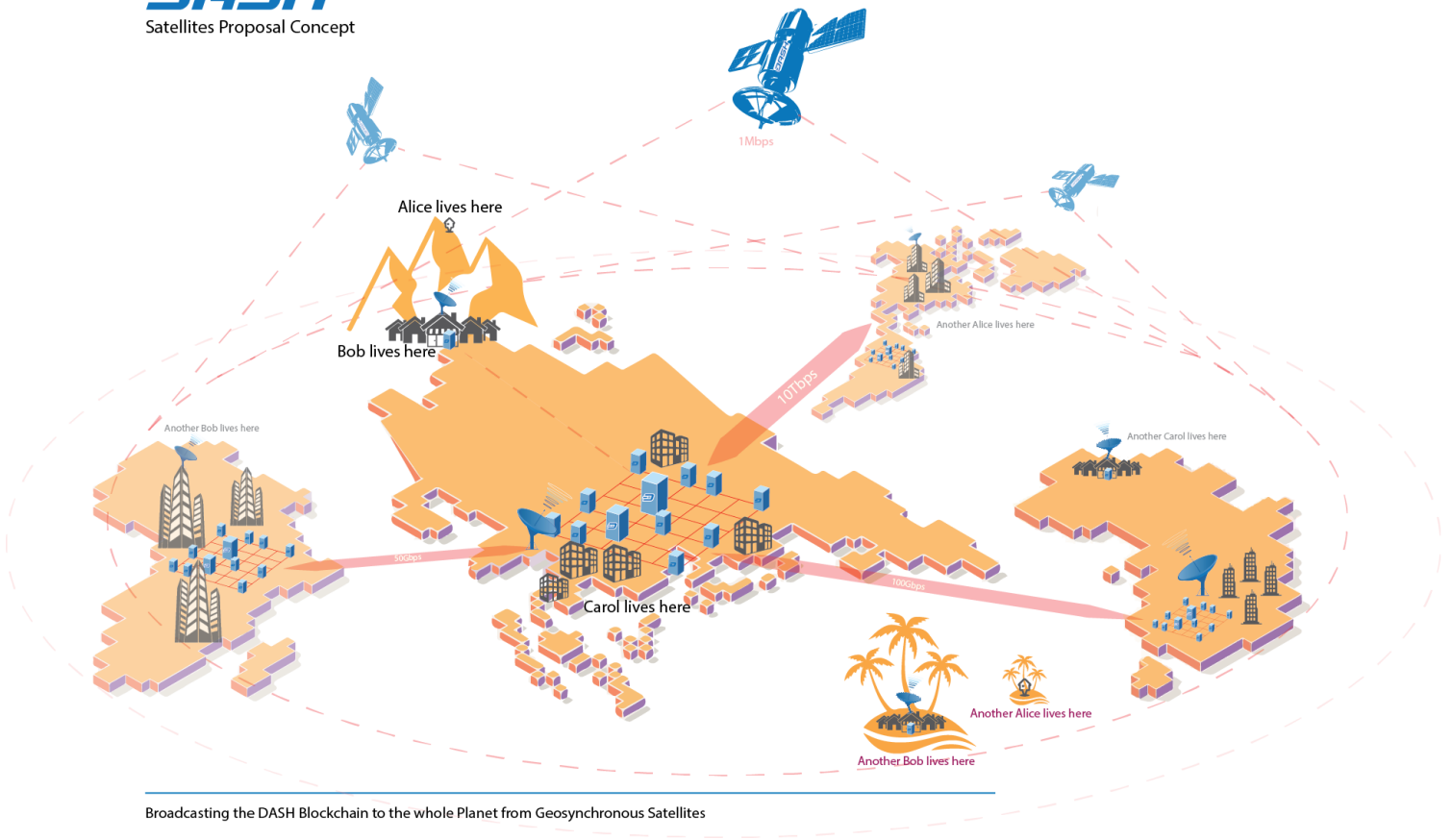


DASH Satellites Demonstration Proposal

DASH
Satellites Proposal Concept



Broadcasting the DASH Blockchain to the whole Planet from Geosynchronous Satellites

DOCUMENT SCOPE

This document introduces the overall DASH Satellites project and details the proposal for the demonstration of broadcasting the DASH chain over one third of the World.

INTRODUCTION

Our proposal to the network is to increase the influence of DASH by transmitting the live chain from satellites around the world providing free access to the DASH network.

The internet is not ubiquitous to much of the world, and if the end goal is the mass adoption of DASH as a globally accessible cryptocurrency, then the DASH Satellites project would represent a necessary component of DASH infrastructure.

The initial phase of this project would be very similar to Outernet (local news, weather, crop prices, URL ref. 5) or Blockstream (Bitcoin, URL ref.1) as it does not require to launch newly dedicated satellites into space, but rather rents frequency from existing providers. The worldwide deployment phase would target applications for the 4.5 billion people (ref.7) who still have zero or very limited access to internet due to many factors. These can be due to financial or political reasons or due to intermittent weather conditions. If you are living or visiting such a forsaken places yourself, you must realize the importance of filling this gap and of enabling the infinite possibilities that the physical universe has to offer. You can find some real world examples of how this technology could be used in the Appendix D – Use Cases below.

ABOUT US

nThinking has extensive experience dealing with engineering projects and corporations. We currently work in railway, logistics and telecom industries. We would be very interested to work on such project.

Founded in 2007, nThinking is headquartered in Hong Kong. Our team of 5 engineers traverse the globe, with local presence in France, the United Kingdom and Hong Kong. You can find the full list of our customers here: <https://nthinking.net/#customers>

The similar projects of interest that we have successfully delivered are:

1. Migration from Optical Fibre (FDDI) to Ethernet of the Hong Kong Metro System (MTRC) (2011-2013)
2. Development, Installation and Administration of the Mailing Track and Trace System used by the whole Direct Link Group worldwide (2009-2015)
3. Development of mesh Specific Absorption Rate (SAR, RF) Clipping & Volume Field Source processors module for ART-FI SAM measurement platform (2012-2013)

ABOUT ME

Being an advocate for freedom of information since the beginning of the 2000s, I've been involved in various open projects: [SourceForge](#), [Wikipedia](#), [Tor](#), [GitHub](#).

In Hong Kong 2014, Tungfa introduced me to Darkcoin, since then I have been following the incredible development of the DASH ecosystem. I attended the first conference in London this September and I really enjoyed the crowd of people I physically met there. This made me realize like Chuck Williams said on his presentation that my morals and principles can align with the work I can be doing for DASH.

Also on my spare time I like to make YouTube videos, here are some examples that will help you know who I am:

- <https://youtu.be/BzX9L7zNkgk>
- <https://youtu.be/C2rsQ1hoSco>

GLOBAL PROJECT ROADMAP

1. **Demonstration (the proposal):** 12 months 1024 kbps broadcasting (with forward error correction, this is equal to 105 GO per month, enough to comply with actual bandwidth requirement in Appendix E – Dash Node Network Traffic & Statistics below) over Asia (see coverage in Appendix C – Demonstration Phase Coverage below) using SDR based terminals (<100 ground links)
2. Worldwide deployment: coverage of the missing areas from Demonstration phase (Africa, Americas, Europe, <1000 ground links). Optimization of the communication protocols (fast relaying, eliminate latency, optimize throughput, block broadcasting flag). L-Band (for smaller/cheaper terminals) and bi-directional transmission demonstration. Implement feedback mechanisms and focus on development of users network.
3. DASH Infrastructure:
 - a. Terminal hardware manufacture and retail
 - b. Cube Satellites (with 10Gb/s Transponders) manufacture and launch
 - c. Stratum mining protocol support

DASH LONG-TERM BENEFITS

1. DASH leading R&D in Telecommunication Infrastructure founded by the governance
2. Serving potential DASH users all over the world in places beyond the reach of the usual internet
3. Enable off-grid DASH applications (outdoor events, remote festivals, Air-gap, ATM, crypto communities)
4. Increasing network resiliency in case of localized catastrophic events (disaster, war, censorship)
5. Public Relations and Marketing benefits from Media exposure
6. Countering political intervention
7. Countless future applications that yet to be discovered (see some examples in Appendix D – Use Cases below)

SCOPE OF WORK

DEVELOPMENT:

- Client Terminal application
- Uplink hub Server application
- Prototype using testing frames
- Prototype with test data sent by Satellite communication company
- Uplink Hub Server hardware (for DASH node) procurement, installation and configuration (2 x for hub server and 1 x for testing platforms)
- Server Kernel hardening (meet uplink hub compliance policies for cybersecurity)
- Factory testing

INTEGRATION:

- On-site installation (cabinet installation + network interfacing)
- On-site Test and Commissioning
- Critical Security Controls auditing
- Comply with Uplink Hub regulatory authority

DEMONSTRATION & MARKETING:

- Demonstrate usability
- Write How-To and documentations to build terminal (translated in French, Spanish Arabic and Chinese)
- Online video for setting up the terminal
- Interface with DASH Meetups projects, focusing on countries having economic instability (Ghana, Zimbabwe, Venezuela etc.)
- Develop a DASH chain visualizer (example in URL ref. 10 in Appendix a - External references below)
- Organize media (YouTube, Al Jazeera, Bloomberg or CNN) demonstrating a real world usage in a remote location (e.g. Mongolia, PNG)
- Measure Media Exposure and Potential Reach

DELIVERABLES

SOFTWARE

1. Uplink hub Server application
2. Client Terminal application
3. DASH Transactions Real-time Viewer

The source code will be released Open Source on GitHub.

DOCUMENTATION

The following documentation will be available for download:

1. Master Programme
2. Submission List
3. Monthly Progress Report
4. Design Submission and Detailed Equipment Specification
5. Factory Acceptance Test Plan and Procedure
6. Uplink Hub Server and Modem Installation Plan and Procedure
7. On-Site Test and Commissioning Plan and Procedure
8. Test & Compliance Reports
9. As-Built Drawings
10. How-to & User Procedure (English, French, Spanish, Arabic and Chinese)
11. Public Relations Report

MEDIA

Videos:

1. YouTube Tutorial about Terminal Hardware Installation
2. YouTube Tutorial about Software Configuration
3. YouTube or News Agency (Al Jazeera, Bloomberg or CNN) story demonstrating a real-world usage in a remote location (e.g. Mongolia, PNG)
4. Professional animation with Voice-over, based on the conceptual graphic on the cover page, that would explain how the communication works

PROGRAMME

PRELIMINARY ENGINEER'S PROGRAMME

| Item | Completion Milestones | Completion Date |
|------|--|-----------------------------|
| 1 | Date for Commencement of the Works | Day 0 (proposal acceptance) |
| 2 | Feasibility study and Design | Day 60 |
| 3 | Development | Day 120 |
| 4 | Factory Acceptance Test Report | Day 150 |
| 5 | Integration, on-site installation | Day 200 |
| 6 | Integration, on-site T&C | Day 220 |
| 7 | Integration, regulatory authority compliance | Day 230 |
| 8 | Demonstration & Marketing | Day 360 |
| 9 | Completion of the whole of the Works | Day 560 |
| | | |

SUBMISSION SCHEDULE

| Item | Completion Milestones | Completion Date |
|------|---|-----------------------------------|
| 1 | Master Programme | 15 days after proposal acceptance |
| 2 | Submission List | 15 days after proposal acceptance |
| 3 | Design Submission and Detailed Equipment Specification | 30 days after proposal acceptance |
| 4 | Factory Acceptance Test Plan and Procedure | 30 days before Development |
| 5 | Uplink Hub Server and Modem Installation Plan and Procedure | 30 days before system Integration |
| 6 | On-Site Test and Commissioning Plan and Procedure | 30 days before on-site T&C |
| 7 | Test & Compliance Reports | Day 230 |
| 8 | As-Built Drawings | Day 250 |
| 9 | How-to & User Procedure | Day 270 |
| | | |

PAYMENT TERMS

12 Payments of 46 DASH for a Total amount of 552 DASH.

Payment address: XsH23RYJJqJZSASg5sfhr3ifeK1wiNZDUv

See full details in Appendix B - Financial details below.

PROPOSAL CONDITIONS

The proposal includes:

- Travelling allowances
- Company expenses
- Taxation
- Immobilisation
- Warranty period described below
- Hardware
- Software licence (if any)

WARRANTY

The Defect Liability Period includes:

- Support during 3 months DLP
- Investigation and correction of problems (see Non-Conformity & Defects Management)

CONTRACT PROPOSAL VALIDITY

The proposal described in this document is valid for 1 month after its submission by nThinking.

CONCLUSION

This project has the potential to open up a world of opportunity for the use of DASH. There are vast areas of the world where the financial infrastructures are in their infancy, and this proposal is a step forward to create a globally accessible cryptocurrency.

It is often easier to follow the urban and developed world perspective as more efficient and rational. In which case, there is not an imminent need to Stream the DASH chain from Geosynchronous Satellites unless you see increasing network resiliency in case of localized catastrophic events of force majeure as necessary, or there is a further concern with regards countering political intervention and censorship impacting the active transmission of the DASH chain. However, this proposal, that embraces the rural and underdeveloped regions, enhances the legitimacy of DASH as a globally accessible cryptocurrency.

In particular, Africa's population explosion offers a tremendous opportunity because financial infrastructures have not been built. Therefore, in parallel to the ongoing renewable energy revolution, humanity has a unique opportunity for developing regions to leapfrog the expensive steps involved in creating centralized financial banking authorities and embrace empowerment through decentralized finance.

Consider the women who are denied bank accounts by their families. Consider the repressed populations who can't purchase goods from overseas and overcome ever-stricter capital controls. With the free global transmission of the DASH chain marginalized communities have access to empowering financial services. There will be opportunities for funding small, inexpensive solar systems disconnected from the main-grid and located in regions without Internet access. This will enhance the availability of opportunities for empowerment and development.

Additionally, this proposal contains significant research and development efforts that will lead to innovative solution in the distribution of DASH. No matter whether it is using other wireless infrastructure or means of telecommunication, the work involved in this proposal is a leap forward in reducing the cost of transmitting DASH chain data all over the world.

Feel free to ask some questions on the DASH forum thread (ref. 10 below) or contact me directly.

Thank you for reading this document and I hope you're as interested in this journey as I am.

Gilemon Villemin

gilemonATnthinking.net

APPENDIX A - EXTERNAL REFERENCES

1. <https://blockstream.com/satellite/>
2. <https://www.forbes.com/sites/leonhardweese/2017/08/18/why-one-startups-plan-to-use-satellites-to-beam-bitcoin-data-around-the-world-might-anger-china/>
3. <https://www.rtl-sdr.com/tag/bitcoin/>
4. <https://github.com/Blockstream/satellite/blob/master/README.md#blockstream-satellite-receiver>
5. <https://en.wikipedia.org/wiki/Outernet>
6. <https://www.DASH.org/forum/threads/streaming-the-DASH-blockchain-to-the-whole-planet-from-geosynchronous-satellites.17279/>
7. <https://data.worldbank.org/indicator/IT.NET.USER.ZS>
8. <https://gilemon.com:8080/static/realTimeVizualizer.html>

APPENDIX B - FINANCIAL DETAILS

The following table lists the project financial planning in DASH*:

| Description | Items | Unit | Unit Price (USD) | Total (DASH) |
|---|-------|--------|--|--------------|
| Feasibility & Design | 10 | Days | | 17 |
| Development | | | | |
| Client Terminal application | 15 | Days | | 26 |
| Uplink hub Server application | 15 | Days | | 26 |
| Prototypes | 10 | Days | | 17 |
| Server Kernel hardening | 10 | Days | | 17 |
| Testing & Integration | | | | |
| Factory testing | 15 | Days | | 26 |
| On-site installation | 20 | Days | | 59 |
| On-Site Test & Commissioning | 20 | Days | | 59 |
| Security Controls auditing | 8 | Days | | 14 |
| Uplink Hub regulatory authority compliance | 8 | Days | | 14 |
| Asia C-Band Satellite single way file transfer data broadcast 1024 kbps | 6 | Months | \$5,148.00 discounted to \$4,290.00 | 126 |
| Project Management | 10 | Days | | 17 |
| Documentation | 8 | Days | | 14 |
| Demonstration & Marketing | 22 | Days | | 65 |
| Hardware | | | | |
| Uplink Hub 1U Servers (Production, Spare + Testing) | 3 | Items | \$2,194.00 | 16 |
| Uplink Satellite Modem + Parts (Production + Spare) | 2 | Items | \$5,391.00 | 26 |
| Electronics parts for Terminals | 1 | Items | \$5,780.00 | 14 |
| | | | TOTAL (DASH) | 552 |

*DASH/USD (as of 13/11/2017) = 408

APPENDIX C – DEMONSTRATION PHASE COVERAGE

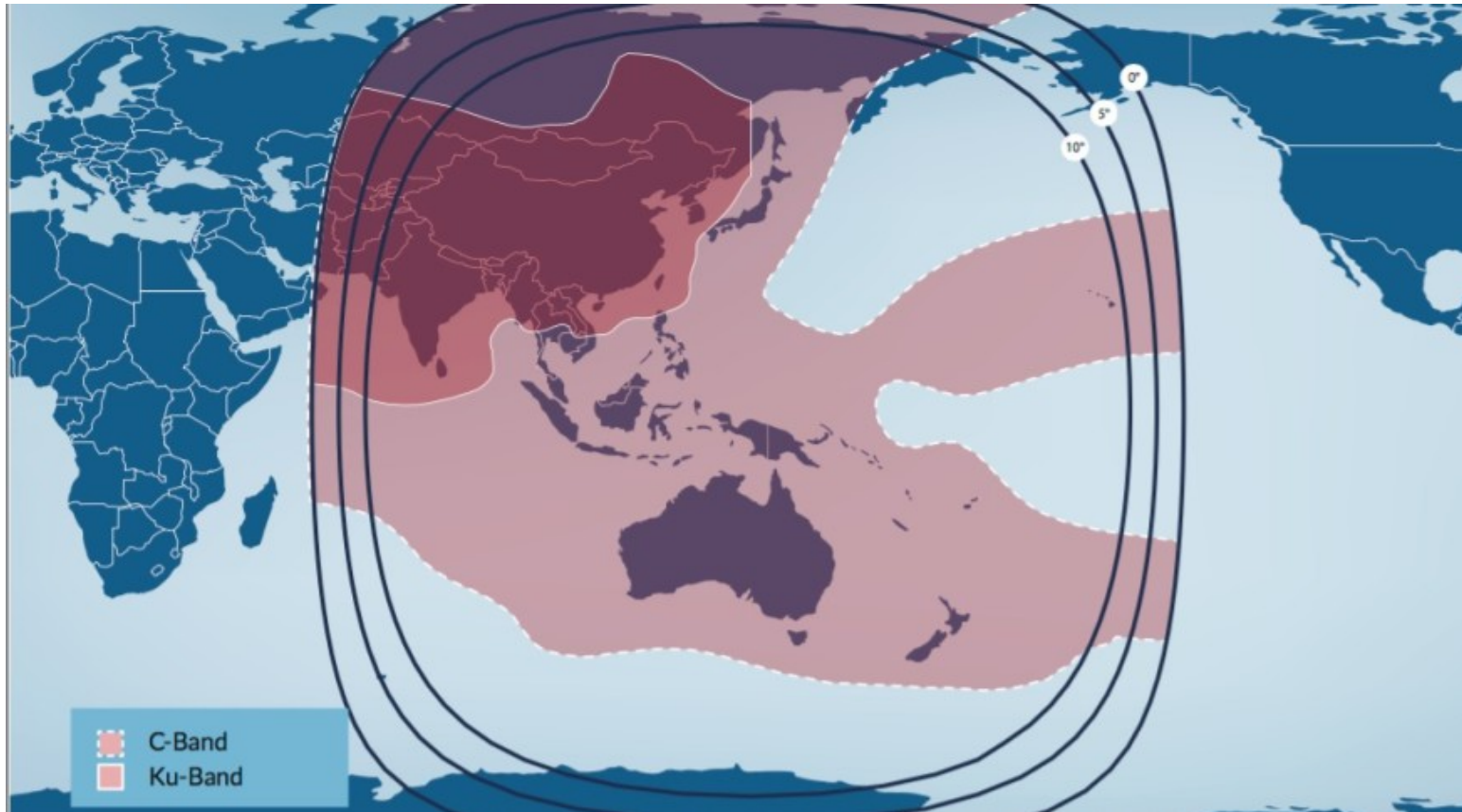


Figure 1: Asia Satellite footprint, source <http://spacenews.com/telesat-and-apt-partner-on-replacement-of-jointly-owned-satellite/>

EXAMPLE 1

Alice is prominent mountain guide. She spends most of her time above the timberline with no connection to the rest of the world. She has no interest and very little time to spend in cities. Dealing with the hassle of online banking is the last of her concerns.

Bob is a business owner in a small village in the valley. The village has roads but very expensive and intermittent access to internet with aggressive data caps. His shop sells the food and equipment necessary for organizing mountaineering expeditions. Bob also sells Wi-Fi access to traveller and he is a good friend of Alice. He proposes her services online.

Carol lives in a world-class city. Her 23rd floor apartment is connected to internet by gigabit fibre. She is organizing her upcoming challenge to the mountains. She wants to climb with Alice. Bob sends Alice's DASH address to Carol. Carol transfer the agreed amount within the next block. The block is broadcasted by satellite to Bob's full node. Bob can tell Alice that the transaction has been confirmed and she can book Carol into her schedule.

Alice has her funds secured within the DASH chain. She can use them as she wishes, for instance spending them at Bob's shop next time she goes back to the village.

EXAMPLE 2

Consider a Western Union kind of scenario. The granddaughter is called Carol and she works hard in a developed country to support her grandparents. Her grandma is called Alice and she lives in a small village in Papua New Guinea with no internet access. So, Alice needs to go the closest city to receive the money from Carol. But now in this village, there is a Bob with a satellite dish and willing to accept DASH.

EXAMPLE 3

Consider an off-grid commune in a remote Island of the Pacific Ocean. Ko Dash commune is autonomous and independent from the government. It has its own productive gardens that grow its own vegetables as a method of self-supply. The commune also makes independent decisions in regards to administration and the use of funding using the DASH currency. The Island has no internet access. There is a library receiving news and Wikipedia and critical messaging alerts and weather forecast through Outernet.

Bob has a bi-directional satellite connection with the DASH satellite. His nodes can be fully synchronised with the DASH chain.

The Ko Dash commune owns some Masternodes. Half of them are hosted in Iceland and the rest is hosted in Ko Dash, powered by the abundant solar energy. These Masternodes have many important uses. They insure a steady flow of revenue that can be converted on demand in fiat currencies to purchase critical goods and parts from the mainland. They also allow to validate transactions in-between the different parties in the island to avoid the problems involve with tacit orals agreement that usually leads to the erosion of social trust.

EXAMPLE 4

A photographer wants to make a journey in a remote location to take some pictures for a future book. The photographer finds a local guide to help him make his way through the beautiful but unforgiving environment. Only the guide does not wish to be paid in the local currency, as the inflation in this country is over 10% a year and is steadily increasing with the political uncertain surrounding the current government. He is aware that while inflation in western countries is lower storing actual physical cash for him has many disadvantages and gold in recent years has diminished in value. He wishes to start storing his wealth in crypto-currencies.

The village where the guide lives has no internet access; they receive TV by satellite for their entertainment. In order to make some transaction with some travellers, the guide has managed to install a dish to receive the DASH chain and valid payment made by travellers for his service. The photographer transfers DASH to the guides wallet.

EXAMPLE 5

On a trip to Mongolia Alice stayed with a Mongolian family in their Yurt. She stayed there for two weeks riding and studying wild horses. While the area was sparsely populated, her host family had veterinary facilities and winter encampment 30 miles away that had a dish to receive the DASH chain. The Capital, Ulaanbaatar was over 700 miles away.

Alice flew back to Berlin and later that year noticed reports that a severe winter was expected for Mongolia. As she sat drinking coffee in a small restaurant in Berlin, she worried for her host family and the horses she was riding. She knew that a severe winter would drain the resources of her host family and she wished to assist them directly in their winter preparations to keep as many of their livestock as safe as possible.

Alice transmitted DASH that was received the winter encampment via the DASH Satellite. The chain was updated, and her host family were able to order supplies and secure their livestock with extra resource at the winter encampment

Alice return to Mongolia the following spring to her see familiar horses and her host family embraced her now as family.

EXAMPLE 6

Alice is a crypto trader living in a dense city in a country with restrictive financial regulation. The punishment for law infringement is harsh and it is leading Alice to become very careful about the way she is accessing Internet. She is not able to access any crypto currency news anymore in the fear of being flagged to the government by his Internet Service Provider. Virtual private network (VPN) solutions have also been compromised a long time ago because of many important political reasons.

Alice has installed a antenna on the roof of his building to receive the precious information from the DASH satellite.

EXAMPLE 7

Consider a remote micro-village, off the grid - getting its energy from solar and wind sources – and without mobile phone coverage. The micro-village has a lot of natural resources – fishing, semi-precious stones mining, wild honey - but depends on other villages for the manufacture of their tools - thread to make fishing nets, metal for blades, ropes – and for some processed food. The micro-village economy is based on barter.

Villagers have set up a satellite dish with a simple computer to receive the DASH chain. They also have established a communication protocol with other villages and barter partners that uses decimal parts of the transaction amounts.

When a transaction is received, they can decode the decimal part and translate it to whatever they have decided during their previous meeting with other parties (villages, trading companies etc.).

For example: a barter order, a delivery request, a notice that some manufactured tools are ready for pick up, an appointment for future barter discussions, etc.

The villagers orally discuss the future coding/decoding the chain transaction when they physically meet with the other parties.

They can either get paid in DASH or more likely by bartering their natural resources with goods or tools manufactured by the other villages.

EXAMPLE 8

Alice is a farmer in Australia. Her fields are remote, with no mobile phone coverage and can only be accessed by airplane.

She sets up a solar powered satellite dish to receive DASH chain and smart hydraulic valves. Each valve has a specific DASH address assigned. By sending a transaction from her farm to the correct addresses, she can open and close the valves and control the optimal watering of his fields.

EXAMPLE 9 (REQUIRE BI-DIRECTIONAL TRANSMISSION)

Alice owns a huge untapped land, blessed with lovely streams and pools, than provide uninterrupted stream of water. She lives in a hydro power goldmine. But both the power and information grids are 100 of miles away. She has no use for the hundreds of kilowatts of hydro energy her land could accommodate if some generators were strategically installed.

She has heard of Dash mining and that she can install a bi-directional satellite terminal to access the stratum overlay protocol. She can now cleverly make use of this 2 TH/s of hashing power.

APPENDIX E – DASH NODE NETWORK TRAFFIC & STATISTICS

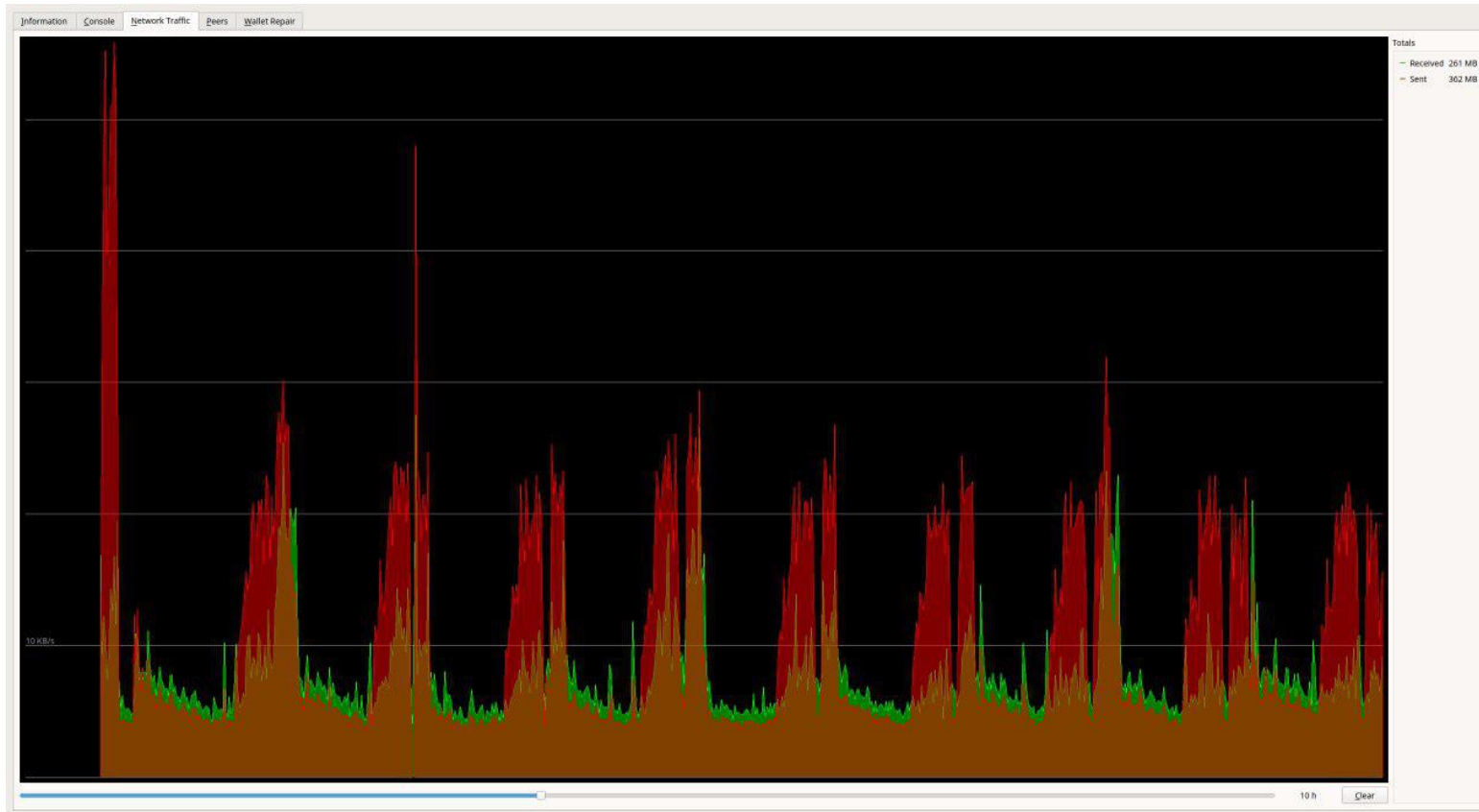


Figure 2: 10H of Full Node Network Traffic, Download peaks at 20KB/s with average of 7KB/s (recorded on 24/10/17)

| Description | Current Value (2Mb block) | Projected Value (300Mb block) |
|---|---------------------------|-------------------------------|
| DASH Chain Size | 4.32 GB | 600 GB |
| Block Time | 2m 36s | 2m 36s |
| Block Size | 11 Kbytes | 1.6 Mbytes |
| Blocks 24h | 554 | 83,100 |
| Blocks avg. per hour | 23 | 3,450 |
| Transactions over 24h | 7,320 | 7,320 |
| Transactions avg. per hour | 305 | 45,900 |
| Average Bandwidth Consumption 24h | 6 MB | 900 MB |
| Average Bandwidth Consumption per week | 42 MB | 6.3 GB |
| Average Bandwidth Consumption per month | 189 MB | 28 GB |

Table 1: Dash Network Statistics, source <https://bitinfocharts.com/dash/> (11/11/2017)

END OF DOCUMENT