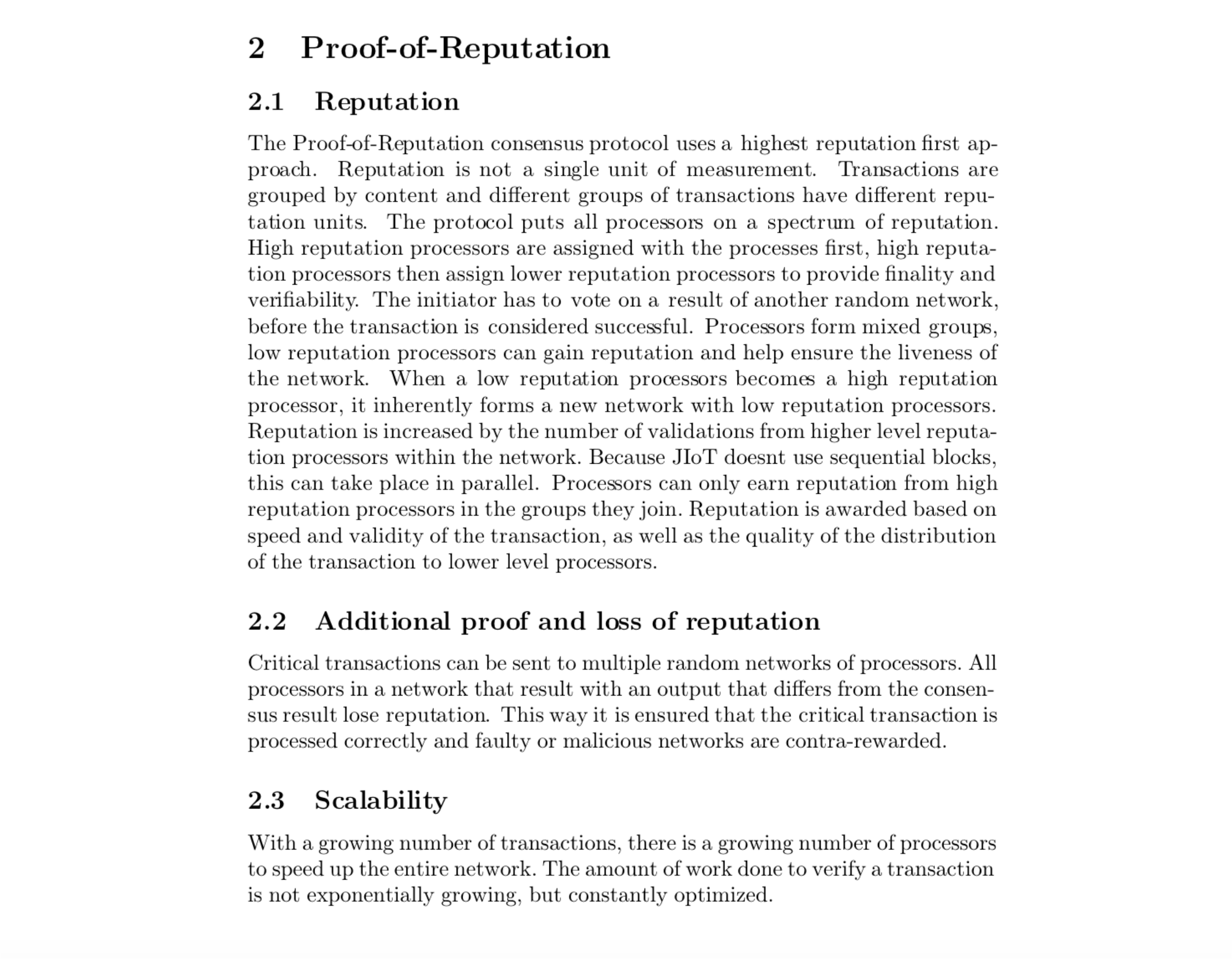
3.10 Network Plugins

Jeshka is network and consensus agnostic. We're aiming to make use of IOTA's capabilities. But really almost every network that meets our security and energy standards can be plugged into Jeshka and Quests as well as Resource Streams can leave the core networks and may get transported in ways we can't even imagine right now. For example, a group of people in Cuba has recently resolved a Jeshka Quest only by using their own physical USB flash drive exchange network. Usually, the first Assembly or Assemblies that receive(s) your Quest decide(s) where and how to transport it from there.

3.11 Meta Conecpts

On a meta layer we can observe many concepts that are emerging from the network as it was theorized by the Jeshka Collective in the original Jeshka Whitepaper.

3.11.1 Proof-of-Reputation



2 Proof-of-Reputation

2.1 Reputation

The Proof-of-Reputation consensus protocol uses a highest reputation first approach. Reputation is not a single unit of measurement. Transactions are grouped by content and different groups of transactions have different reputation units. The protocol puts all processors on a spectrum of reputation. High reputation processors are assigned with the processes first, high reputation processors then assign lower reputation processors to provide finality and verifiability. The initiator has to vote on a result of another random network, before the transaction is considered successful. Processors form mixed groups, low reputation processors can gain reputation and help ensure the liveness of the network. When a low reputation processors becomes a high reputation processor, it inherently forms a new network with low reputation processors. Reputation is increased by the number of validations from higher level reputation processors within the network. Because JIoT doesnt use sequential blocks, this can take place in parallel. Processors can only earn reputation from high reputation processors in the groups they join. Reputation is awarded based on speed and validity of the transaction, as well as the quality of the distribution of the transaction to lower level processors.

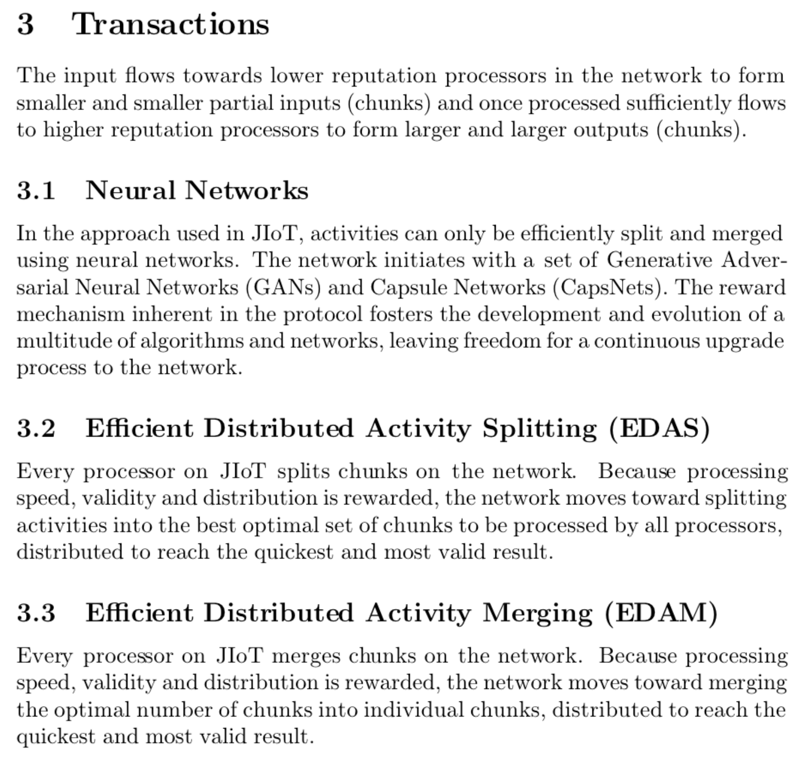
2.2 Additional proof and loss of reputation

Critical transactions can be sent to multiple random networks of processors. All processors in a network that result with an output that differs from the consensus result lose reputation. This way it is ensured that the critical transaction is processed correctly and faulty or malicious networks are contra-rewarded.

2.3 Scalability

With a growing number of transactions, there is a growing number of processors to speed up the entire network. The amount of work done to verify a transaction is not exponentially growing, but constantly optimized.

3.11.2 Transactions - NN, EDAS & EDAM



3 Transactions

The input flows towards lower reputation processors in the network to form smaller and smaller partial inputs (chunks) and once processed sufficiently flows to higher reputation processors to form larger and larger outputs (chunks).

3.1 Neural Networks

In the approach used in JIoT, activities can only be efficiently split and merged using neural networks. The network initiates with a set of Generative Adversarial Neural Networks (GANs) and Capsule Networks (CapsNets). The reward mechanism inherent in the protocol fosters the development and evolution of a multitude of algorithms and networks, leaving freedom for a continuous upgrade process to the network.

3.2 Efficient Distributed Activity Splitting (EDAS)

Every processor on JIoT splits chunks on the network. Because processing speed, validity and distribution is rewarded, the network moves toward splitting activities into the best optimal set of chunks to be processed by all processors, distributed to reach the quickest and most valid result.

3.3 Efficient Distributed Activity Merging (EDAM)

Every processor on JIoT merges chunks on the network. Because processing speed, validity and distribution is rewarded, the network moves toward merging the optimal number of chunks into individual chunks, distributed to reach the quickest and most valid result.

On the local Jeshka Network it has to answer to: req getchannel(peer)historyastxfile for channels in its domain req getlatestwhistleforpeerinchannel for channels in its domain chn open channel with peers from its domain chn open channel with peers from different domains

A representative also **must** forward transactions to the next level up (and sign them) if the receiver is on a different domain. –>

CHAPTER 4

License

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    Preamble
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The GNU Affero General Public License is designed specifically to ensure that, in such cases, the modified source code becomes available to the community. It requires the operator of a network server to provide the source code of the modified version running there to the users of that server. Therefore, public use of a modified version, on a publicly accessible server, gives the public access to the source code of the modified version.

An older license, called the Affero General Public License and published by Affero, was designed to accomplish similar goals. This is a different license, not a version of the Affero GPL, but Affero has released a new version of the Affero GPL which permits relicensing under this license.

The precise terms and conditions for copying, distribution and modification follow.

TERMS AND CONDITIONS

1. Definitions.

“This License” refers to version 3 of the GNU Affero General Public License.

“Copyright” also means copyright-like laws that apply to other kinds of works, such as semiconductor masks.

“The Program” refers to any copyrightable work licensed under this License. Each licensee is addressed as “you”. “Licensees” and “recipients” may be individuals or organizations.

To “modify” a work means to copy from or adapt all or part of the work in a fashion requiring copyright permission, other than the making of an exact copy. The resulting work is called a “modified version” of the earlier work or a work “based on” the earlier work.

A “covered work” means either the unmodified Program or a work based on the Program.

To “propagate” a work means to do anything with it that, without permission, would make you directly or secondarily liable for infringement under applicable copyright law, except executing it on a computer or modifying a private copy. Propagation includes copying, distribution (with or without modification), making available to the public, and in some countries other activities as well.

To “convey” a work means any kind of propagation that enables other parties to make or receive copies. Mere interaction with a user through a computer network, with no transfer of a copy, is not conveying.

An interactive user interface displays “Appropriate Legal Notices” to the extent that it includes a convenient and prominently visible feature that (1) displays an appropriate copyright notice, and (2) tells the user that there is no warranty for the work (except to the extent that warranties are provided), that licensees may convey the work under this License, and how to view a copy of this License. If the interface presents a list of user commands or options, such as a menu, a prominent item in the list meets this criterion.

1. Source Code.

The “source code” for a work means the preferred form of the work for making modifications to it. “Object code” means any non-source form of a work.

A “Standard Interface” means an interface that either is an official standard defined by a recognized standards body, or, in the case of interfaces specified for a particular programming language, one that is widely used among developers working in that language.

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CHAPTER 5

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CHAPTER 6

Indices and tables

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