Bloculus - Business Case

Communications Protocol | Version 0.0.1

Author(s): DATRO Consortium

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Contents

Release Notes and Notices

This section provides information about what is new or changed, including urgent issues, documentation updates, maintenance, and new releases. - ‚Updates' are the term used to describe significant changes to our public source code and/or records.

1.1 This Release (Version 0.0.1)

- **2021-Aug-24** - *Archived version 0.0.0 (see older versions table below) and updated this (latest) release to symantic version 0.0.1 accordingly*

- **2021-Aug-24** - *Rebuilt using new rebuild.sh script (adds copyleft date range in footer)*

- **2021-Aug-24** - *Added some more text - mainly to justification segment*

1.2 Older Versions

In the table below the last entry displays a link to an archived copy of the last report. To keep the filename from overflowing in the table below the name displayed may differ from the file name. The date the file was archived will differ from the date of the document label, which is its creation date. If you're viewing this document on a subdomain of *.datro.world* you may need to right-click and select ‚open link in new tab`. In the interim of a bug fix, you can avoid right-clicking all together, by viewing our document library at its original location datro.xyz/static/library

Table1: Older Versions of this Document

Archive Date	Version	Description	Download Link
2021-08-24	0.0.0	see releasenotes	2021-08-24__v0.0.0.pdf

1.2.1 Version 0.0.0

- **2021-Jul-24** - *Added SVG download links in Annexures*
- **2021-Jul-11** - *Added Annexures with Resolutions 5 and 6*
- **2021-Jul-09** - *Document title changed to „Business Case"*
- **2021-Jun-24** - *Changed document title to match directory path (which was changed from 'recon' to 'sitesurvey')*

1.3 Known and Corrected Issues

Below is a table of pending issues which have been reported to our team. When these issues are remedied, or any significant changed made, a new release will be published.

Table2: Known Issues

Date	Version	Subject	Description
2021	0.0.0	security	`Having the domes H3 cell reference/ location in HotspotBnB prior to it autonomously self-building is cool; but the solution must circumvent bad actors'

Executive Summary

DATRO is a for-profit consortium that is currently pioneering (and actively beta testing) its own web3.0 internet service along the 70km „Scottish Bay" caribbean coastline. This new fixed communications infrastructure comprises of geodesic communications equipment rooms (entitled „Neo Dome's"), which are solar powered and mesh together using licence-free Radio Frequencies (RF).

The entire network, including the communication rooms blueprints to the software which operates them and the end-users wireless access points, are in the public domain under a General Public Licence (GPL) - allowing anyone, anywhere to launch the same secure and decentralized network in their area. The purpose of this document is to introduce a component of this network entitled the Bloculus Protcol, which is to become the underlying foundations of this new type of (web3.0) network. This document will also briefly explore the business model and subsequent business opportunities surrounding the Bloculus protocol.

2.1 Challenge

The Bloculus protocol is being developed in order to overcome a few core challenges;

1. Each newly constructed Neo Dome needs a suitable protocol to quickly, securely and autonomously locate and pair with neighbouring Neo Dome's over licence-free Radio Frequencies

2. After establishing secure radio links, the DWeb/Web3.0 nodes hosted inside the dome(s), must have a method to autonomously pair to their corresponding nodes inside neighbouring domes

3. Character lengths/ texstrings must be short enough for the protocol to operate effectively over low-bandwidth/low-cost/low-energy fallback radio links e.g. LoRaWAN, Cellular USSD etc

4. The same protocol used to establish links of equipment rooms and nodes contained within, will serve to route and re-route traffic over the network e.g. uptime monitoring etc

5. Protocol will be exclusive to the DATRO Consortium. Usage of the protocol will be autonomously compesated by the nodes using it, using cryptocurrency smart contracts e.g. a Decentralized Autonomous Organization (DAO)

2.2 Solution & Outcomes

This new protocol has been named Bloculus, which is a combination of the two primary words which best describe it:

- ‚Bloc' is a referece to Blockchain (particularly the Polkadot blockchain which is used in this protocols day-to-day operations)

- ‚Loculus' is an architectural and biological reference, used to describe a „little place" and/or compartmentalisation

The Bloculus protocol works by combining Uber's hexagonal („H3") grid reference system with the Top Level Domain platform: Handshake. The result is a dedicated Top Level Domain (TLD) for each hexagonal grids unique reference. Initially the protocol and TLD's function on a Local Area Network (LAN) basis, then when a gateway exists on the network, the TLD's validate and become accessible to the Wide Area Network (WAN). In order to share in the excitement and opportunities surrounding this new protocol, it's worth having a basic understanding of Ubers H3 system and the Handshake platform.

There's a multitude of grid reference systems in operation e.g. Universal Transverse Mercator (UTM), Military Grid Reference System (MGRS) etc One of the most unique is Ubers H3 solution, which instead of referencing a point or square on a map it uses hexagonals, commonly known as „honeycombs". A key feature of H3 used by DATRO is called „resolution", which permits the size of these honeycombs to be selected from a shortlist.

H3 Resolution	Avg. Hexagon Area (km2)	Avg. Hexagon Edge Length (km)	No. of unique indexes
5	252.9033645	8.544408276	2,016,842
6	36.1290521	3.229482772	14,117,882
7	5.1612932	1.220629759	98,825,162
8	0.7373276	0.461354684	691,776,122

For DATRO's new network, 500 meter long honeycombs are sufficient for a balance between security obscurity and locationv accuracy. The closest suitable resolution is therefore resolution 8, which sets the honeycombs lengths to 461 Meters. Each of which has a dedicated 15 digit unique reference ID e.g. 8843a13687fffff

There's a ‚self-service website <https://observablehq.com/@sw1227/h3-index-visualizer>'__ for experiencing H3 in action without having to set it up locally. You can right click and edit the map and enter a UTM co-ordinate to specify the location. (remembering to reverse longitude and latitude). This is better than trying to pan and zoom to find a location, since the website is heavy on resources and crashes.

In any case, use of these h3 references isn't something which can be exclusively owned and controlled. So how to we overcome this challenge ? Enter Handshake. To understand Handshake its best to first understand Top Level Domains (TLD's). TLD's are unique in nature e.g. dot com (.com) for example is only able to be possesed by a single entity at any one time. If two entities both provided the TLD .com at the same time, how would a network know which party's .com to direct traffic to when someone enteres a .com url into their browser ? .com used to be owned by the United States Department of Defense, but today it's operated by Verisign. Until Handshake came along, you could only obtain a TLD through an expensive and lengthy processes ($130k - $180k and 6+ months) with ICANN (which also offered no guarentees). The Handshake platform has democratised and cheapened this process through what is known as a candle auction. Now registration only takes a few dollars and a couple of days.

In the case of the Bloculus protocol its possible to have a dedicated TLD for each H3 reference e.g. .8843a13687fffff The nodes running in the domes are categorised and these categories are listed as the domain name e.g. messaging.8843a13687fffff And finally the name of the service running in the dome is listed as the subdomain e.g. matrix.messaging.8843a13687fffff

The domes can now establish links autonomously, since the addressing system contains the physical location. Next the services/ nodes running inside each dome can pair quickly by specifying the corresponding domain and subdomain. And later, when the network is a few domes and nodes in size, the Bloculus protocol can be used to route traffic around the network, more effectively than anything in existance.

2.3 Market Potential

DATRO's approach is to sell 50% co-ownership (co-lessor rights) for a one time fixed sum of $500 USD per 460 meter honeycomb. For this price the Scottish Bay alone will generate in the region of circa $1.4M USD of digital real estate inventory for the consortium to sell. The area is defined by the 70km width of the coastline and the depth is inland as far as the west/southern boundaries of the two provinces which make up the Scottish Bay. The services and nodes inside each dome effectively become lessee's, using cryptocurrency smart contracts to lease use and enjoyment of the Bloculus protocol. The proceeds of which will pool together and divide proportionately between the protocols lessors/ beneficiaries. Henceforth the Scottish Bay will become the first of many estates, of this new protocol. Furthermore, the web3.0 services and nodes on this new fixed communications network, are expected to be the first of many types of digital lessee's which will pay to use the Bloculus protocol.

2.4 Recommendation

It's recommended the consortium expand on this business case and produce a dedicated whitepaper on the technology. It would be wise to purchase the Scottish Bay's entire H3 references as TLD's, ahead of competing party. Then select future regions of the world to ringfence H3/TLD's for use with this protocol. The retail rate of co-ownership of the preceeding estate, should help towards this growing capital requirement, failing this investors maybe interested in financing this initiative.

Moving forward the consortium will overlay the desired H3 grid onto a map of the Scottish Bay. A salesforce will sell the inventory to interested parties. The lessor/lessee agreement will be as a cryptocurrency smart contract.

A typical business case would see this estate divided into 2,800 honeycombs.

    a) In this example a capital investor purchases co-ownership of a quarter of this estate (700 H3 hexagons) for circa $350,000 USD ($500 per honeycomb).

    b) The first lessee is the aformentioned mesh network, which takes say 3 years to construct and begins earning in the region of $6M USD per annum for use/enjoyment of the protocol.

    c) The benefactor which co-owns a quarter of the estate would receive $750,000 USD per annum in royalties.

    d) At this juncture the currency invested would be USD but the currency generated by the network and paid to beneficiaries would be the cryptocurrency DOT (on the Polkadot blockchain).

The interface for configuring the final phase of deployment of the domes is HotspotBnB. A simple localhost webapp, developed by the DATRO Consortium. HotspotBnB features a built in appstore which supports ‚one-click' install of a variety of software (including DApps) for uniformity and scaliability. HotspotBnB is ultimately just a webserver designed to run on a low energy/ low cost single board computers e.g. Raspberry Pi. The operating system autonomously self-builds and configures. And can do so without an active internet connection (using another DATRO solution called Cacher)

DATRO is soon to release a self-service website for making customisations to this autonomous self-buiding OS prior downloading a copy (websites are also all accessible offline via Cacher) HotspotBnB can be used as a residential

wireless IoT Home Server if the end-user enters their wireless router SSID and password before generating their copy of the OS. HotspotBnB can also be used to manage a Geodesic Equipment Room if the physical location (in H3/ resolution 8 format) is pre-selected in order to include the H3-TLD inside the OS. Now when HotspotBnB is booted up (providing an active internet exists or Cacher is used to simulate internet) it can identify itself and pair to other equipment rooms in its proximity.

2.5 Justification

This protocol is justified from both a technical and business standpoint. The alternatives aren't half as effective and have limitations which this protocol overcomes. Furthermore this is a new generation of communications network and so a new protocol has had to be developed specifically because the existing technologies didn't suffice. The Bloculus protocol is designed for a reality of automation, decentralization, anonymity, cryptographic security, currency and tokenized voting/ liquid democracy.

The vision of web3.0 (in the eyes of DATRO in anycase) are wi-fi access points which host all webservices as decentralized (federated) localhost progressive webapps. There is subsequently no central point of control or central service provider. Furthermore the network meshes, so even the concept of an ISP becomes exstinct (see althea.net) Furthermore this access point software (able to host the abovemonetioned webapps) will work on many of the existing 1Billion wireless access points.

Although the expectation of these pre-existing access points is low in terms of storage and webserver capabilities, they should be enough to serve an on onramp for a web3.0 revolution. In parallel will run single board computers, which will more sufficiently operate the abovementioned webserver software and connect to pre-existing wireless access points. As with Bitcoin, the concept of ISP's, much like banks pre-cryptocurrency, will decentralize e.g. althea.net And centralized webservices e.g. whatsapp, salesforce, meetup, dropbox etc will be succeeded by decentralize, federated, localhost web-services e.g. matrix/element, crm?, odoo, owncloud etc

There is popularity with progessive localhost webapps with smart-homes e.g. jellyfin, virtual/ mobilegamepad, openhab etc And with the work-from-home boom post 2020, the fediverse (federated universe) boast some 2million users, with a growing emergence of business applications decentralizing and federating. Returning full circle, the implimentation of fediverse in homes in still a technical process. Hence why DATRO's focus is a universal, fully-autonomous, self-building, webserver for wireless access points/ single board computers connecting to wireless access points.

The software (entitled HotspotBnB) provides end-users with a friendly user-interface to explore and install web-apps and a friendly local hostname for network access e.g. https://hotspotbnb/ In effect the HotspotBnB search engine on the intial splashpage will display web3.0 applications, which can be installed with 1-click. The more decentralized, federated webapps end-users install locally, the less they'll use web2.0 e.g. Google, Facebook, Dropbox, Twitter etc And with IPFS websites themselves are decentralized too. For this reason IPFS may become part of HotspotBnB during installation. In much the same way we're considering making the virtual touchpad, keyboard and gamepad controller part of HotspotBnB. Since single board computers have HDMI out. Without digressing into detail any further, this is all to say, that this vision of web3.0 is why a protocol such as Bloculus is being thoughtup.

Bloculus does use Uber's H3 grid reference system which symbolises geographics locations with unique references per each hexagonal in a fractal layered way. But that's not to say each end-user wont obtain a Bloculus H3 reference as a Top Level Domain which corresponds to the physical world location. Security through obscurity is important so the real-world location wont be mandatory. But it will help to have the end-users systems adopt a h3 ref. in a proximity of their location. The reason for this is due to the fact the ISP role is also decentralizing, so the packet routing and speed will be optimum if it can triangulate/ drill down using h3's levels.

For example Jack is in Scotland and Jill is in London. Jack's message to Jill will get to her by asking each H3 level 1 if Jills H3 level 8 reference is contained within it. The search for Jills reference (as oppose to IP) will search outward from Jack's location in Scotland all the way down to London (not outward over sea, since marine is ignored with Bloculus). And with just a few logical queries at a H3 level 1, a binary 1 will be returned indicating Jills address (h3 level 8 TLD) is part of, say, the 12th H3 level 1 reference queried. Then the routing will query that H3 level 1 reference for all of its level 2 reference until a binary 1 is returned for the H3 level 2 reference containing Jills h3 Level 8 TLD)

This triangulation feature of the bloculus protocol effectively paints a realtime map of a nationwide mesh network. Since each user's alloted TLD (as oppose to IP address) will have similar domains and subdomains to reflect the locallyhosted decentralized services they're hosting, the federated services can all connect and sync autonomously, including with those on each radio-relay station.

Futhermore anyone hosting the same federated webservice as Jack and Jill, regardless of if they're a radio-relay between the two friends, effectively help share the load of the overal service, meaning Jack and Jill maybe miles apart, but the service is faster than any centralized service, using DNS and IP etc. And anyone can pull blueprints, build HotspotBnB locally, install decentralized/ federated web-apps, scan and join an Althea mesh network and contribute to and reep the benefits. The concept of Bloculus is secure, decentralized, autonomous, highly compatible and can be made simple to deploy. For the revolutionary implications of such a protocol (Bloculus) and wireless access point operating system (HotspotBnB), the source code itself is public, decentral and under a General Public Licence.

2.6 Annexures

A suppliment or appendix to a written document. An annexure is an addition to something, often to a document. When used generally to simply mean something added, annexure is interchangeable with annex. More commonly used in Britain and India, where it often specifically refers to an addition to an official document.

CHAPTER 3

Finance

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Project Definition

4.1 Background information

4.2 Business Objective

4.3 Benefits and Limitations

4.4 Option Identification & Selection

4.5 Scope, Impact, and interdependencies

4.6 Outline Plan

4.7 Market Assessment

4.8 Risk Assessment

4.9 Project Approach

4.10 Purchasing Strategy

CHAPTER 5

Project Organization

5.1 Project Governance

5.2 Progress Reporting

Annexures

This section contains the Annexures, referenced in the text above. The *Download Links* for these Annexures can be found at the very end of this document:
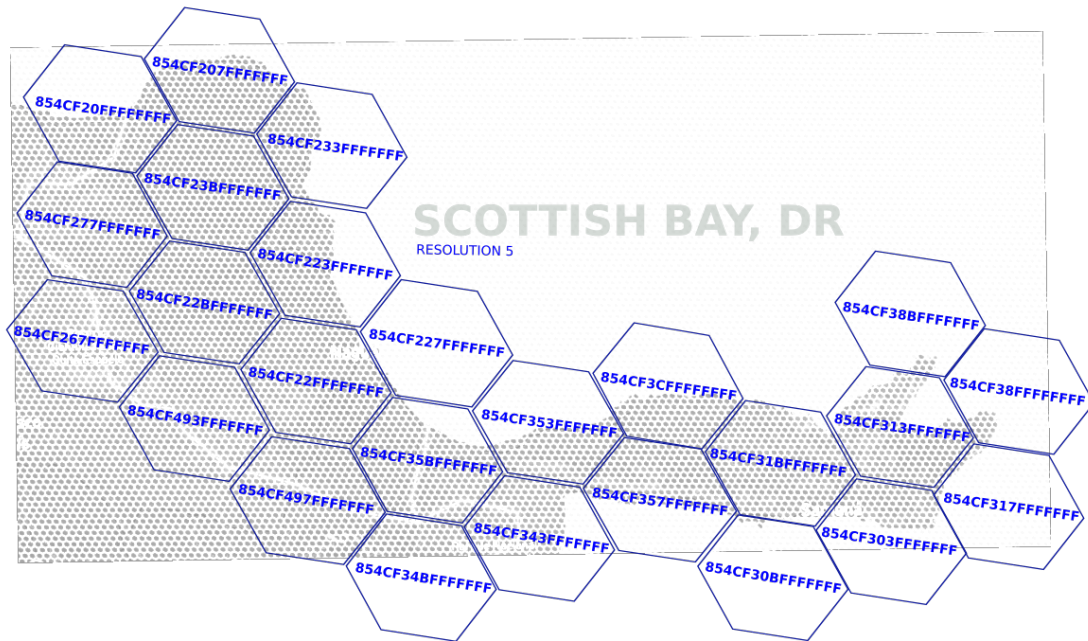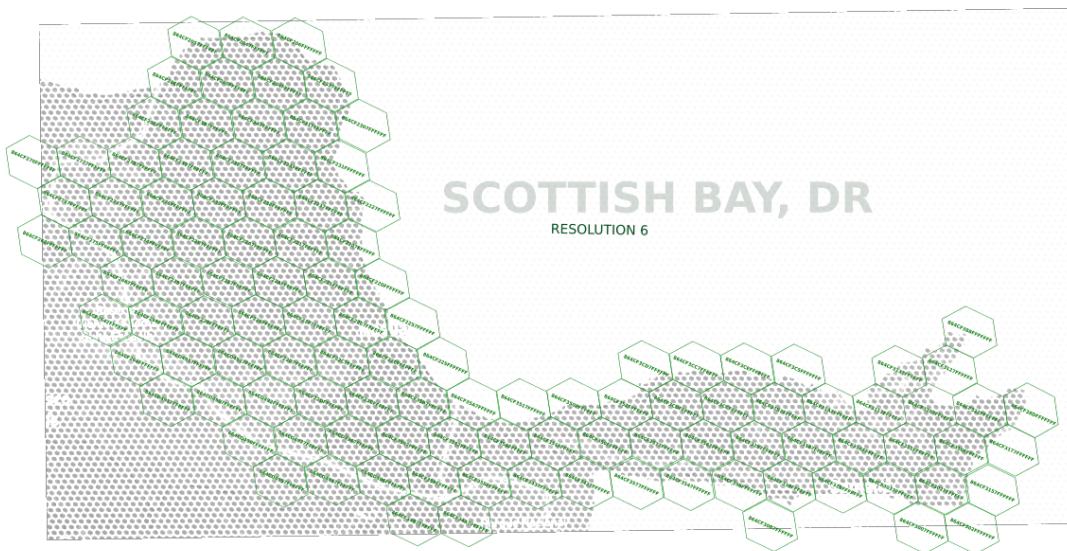
6.1 Resolutions 5,6,7 & 8

Download the SVG File

6.2 Resolution 5 (8.544Km Wide Hex's)

Download the SVG File

6.3 Resolution 6 (3.23Km Wide Hex's)

Download the SVG File

6.4 Download Links

See below a table of the download links for the Annexed items in this document:

Table1: Download Link of Annexures

Date	Description	PDF	SVG	PNG
2021-07-24	Resolution 5 6 7 & 8		link(1.46Mb)	link(630kb)
2021-07-11	Resolution 5: 8544.4 Meters Wide		link(1.5Mb)	link(514Kb)
2021-07-11	Resolution 6: 3229.5 Meters Wide		link(1.5Mb)	link(537Kb)

CHAPTER 7

Document Author(s):

7.1 DATRO Consortium