WHITE PAPER

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This is the FINAL document published prior to the RightMesh Token Generating Event (TGE)

This document constitutes a description of the RightMesh platform and the functionality of the RightMesh RMESH tokens; it is for informational purposes only and may change as the RightMesh technology develops over time.

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A Decentralized Mobile Mesh Networking Platform Powered by Blockchain Technology and Tokenization

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Our Vision

We believe in the right to connectivity. A connected world is a better world. When you give people the ability to connect—to the world, to each other, across the street, or around the world—the world becomes a more intimate place where anything is possible.

We believe in the rights of an individual and net neutrality. A person has the right to privacy, security, freedom of expression, and freedom of association. When you empower a person with the ability to earn, contribute, own property, and generate value, the Community benefits.

We believe in doing the right thing. Basic human decency appears not to be so basic anymore. Just because we believe in the rights of the individual, doesn't mean we don't have a responsibility to care for and protect each other and the planet. There are things we all share: humanity, the air, the environment, knowledge, ideas. If we take care of these not-so-little things, we are all better for it.

We believe we are fortunate to live in a world where technology can enable and protect these rights. As such, it is our responsibility to create an ecosystem that connects the world, empowers a new generation of digital entrepreneurs, and allows the unconnected to access content and information that improves their life outcomes and makes the world a better place for all.

We believe these things are right. We are RightMesh™.

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Change Log

Date	Version	Comments/Edits	Editor
Sept 7, 2017	v.1.0	Initial version of the White Paper published for Community Feedback	JL
Dec 11, 2017	v.2.0	Updated Advisors Updated Legal & Regulatory Elements	JL SO
Dec 14, 2017	V.3.0	Updated legal statements (not cover page and date) Updated description of RightMesh platform and mockups	MQ JL
Jan 24, 2018	V.3.1	Additional Advisor	MQ
Feb 15, 2018	V.3.2	Updated Advisors, Team Members, Corp Name, Ticker Symbol, and Telegram ID	JL
March 8, 2018	V.5.0	Include token usage, case studies, roadmap, and minor grammatical details	JL

July 9, 2019	V.6.0	Roadmap and minor grammatical details	AM

Abstract

At RightMesh, we have created new technology platform and protocol for connecting users in an ad hoc wireless mesh network, and in so doing, we are creating new connectivity options and improved outcomes to billions of unconnected users around the world—all while providing a pathway to a new Internet for all. The fight for Net Neutrality is real. A decentralized mobile mesh networking platform, powered by blockchain technology and tokenization, can put the power of connectivity back into the hands of the people.

Core to the platform is an Ethereum account and identity layer that uniquely identifies every mesh node. In an off-the-grid mesh world, when linking multiple hotspots and networks together, traditional identity methods (IP addresses) will not work adequately. The network's approach to mesh participation and activation solves this problem. We believe that when you combine blockchain-based technologies, token incentivization, and wireless mesh networks—you unleash the potential of both technical and economic network effects while making a lasting difference on the world around you.

We call this RightMesh™.

With RightMesh, the devices people already carry around everyday form the infrastructure. This is a software-based solution running as a background process on a device that will achieve distributed decentralization that will only continue to strengthen with network density. The key principle is that the RightMesh network is self-forming, self-healing, and self-regulating, using whatever it has at its disposal. It runs on devices most of the world already uses and can easily afford. No additional hardware or infrastructure is required, and no longer will people be beholden to ISPs.

As both a platform and a network, RightMesh enables developers to retrofit existing mobile applications or build new, decentralized mesh applications. RightMesh also intends to introduce a RightMesh utility token, or RMESH (alternatively Mesh Token and/or Mesh Coin), that participants in the ecosystem will use to facilitate the purchase and sale of goods and services.

One example of such a transaction would be an application that empowers a RightMesh user to sell excess Internet capacity, giving those who do not have access to this utility the ability to connect to other meshes (today) or consume general Internet traffic (soon). There will soon be more than 6 billion smartphones[1] on the planet and 20 billion IoT devices by 2020[2], a lot of which will have underutilized connectivity, storage, and processing capabilities. This is the sharing economy flattened by a P2P, decentralized revolution. And just as companies have shared their homes (Airbnb) and automobiles (Uber and Lyft), RightMesh will empower users to take control of their device and extract its intrinsic, already-invested value, but without relying on middlemen.

Another example might be a user who creates a digital good (i.e., music, video, apps, magic swords, or photos) and transmits this to another user for an exchange of RMESH tokens. We live in a world that is becoming increasingly digitized, and thus, the concept of work and value creation has

[1] IHS Markit, Global Smartphone Install Report 2017, January 2017, (Source: http://bit.ly/2jKEZbG)
[2] Cisco, *Cisco Visual Networking Index Mobile 2017*, February 2017, (Source: http://bit.ly/1Qehjo2)

changed. A user with a connected smartphone can transact and produce value that is useful to a person or machine on the other side of the planet.

RightMesh believes this ecosystem will create a new generation of digital entrepreneurs, provide a viable option for a free and open Internet as initially envisioned—all while helping emerging economies access content and information that improves their life outcomes.

Why RightMesh? Why Right Now?

Connecting the World is the Right Thing to Do

As the McKinsey Global Institute pointed out, there is a strong correlation between access to the Internet and one's contribution to wealth creation, making possible "*...new waves of business models and entrepreneurship"* as well as *"radical innovations for accessing, using, and delivering goods and services for everyone."*[3]

Furthermore, as Manuel Castells, distinguished author and oft-cited Professor for Communication Technology and Society at University of Southern California stated, "*The Internet is the decisive technology of the Information Age, as the electrical engine was the vector of technological transformation of the Industrial Age... this global network of computer networks, largely based nowadays on platforms of wireless communication, provides ubiquitous capacity of multimodal, interactive communication in chosen time, transcending space.*"[4]. Castells further adds, "*The Internet ensures the production, distribution, and use of digitized information in all formats*", calling out a 2011 study published by Martin Hilbert in Science noting that **95 percent of all information existing in the planet is digitized and most of it is accessible on the Internet and other computer networks.**[5]

Given the above, it should have surprised no one when in June of 2016, the United Nations issued a declaration on the importance of connectivity and that access to the Internet and online freedom is a human right. The UN Resolution called on nations to apply *"a comprehensive human rights-based approach when providing and expanding access to the Internet and for the Internet to be open, accessible, and nurtured."*[6]

Providing global connectivity and access is simply the *right* thing to do.

Blockchain Makes it Better

Given the already significant technical impact the Internet has had on society and economies, a new technology has emerged with the potential to radically transform network connections and make global data flows even better. The technology is known as blockchain.

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[3] McKinsey Global Institute, *Internet matters: The Net's sweeping impact on growth, jobs, and prosperity*, 2011, (Source: http://bit.ly/2tXIgfC)

[4] Manuel Castells, *The Impact of the Internet on Society: A Global Perspective*, 2014, (Source: http://bit.ly/2u14c9w)

[5] Martin Hilbert and Priscila Lopez, *The World's Technological Capacity to Store, Communicate, and Compute Information,* Science, 2011 (Source: http://bit.ly/2u1dYs9)

[6] U.N. Office of the High Commissioner for Human Rights, HRC, Resolution A/HRC/32/L.20, 2016, (Source: http://bit.ly/2sUVsSQ)

When deployed across a network, blockchain can remove inefficiencies, increase trust and security, and enable new technological advancements without the need for middlemen[7], the primary beneficiaries of the Internet economy in the current paradigm.

The hype behind blockchain has been at an all-time high, thanks largely to dramatic increases in value of many of the world's cryptocurrencies that use this technology as their underpinnings. While a lot of the hyperbole gives many reasons to be excited, the statement "*Blockchain can change the world*" needs to be amended to include the statement, *"...if the user has connectivity."* Without connectivity, the power and potential of blockchain—and decentralized networks in general—is much reduced .

Connecting the Unconnected

In fact, the world is NOT connected. **There are nearly 4 billion people-—over half the world's population—who lack connectivity** (3.7 Billion, April 2017).[8] These people cannot benefit from the societal and economic benefits brought about by the Internet.

According to PwC Strategy&, *"Affordability is the main barrier to Internet adoption.... The Internet's truly revolutionary potential will be unleashed only when the remaining 56 percent are also connected. This will create millions of new jobs, develop vast new markets, and lift millions out of poverty."* The PwC study noted that data prices needed to fall by around 90% below 2016 prices on average to be universally affordable (defined as 500MB costing less than 5% of the monthly income).[9]

However, PwC concludes universal affordability is "*challenging*" given that margins on data are already negative in many developing countries. And that, *"reducing data prices while increasing capacity to deal with ever-increasing data demand requires modernized technologies and a rethinking of content distribution."*

It is not that this less-connected half of the population does not have the potential for access. In Facebook's *2016 State of Connectivity Report*, they found that 96% of the world's population live within range of a 2G mobile signal.[10]

Throughout the past year, connectivity reports have been improving somewhat over 2016 figures according to the Global System Mobile Association (GSMA), largely because of cheaper smartphones and gradually-decreasing data costs. New smartphones—complete with cameras, Wi-Fi, Bluetooth, and an abundance of sensors—provide the possibility for connectivity, assuming data costs are reasonable and networks are not over capacity (which, unfortunately, they often are).[11]

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[7] Vinay Gupta, Harvard Business Review, The Promise of Blockchain is a World Without Middlemen, March 2017, (Source: http://bit.ly/2mtyPk0)

[8] Hootsuite, *Global Digital Snapshot: The global state of the internet in April 2017,* April 2017 (Source: http://bit.ly/2rQNHgk)

[9] PwC Strategy&, *Connecting the World: Ten Mechanisms for Global Inclusion, May 2016*

[10] World Economic Forum, *4 reasons 4 billion people are still offline, February 2016,* (Source: http://bit.ly/264bhR3)

[11] One of the more recent, public examples of overcapacity occurred in July of 2017 at Chicago's Grant Park when the first Pokemon GO Festival descended into chaos. As reported by The Guardian, *"Trouble started almost immediately. From 6am on the day – four hours before the event was due to start – players were complaining they were unable to log in, as the concentration of high-bandwidth connections swamped, then collapsed, mobile*

Telecom infrastructure companies argue that the future does look bright, with the potential for 5G networks. These fifth-generation cellular networks promise to provide ubiquitous connectivity, extremely low latency, and very high-speed data transfer. Unfortunately, forecasts are calling for only 150M subscriptions to 5G networks by the year 2021, and most of these will be in well-developed economies.[12] Furthermore, the GSMA reported that there will be more than 1 billion people in the year 2020 that will still rely on 2G connectivity.[13]

Piling onto this pessimistic news is the fact that demand for data is increasing. With the introduction of new, larger-screen smartphones and data-consuming tablets, there is a continuing increase in usage in terms of gigabytes per month per user in all the top tiers of mobile users. Global mobile data traffic grew 63 percent in 2016, reaching 7.2 exabytes per month at the end of 2016, up from 4.4 exabytes per month at the end of 2015.[14] Unfortunately, the laws of physics stipulate that the available spectrum is finite.

Given all these factors, telecom companies globally are faced with investing significantly in new infrastructure while existing revenue streams are eroding just to maintain the status quo. This includes upgrading to new networks, physical infrastructure deployments, as well as purchasing the required spectrum licenses via expensive auctions. The problem in emerging markets is not the same as within North America either. As Rajan Anandan, Google's VP and Managing Director for South-East Asia & India has said, "If you are going to connect a billion Indians, you are going to need radically different sets of technologies."[15]

The unfortunate reality is an even greater digital divide is emerging: those who *have* are experiencing a golden age of connectivity. While those who *have not*, are being left behind.

The Role of Facebook, Google, SpaceX, and Incumbent Telecom Companies

In recent years, many of the leading technology companies have invested in "moonshot" projects to connect the next billion. Among several initiatives, Facebook is launching drones to beam Internet around the world[16] while Google deploys a fleet of both high-altitude weather balloons and solar-powered drones.[17] SpaceX plans to launch more than 4,400 satellites to provide Internet connectivity to offset costs for funding a Mars colony.[18]

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networks in the area." Upon the event's conclusion, Niantic, the company behind the popular game, offered a full refund on the $20 ticket plus $100 worth of in-game tokens to all attendees. TheGuardian, *Pokémon Go fans enraged as first festival ends in connectivity disaster*, July 2017, (Source: http://bit.ly/2tYz1YH)

[12] Ericsson, *Ericsson Mobility Report on the Pulse of the Networked Society, June 2016, (Source: http://bit.ly/25OZI3v)*

[13] GSMA Intelligence, *Global Mobile Trends,* October 2016, (Source: http://bit.ly/2v1oMno)

[14] Cisco, *Cisco Visual Networking Index Mobile 2017*, February 2017, (Source: http://bit.ly/1Qehjo2)

[15] Google, Rajan Anandan, *NILF 2016: Google's Next Billion Users*, February 2016, (Source: http://bit.ly/2vGIbgz)

[16] Cade Metz, WIRED, *Facebook's Giant Internet-beaming Drone Finally Takes Flight,* July 2016. (Source: http://bit.ly/2cZRhOw)

[17] Anthony Cuthbertson, Newsweek, *How Google Plans to Reach its 'Next Billion' Users with Android Go, May 2017, (Source:* http://bit.ly/2sVAwLJ*)*

[18] Jon Brodkin, Ars Technica, *SpaceX plans worldwide satellite Internet with low latency, gigabit speed*, November 2016, (Source: http://bit.ly/2klrKgB)

These companies see "Connecting the Next Billion" as part of their global missions. Critics, meanwhile, have argued that these big infrastructure initiatives are self serving.[19] Their goal of connectivity, many believe, is not about engendering freedom and opportunity (e.g., the *Arab Spring* revolution), but rather growing their respective advertising kingdoms. A huge payoff is in store for the company that can be first in bringing the next wave of users online.

In a centralized, Internet-world of middlemen where content is free, the consumer is the product.

> *"Google, of course, has a vested interest in getting more people online. It makes its money from online advertisers who need an audience, while it benefits from having more people using its services — such as YouTube, which now has a dedicated app for emerging markets — and owning devices running on its Android operating system. Connectivity is the planet's biggest tech challenge right now, it is the piece of the internet that is missing or broken in many parts of the world where people are coming online for the first time. In India alone, Google estimates that 10,000 people go online for the first time each hour, while in Southeast Asia the figure is 3.8 million per month."*[20]

The Role of Government in Connectivity

Like the big technology companies, various world governments also play the role of the central authority figure (the "Middleman"), governing who can see what on the Internet and who can communicate with whom. As evidenced by the Electronic Frontier Foundation (EFF) and reported by The New York Times, a centralized approach to the global networks may mean that someone may always be watching, citing a relationship between the US National Security Agency (NSA) and AT&T. [21]

Furthermore, central authorities can always shut networks down, fearing threat to an incumbent way of life. Many apps stop short at the "Great Firewall of China". During times of civil unrest, governments appear too eager to dampen communication methods. The governments of Egypt, Libya and Syria imposed full Internet shutdowns during the Arab Spring in an attempt to quell protests. WhatsApp was blocked in Brazil four times in 2016 amid public outcry. Twitter was blocked by many countries in the past, and continues to be blocked in North Korea, China and Iran. Viber was shut down in Bangladesh and Zello was blocked in Venezuela: both during times of public protests against the ruling governments.

Before one jumps to the conclusion this is only a problem for emerging markets, every natural or manmade disaster (hurricanes, floods, earthquakes, school shootings, or others) results in similar network disruptions with similar effects. One must only be separated from a family member during a chaotic event to realize the failures of a centralized infrastructure.

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[19] Matt Buchanan, The New Yorker, *Internet.org's Less-than-Charitable Plan to Give the Internet To All, August 2014, (Source:* http://bit.ly/2tZbg6U*)*

[20] TechCrunch, *Google expands its initiative to provide free Wi-Fi hotspots in emerging markets*, September 2016, (Source: http://tcrn.ch/2dgyBIZ)

[21] *"AT&T's cooperation has involved a broad range of classified activities, according to the documents, which date from 2003 to 2013. AT&T has given the N.S.A. access, through several methods covered under different legal rules, to billions of emails as they have flowed across its domestic networks. It provided technical assistance in carrying out a secret court order permitting the wiretapping of all Internet communications at the United Nations headquarters, a customer of AT&T."* The New York Times, *AT&T Helped Spy on U.S. Spy on Internet on Vast Scale*, August 2015, (Source, http://nyti.ms/2v8Zzeq)

Within open democracies, the concept of a free and open Internet is being eroded. The most recent proof is a decision by the U.S. Federal Communications Commission (FCC) who voted to "roll back U.S. laws designed to ensure a free and open internet, a controversial but expected decision that critics say hands control of web traffic to a small number of billion-dollar companies."[22]

Connectivity on a global scale cannot happen fast enough. **A new approach is needed to efficiently and affordably connect the world.**

Overview of the RightMesh Platform

The First P2P Network that Does Not Require Infrastructure or Network Connectivity

To be truly decentralized, we believe we first have to deal with the dependency that we have on incumbent ISP's. Today, all cryptocurrencies touting P2P payment capabilities require centralized infrastructure to execute any of their actions. As such, we believe other peer-to-peer (p2p) tokens, cryptocurrencies, and many p2p applications are incorrect about their definition and claims of being decentralized.

To clarify, while other projects have removed centralized servers which may store websites, apps, and user data, users have no means to physically connect with other peers without the infrastructure supplied by ISPs and controlled by the middlemen previously mentioned (notably, corporations and governments). While we have gained the ability to control who may possess our data, and create apps that operate without centralized infrastructure to manipulate this data in a meaningful way to extract value, we still almost always need to go through an ISP. Data transmitted between users still must take predictable paths along physical infrastructure including fibre optic cables, copper and coaxial wires, and through cell towers and Wi-Fi hotspots to reach its destination.

In other words, we can do all the things the web can do with decentralized applications (e.g., without Amazon, Google, Facebook, PayPal, eBay, etc.), but we cannot yet do it without the help of Sprint, Verizon, AT&T, China Mobile, and other large infrastructure providers, even in our p2p-enabled, cryptocurrency world of today.

[22] Pete Evans, CBC News, *FCC votes to roll back U.S. net neutrality protections, December 2017, (Source:* http://bit.ly/2AZo2mO)

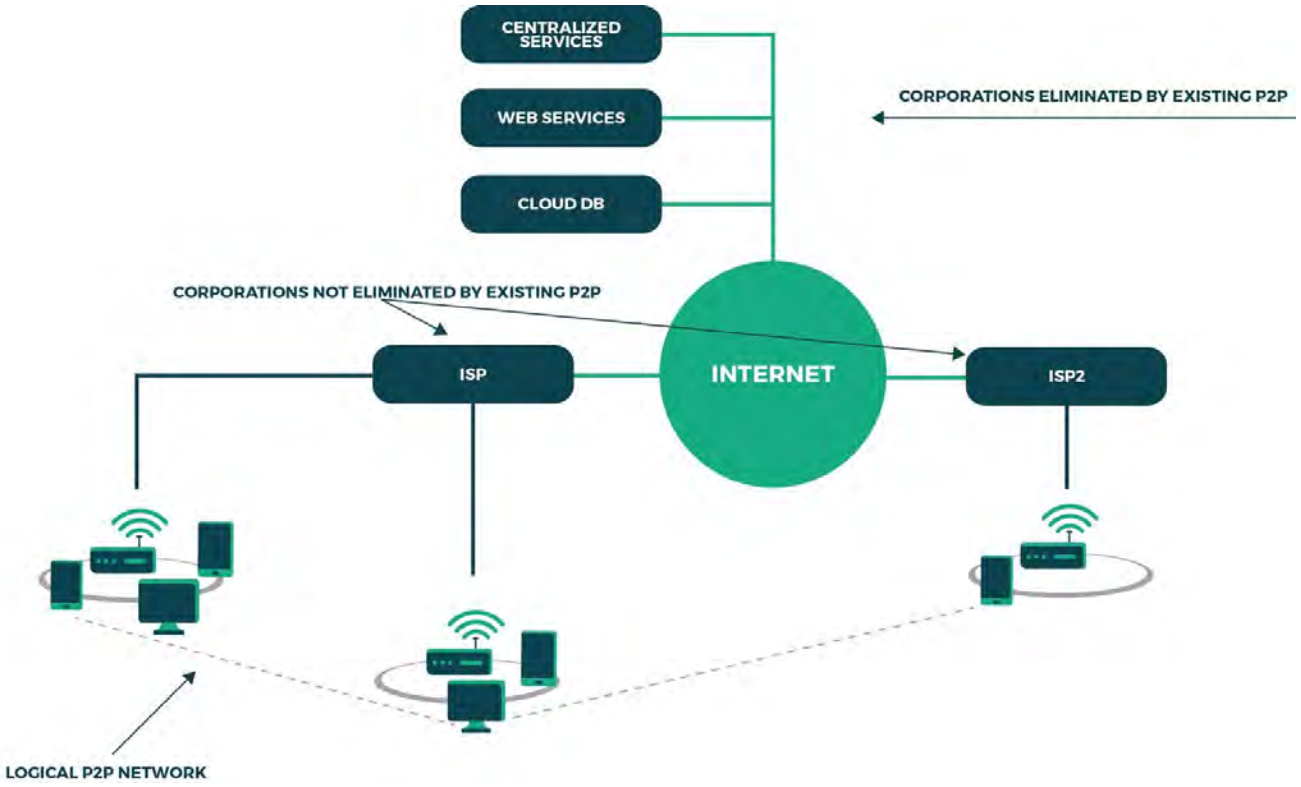

Figure 1. RightMesh is connecting users, devices, and machines p2p without ISPs and other middlemen.

Existing p2p networks construct a logical p2p network where it appears as if everyone is connected directly to each other, but in fact there is no effort to make a path that uses local connectivity. The logical path still uses Wi-Fi links directly to our ISPs and through the Internet, when in fact a true p2p network would attempt to directly connect whenever possible. For example, the Status.im teller network is a great idea to convert fiat cash into cryptocurrencies, but it won't function unless every one of the network participants has a direct Internet connection. As noted earlier, more than 4 billion people do not presently have connectivity. RightMesh could support their efforts by providing connectivity. .

Core Features of the RightMesh Platform

Ad Hoc Wireless Mesh Networking

From Wikipedia (and originally written by Dr. Jason Ernst, RightMesh's Chief Networking Scientist in 2009):[23]

> *"A wireless mesh network (WMN) is a communications network made up of radio nodes organized in a mesh topology. It is also a form of wireless ad hoc network... a decentralized type of wireless network. The network is ad hoc because it does not rely on a pre-existing infrastructure, such as routers in wired networks or access points in managed (infrastructure) wireless networks. Instead, each node participates in routing by forwarding*

[23] See Wikipedia, *Wireless Ad Hoc Network* and *Wireless Mesh Network*, (Sources: http://bit.ly/2v3YQaT and http://bit.ly/1IgARbO)

data for other nodes, so the determination of which nodes forward data is made dynamically on the basis of network connectivity and the routing algorithm in use."

"The coverage area of the radio nodes working as a single network is sometimes called a mesh cloud. Access to this mesh cloud is dependent on the radio nodes working in harmony with each other to create a radio network. A mesh network is reliable and offers redundancy. When one node can no longer operate, the rest of the nodes can still communicate with each other, directly or through one or more intermediate nodes. Wireless mesh networks can self form and self heal. Wireless mesh networks work with different wireless technologies including 802.11, 802.15, 802.16, cellular technologies, and need not be restricted to any one technology or protocol."

RightMesh is the first project which can tackle these problems, building a network and platform which can be truly called p2p. With RightMesh, the devices people already carry around everyday form the infrastructure. According to Ericsson's 2017 Mobility Report, there were 3.9 billion smartphone subscriptions at the end of 2016.[24]

A heterogeneous network (HetNet) is a network connecting computers and other devices with different operating systems and/or protocols. RightMesh uses Wi-Fi, Bluetooth, and Wi-Fi direct, and allows mobile phones, computers, and even IoT devices to connect with each other and form the infrastructure when none exists, or is too expensive to use. Additional communication protocols can be incorporated as the phones/devices support them (e.g., LiFi, LTE-Direct, etc.). These devices can be used to form a wireless mesh network using many of the existing wireless technologies on the device, creating a large-scale, mobile HetNet.

With RightMesh, people can achieve distributed decentralization that can only continue to strengthen with network density. When installed on a smartphone or Java-enabled device, it could be impossible to stop, short of confiscating every device from every person. **The key principle is that the RightMesh network is self-forming, self-healing, and self-regulating, using whatever it has at its disposal.** It runs on devices most of the world already uses and can easily afford.[25]

Compared with competing mesh technologies, the RightMesh network can compute paths. It does not naively broadcast to all devices. Instead, it can make use of multiple paths at once and spread the load across multiple technologies. Importantly, RightMesh does not rely on operating system routing. It gives the protocol full control to use multiple paths to optimize and manipulate routes without rooting the device.[26] Furthermore, RightMesh allows data to flow through disparate MeshPorts (i.e., those from other applications). This allows for larger meshes to be created and greater density to be achieved.

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[24] Ericsson, Ericsson Mobility Report, June 2017, (Source: http://bit.ly/2szKfGz)

[25] "Shipments growth over the past few years has been driven by the falling price of smartphones, which has made handsets more accessible in emerging markets. The average selling price of a smartphone in India nearly halved between 2010 and 2015." BI Intelligence, *THE GLOBAL SMARTPHONE REPORT: The forces behind the global deceleration in smartphone sales*, June 2016, (Source: http://read.bi/1TisS3r)

[26] Through its implementation, RightMesh has overcome a long obstacle to mesh networking that required smartphones to *root* the device, bypassing Android's security controls. In other implementations, unrooted devices can use connectivity provided by a mesh network, but they can't help expand its coverage. MIT Technology Review, Build Your Own Internet With Mobile Mesh Networking, July 2013, (Source: http://bit.ly/2c00XCN)

Case Study - Doctor Easy

Consider the following example, the RightMesh team is currently building an application with the RightMesh protocol called DoctorEasy. The application came out of a need identified during a Bangladesh Hackathon with the team in December 2017. The application is attempting to solve the problem experienced by tens of millions of Bangladeshi every year.

In Bangladesh, you presently have one doctor that serves about 10,000 people. Most community doctors operate out of local Doctor's Chambers, located among the neigbourhood in which their patients live. The average doctor sees about 100 patients per day. To visit a doctor, the typical patient has to queue up an average of 3 to 4 hours prior to seeing the physician, frequently waiting in crowded, un-airconditioned, germ-infested waiting rooms. Should patients leave, they lose their place in line. In this inefficient system, they are unable to care for their families, grab food/tea, or remain at work.

Within the application we are creating, a person can digitally "line up" and get alerted across the mesh when it is their turn to see the doctor. The patient can get a copy of this application from their doctor's office. Given the close geo=proximity that the patients will have to the doctor's office and to each other, we believe that after just a few weeks, the neighbourhood surrounding the Doctor's Chambers will have enough density to support the mesh to blanket the community.

However, where network effects come into play is that subsequent applications can leverage the density established by this first application, to allow mesh connectivity across the same neigbourhoods. Thus, a potential messaging app can use the density created by Doctor Easy to increase the likelihood of connectivity between peers.

Case Study - Flare

Another product being developed that will use the Mesh SDK is Flare— a mesh-enabled application that will act as an "emergency communications kit" when all other forms of communication fail.

The mesh-enabled Flare app is intended to serve as a staple in any emergency preparedness kit. Just as people stock up on bottled water, people can download the Flare app as a backup for communication in case of disruption to phone and Internet service.

Key features under development include:

- Peer-to-peer text, photo, audio and location messages
- Send an Emergency "Flare" — blast messages for help, sent to anyone available in the mesh
- Ability to post and respond to requests for items such as water, pet food, or a generator
- Ability to share location on downloaded maps so users can geolocate each other

An additional concept RightMesh has been developing is a drone that can function as a node in the mesh to enhance Flare's utility to help rescue efforts. With the autonomous connectivity of the mesh network, the drone could fly over affected areas and instantly detect autonomous blast messages or 'Flares' asking for help from within 100 metres or anyone that is mesh connected. The drone could then return to a base or Internet-connected zone to relay the information to rescue workers.

There is more than one reason for RightMesh to develop Flare (other than the obvious humanitarian reasons).

It is no secret that mesh networks require density. RightMesh-powered Flare will be the first app that will create density by redefining app 'users' in the mesh. Traditionally, consumer apps measure success and growth in daily active users (DAU) or monthly active users (MAU). With RightMesh, what matters is active 'nodes', meaning devices that have installed our library (and have not uninstalled it) by downloading and initializing a mesh-enabled app. So a 'user', in our new definition, may not actually be actively using the app; however, with our library installed, they can still be an active node by contributing passively as a routing node and can still be reactivated in times of true network disruption. These are the 'users' we need to create the density required.

We, in fact, hope that people will never use Flare — meaning, we hope they never experience a catastrophe that requires it. But, our intention is that they also will never uninstall it. It will remain on their devices 'just in case'. The secondary purpose for the app, then, is to create 'users' (defined now as 'nodes') to build density.

Flare will be free and accessible to all Android users as a critical emergency preparedness tool and as a way to build density. When it is published, Flare will be shared to the community as open source on our GitHub repository. It is our hope that the community will continue to improve upon it, localize it into other languages, and build variations that adopt the same principles, thus bringing this public service tool to the world and helping to spread RightMesh network density worldwide.

It is our eventual hope that device manufacturers and launchers will choose to install Flare as a pre-installed app. We will be pursuing partnerships in this area, and we will announce this to the community should any materialize.

Within our architecture, users of the above Doctor Easy application can create community density, and with this users of Flare would be able to leverage that density for its own purposes. Sharing this common core between applications is unique to RightMesh.

Additional information on the RightMesh architecture and technology that enables multiple apps to interoperate on a single, mesh network can be found in greater detail in the *RightMesh Technical White Paper.*

RightMesh Tokens (RMESH)

RightMesh intends to introduce a RightMesh token, or RMESH, that will allow participants in the ecosystem to facilitate the purchase and sale of goods and services, be it data and Internet access; device storage, battery, and processing power; personal identity, geolocation, and attention; or other digital goods and services created by mesh participants themselves.

The RightMesh token will be an ERC-20 token to provide utility in the mesh network and enable interoperability with other DAPPs that use the same token. RMESH is the native token for the RightMesh protocol and unlocks its utility value and removes many of the identified barriers to entry. It is the incentive mechanism to reward participants for behavior that is beneficial to the network maintenance and growth.

A few of its use cases include:

- RMESH is the economic incentive for nodes in the network to provide 'connectivity' between devices, and to manage and sustain the network.
- RMESH can be used by end users to pay for premium services or data from app or content providers, or from other nodes (e.g., sensor data).
- RMESH can be used by the content providers to incentivize users to consume content

- RMESH is a specific token that will only work on the RightMesh network when nodes are not connected directly to the Internet.

With RightMesh, participants in the ecosystem can be concurrently earning and spending tokens as each user plays the role of producer and consumer of mesh services.

The RMESH token has its own distinct unit value from Ether that pertains to how it is used specifically in its own economy. While the RightMesh network can facilitate some entirely off-grid connectivity between users, we believe the RMESH token is essentially the fuel that powers the mesh network, and without it the mesh network cannot operate.

The RightMesh tokens do not represent or constitute any ownership right or stake, share or security, or equivalent rights; nor any right to receive future revenues, shares, or other form of participation or governance right in or relating to the RightMesh AG platform, its parent company Left (Left of the Dot Media Inc.), and all its subsidiary companies.

RightMesh Developer SDK

The RightMesh SDK is the primary product of RightMesh, and thus, the users of the free software development kit are the company's primary customers. Everything starts with the developer or partner who integrates the technology.

The RightMesh platform was released into private beta in September 2017 and to date, more than 200 developers and 80 different projects have been compiled with the SDK. Developers can use the SDK to build decentralized mesh applications. Within a few lines of code, the RightMesh service can be integrated into new or existing mobile applications (without end users knowing anything about mesh networking). The platform currently supports Android and some Java-enabled devices. Additional operating system platforms are included on our roadmap.

The following diagram depicts the RightMesh network stack in its entirety (further detailed in the *RightMesh Technical White Paper*). The top layer are the applications that consumers and businesses would interact with on an everyday basis. These applications communicate with the RightMesh API (AndroidMeshManager) and RightMesh Service to manage everything else.

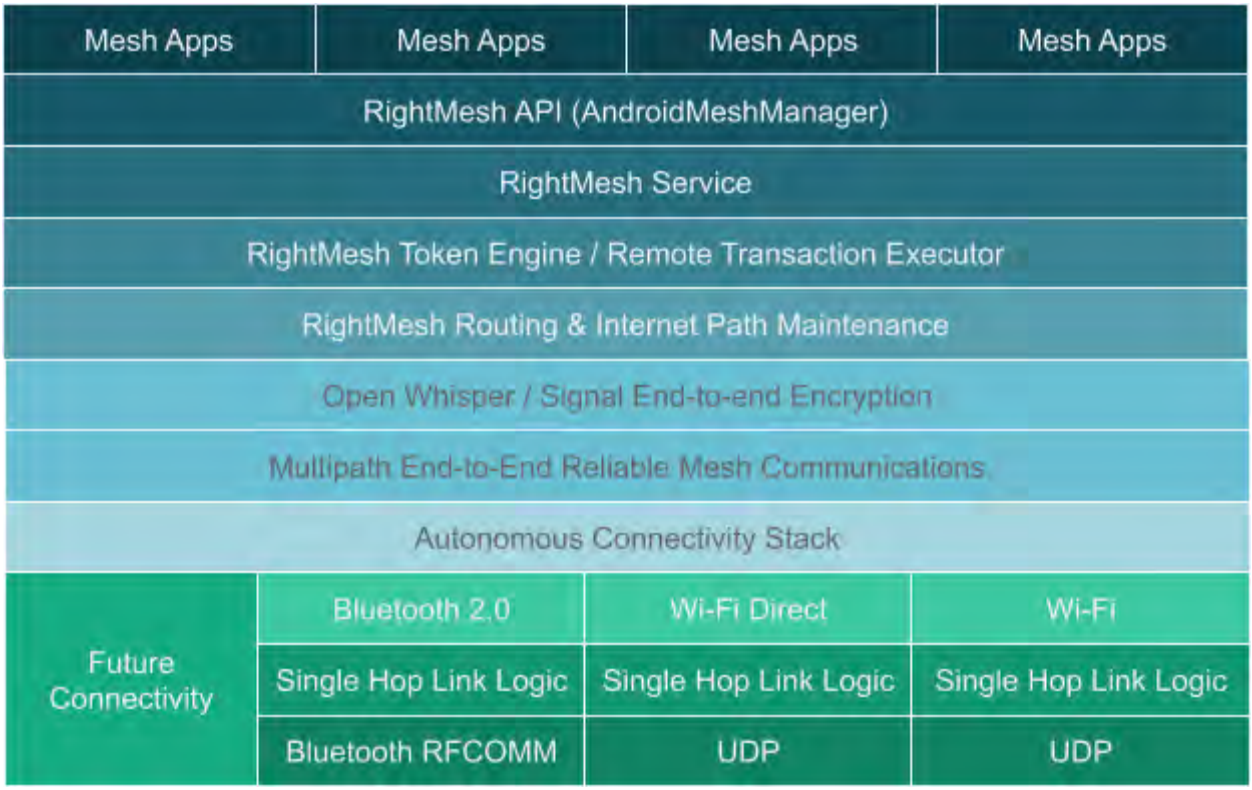


Figure 2. The RightMesh Network Stack, high-level system overview.

While RightMesh is building certain applications itself (including messaging, app distribution, app updating, content sharing, emergency services, and Internet sharing), providing a software development kit to developers allows us to integrate with existing applications (and thus spread the mesh much faster). We also believe one of the barriers to connectivity adoption is the lack of relevant content and applications in the local language.[27] RightMesh-powered apps can be built by the community in local languages and feature local content to increase relevance to consumers.

The applications built by the RightMesh Apps team will be released as Open Source and published on GitHub. Thus, a user can take our Flare emergency application, by way of example, and modify it to work in a different language. This makes the app more usable for local audiences, but the underlying mesh network will keep on working.

Application developers can start building applications directly via the RightMesh Developer's Portal. The SDK is being provided free to developers. A license key is required to build applications with the toolset, however. The license provides a way to ensure two apps don't attempt to use conflicting MeshPorts. This reduces the possibility that one mesh app will attempt to intercept data intended for another app. Decentralized developer environment are also being explored.

The company is exploring incentivization options for developers, including but not limited to, issuing a nominal amount of RightMesh treasury tokens to projects of interest, or providing the

[27] Facebook noted in their *2016 State of Connectivity Report*, February 2017, "Local language content is necessary to create universal relevance, and therefore vital to inclusive connectivity." (Source: http://bit.ly/2sFQpl6)

staking of a mesh tokens on behalf of projects. While nothing is assured, all such decisions will be made via the sole discretion of RightMesh.

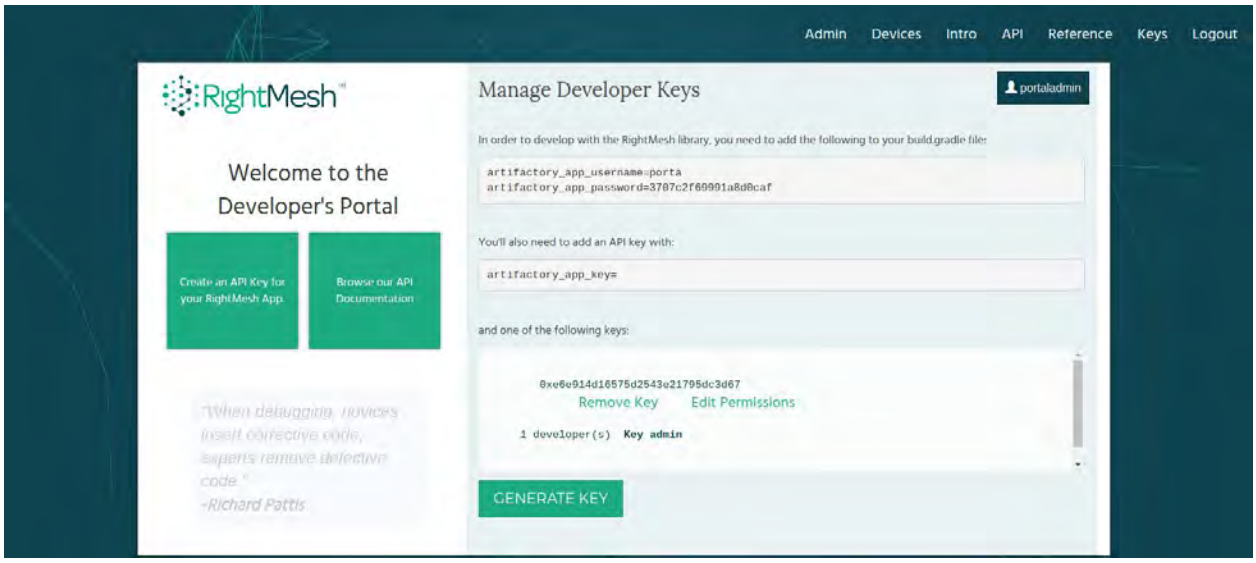


Figure 3. The RightMesh Developer's Portal where application developers can get access to the RightMesh SDK for free.

The Developer SDK makes it possible for new RightMesh app developers to piggyback on the success of other developers. RightMesh allows apps, empowered by the RightMesh protocol, to forward through other devices which may not even have the same app. All apps use a common service (or common core) that, once initialized, allows data to flow through it to others nearby, regardless as to whether the same app is used by all participants in the network. As a result, RightMesh networks will automatically form whenever smartphones come together, even though users may be using different RightMesh apps.

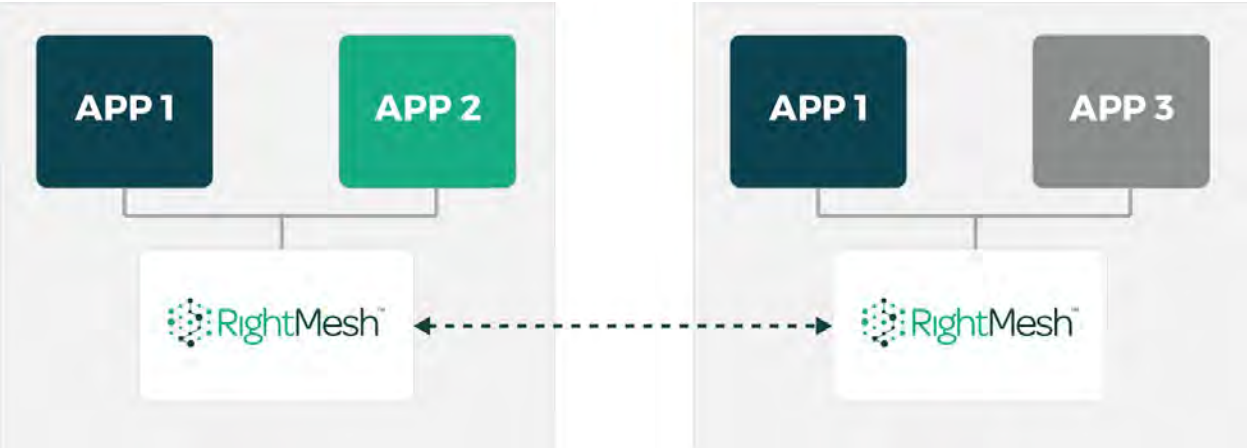


Figure 4. Applications use the common RightMesh Service meaning that users of one application can piggyback on the network infrastructure provided by other applications.

We believe by empowering developers to make relevant apps, or integrating into existing apps, we create a network effect.

In examining historical attempts at mesh networking, the primary reason deployments were unsuccessful was due to lack of density. Previous attempts had required a physical investment in specialized hardware: physical routers and switches that were locked in place rather than travelling with the user. With RightMesh, density is no longer a constraint. RightMesh uses the growing density of users with smartphones as well as the ever-increasing number of IoT sensors to provide the infrastructure wherever users congregate the most.[28]

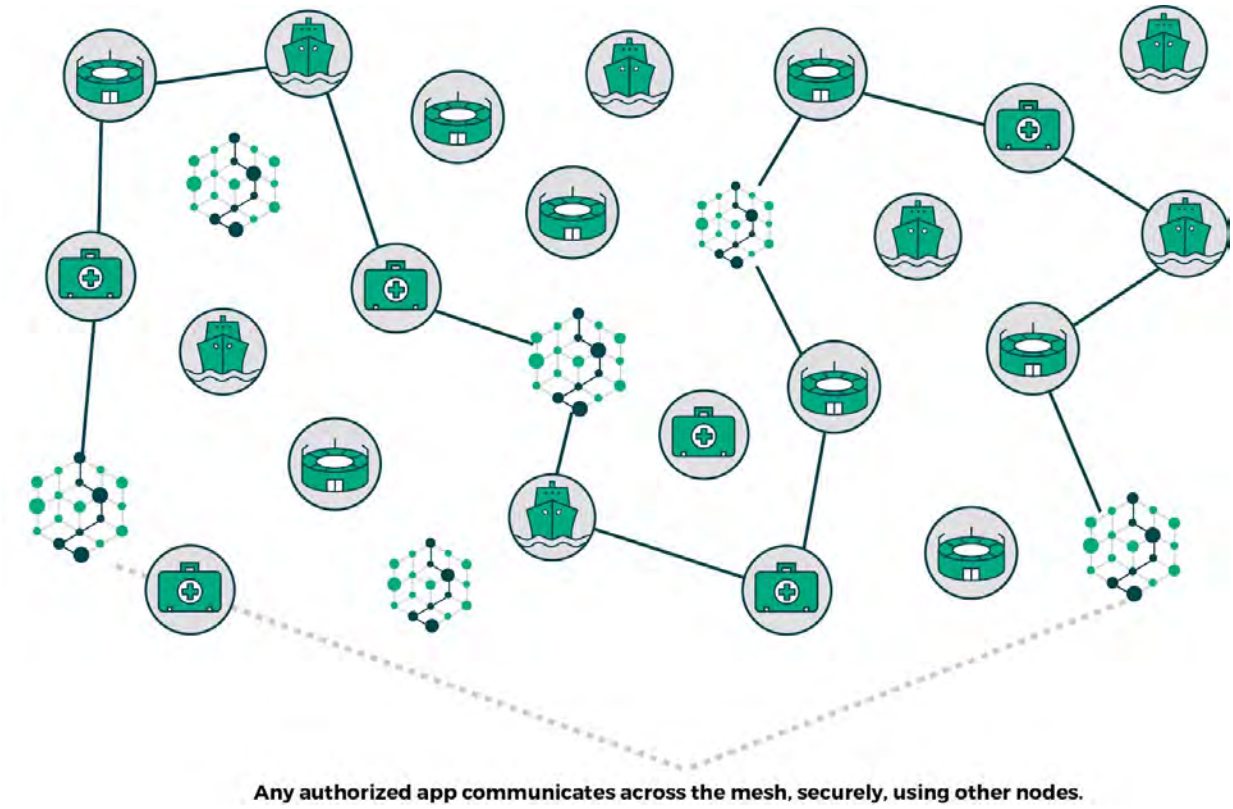


Figure 5. With more applications using RightMesh, each subsequent developer and application improves the quality of the network.

What makes RightMesh technology unique is that it works on existing smartphones (without rooting the device), which makes all other infrastructure and hardware technologies complementary to creating a stronger mesh.[29] This allows the mesh infrastructure to move and

[28] "Almost half a billion (429 million) mobile devices and connections were added in 2016. Smartphones accounted for most of that growth, followed by M2M modules. Global mobile devices and connections in 2016 grew to 8.0 billion, up from 7.6 billion in 2015." Cisco, *Cisco Visual Networking Index Mobile 2017*, February 2017, (Source: http://bit.ly/1Qehjo2)

[29] A common question asked relates to the increasing ubiquity of high-speed connectivity. As noted earlier, spectrum is finite and 5G is not coming quickly into the world, especially the emerging markets. Regardless, RightMesh complements such deployments. A single, 5G connection can provide the backbone for other devices on a network and RightMesh provides essential last mile delivery to connect those that are unable to connect due to cost or technical limitations.

operate where people naturally congregate. Note: the current distance between nodes is dependent on the technology, hardware, spectrum being used, and environment. For reference, we anticipate being able to connect nodes when the participants are 80m to 100m apart. A few target environments to start with include:

- Stadiums
- Schools
- Public spaces
- Hotels, Resorts & Venues
- Office buildings
- Dense indoor residences/apartments
- Shopping malls
- In Transit/riding on buses
- Sitting in congested traffic

Competing technologies—including femtocells, picocells, microcells, mesh routers, and even beacons—require physical infrastructure investment and do not scale up or down to meet population changes and do not move with the consumer. RightMesh creates an on-device mobile mesh that complements other infrastructure.

As more users begin to use RightMesh in a given geographic location, the value to incumbent users increases. New users would receive a better user experience, enjoy more content, get access to more content/apps, and increase the likelihood of accessing shared connectivity and resources. A study undertaken by the RightMesh team concluded that a city with the density of Dhaka, Bangladesh (24,700 people per square km) could be entirely covered with only 5% mesh penetration. In comparison, San Francisco, the second most dense city in the USA, has a density of 6,632 per square km.[30]

While the aforementioned environments focus on "pop-up" use cases, in many urban cities daily life is filled with sufficient density to make a mesh network useful nearly all of the time once density has been established.

[30] Dr. Jason Ernst, RightMesh, *The State of Connectivity in Guatemala*, Date, Source: https://medium.com/@compscidr/the-state-of-connectivity-in-guatemala-c07be63368bd

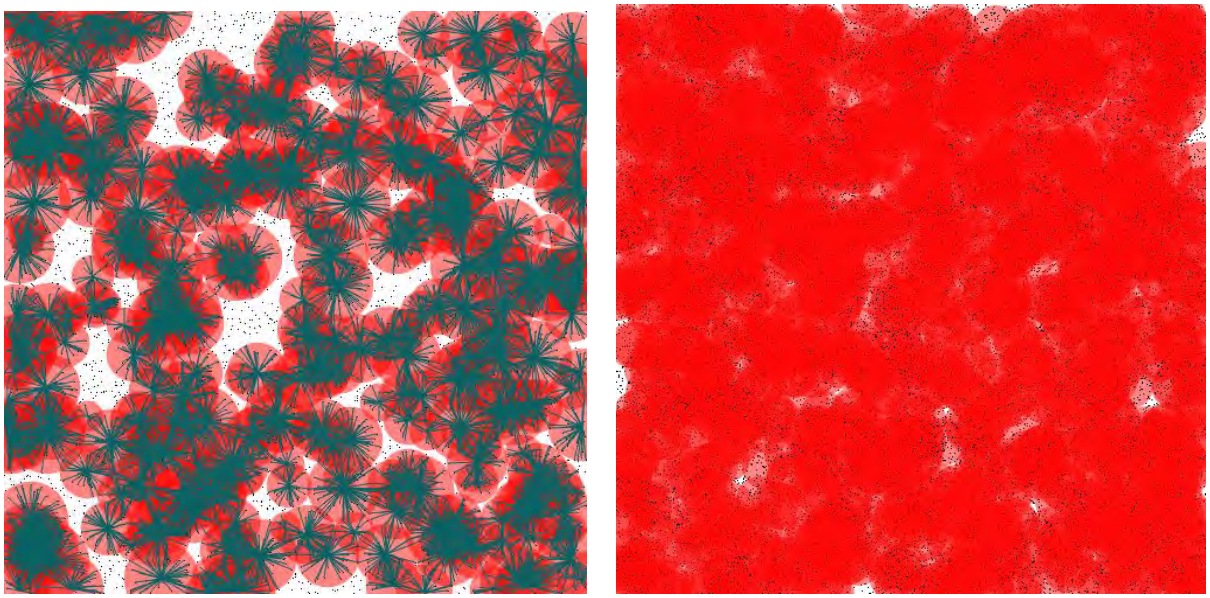


Figure 6. This is a modeled network density San Francisco USA (on the left) vs Dhaka, Bangladesh (on the right), each showing a 5% penetration of the RightMesh Service. In San Francisco, which has 6632 people per sq km, there is 90.82 % coverage and each phone is covered by an average of 2.57 hotspots. Each hotspot has an average of 44 clients. In comparison, Dhaka has 24,700 people per sq km.

The world has embraced the Sharing Economy, where any individual can sell or donate already invested assets: be it a house, an automobile, or surplus computer storage. RightMesh provides for a decentralized application of the sharing economy where users share p2p with other users. As this economy grows for access to connectivity or on-device resources (storage, processing, or sensor data), we believe that the challenge of mesh density will be addressed.

The Competitive Landscape and Where RightMesh Fits In

It is important to note that "mesh networking" is an abstract phrase. There are many types of mesh networking implementations that exist today. At a high level, mesh networking solutions could broadly be classified into two categories: hardware-based and software-based solutions. It is also beneficial to understand how mesh networking solutions differentiate from "traditional networking" solutions, which can also be either hardware-based or software-based. We define "traditional networking" as a connection between two endpoints with at most one wireless hop on each end, often covering vast distances through expensive wiring, fibre optic cables and using servers in some far away land. Mesh networking requires none of that and minimizes the physical distance between the two end-points. It achieves this by wirelessly connecting across multiple nodes or devices. Traditional infrastructure mesh networks minimize the distance to the Internet so we can continue to use our existing methodology. Mobile mesh networks find the most appropriate connection(s) between two peers whether that is through other devices, infrastructure, or some combination of both.

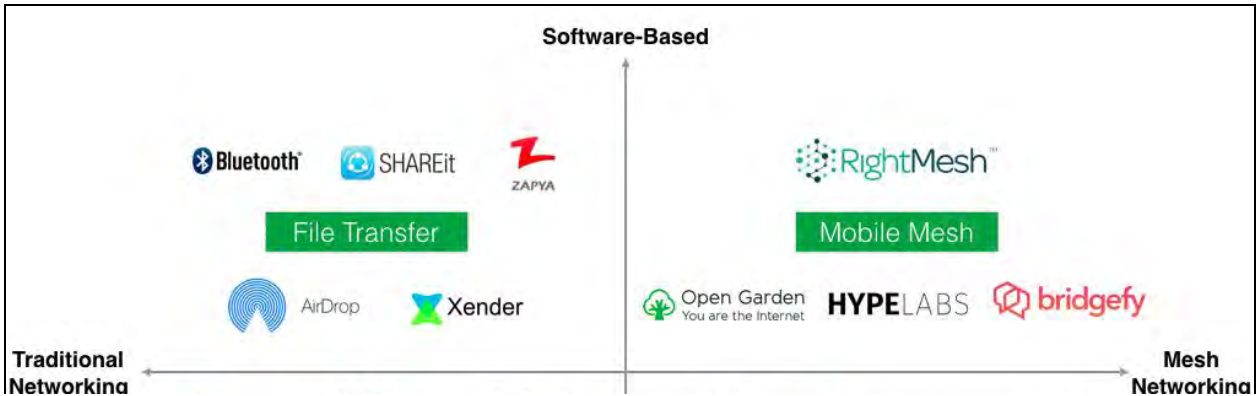


Figure 7. The competitive landscape for RightMesh. RightMesh is a software-based mesh networking protocol that does not require hardware infrastructure investments.

The large majority of companies today fall under the hardware-based traditional networking quadrant, which is dominated by the many players that connect the online world today, including network equipment providers, telecommunication companies, and Internet giants. Not surprisingly, this is also where the most investment is being made today.

There are a few dominant technologies that fall under the software-based traditional networking space, such as Bluetooth and AirDrop. Several file transfer applications such as SHAREit, which rely on peer-to-peer Wi-Fi connections between two nodes, have proven to be immensely popular in emerging markets. However, connectivity is limited to two participants and is restricted by a short range distance.

As for mesh networking, hardware mesh networking solutions have gained a lot of recent attention, most notably for Wi-Fi routers (e.g. Meraki, Eero, Ammbr) that act as “fixed nodes”, and mobile phone accompaniments (e.g. goTenna). The software-based mobile mesh networking space, to which RightMesh belongs, is much more sparse in comparison. This is not due to the fact that it has not been thought of seriously. In fact many companies have attempted to build mobile mesh networks, but with only limited success. We firmly believe that in order for mesh networking to be truly impactful, it needs to reach mass markets and for that, it needs to run on existing devices and OS platforms—without rooting the smartphone.

Executing a successful token generation event, providing the RightMesh SDK for free to the world’s development community, and creating intrinsic incentives for end-user adoption will all help the platform and network achieve its potential.

RightMesh also believes that there is a possibility for many projects to co-exist and collaborate in this area - as different projects could be looking at different technologies (hardware or software, different wireless links) while serving different markets (e.g. broadband WiFi is different from mobile data). And so projects like Althea, Ammbr, Orchid, and goTenna are potentially collaborative projects as they are looking at different technologies. To this end, RightMesh has launched the Universal Connectivity Alliance (UCA) in conjunction with BlockMesh and Althea. This alliance seeks to accelerate the deployment of connectivity to the nearly 4 billion people who do not have internet access today by encouraging collaboration between members, investigating interoperability opportunities, and conducting academic research.

RightMesh Security

RightMesh supports end-to-end encryption using the Open Whisper/Signal library (whispersystems.org). The Signal protocol has been implemented by WhatsApp, which is said to encrypt the conversations of “more than a billion people”. Google’s messaging app called Allo, which features an optional "incognito mode", also uses the Signal protocol for its end-to-end encryption. For within RightMesh, the Signal library has been modified so that it no longer involves the server portion, since that would require Internet access.

RightMesh offer two levels of security: one where the key is directly exchanged in a single hop (this is the more secure option). Secondly, where the key exchange occurs through the mesh over multiple hops, this method is less secure. The company is working on ways to improve this process

(e.g., sending the key across multiple paths, split up, so that the attacker would need to compromise many devices at the same time). RightMesh is also working on ways to improve the user-friendliness of a secure key exchange such as with a 2-dimensional barcode or near-field communication (NFC). RightMesh does not store any keys on any server, so any key exchange that occurs securely means only the recipients can decrypt the data. There is no way RightMesh or the RightMesh team can be compelled to give up the keys because we do not store any.

Unlike other mesh platforms which broadcast naively to every device, RightMesh only forwards directly on a routing path. As a result, fewer devices have data flowing through them, so it is much harder to attack. On the Wi-Fi portion, RightMesh uses WPA2 encryption, so only devices using RightMesh can connect to each other. The MeshID which is the device identity in the mesh is encrypted, protecting access to tokens associated with the device. It is also our policy to enable encryption by default. Our portal uses https and passwords are never sent, nor stored, in plaintext.

Further details of RightMesh security are addressed in the *RightMesh Technical White Paper.*

The RightMesh RoadMap

The technology of RightMesh is new and complex and requires substantial effort to build. Each phase in the roadmap consists of individual mega projects that must be executed with careful planning and consideration. We are aware, however, that unexpected surprises are par for the course in software development, and unexpected surprises could pop up that may or may not require us to alter the path we tread. For this reason, the roadmap should be looked at as a living and breathing document that will be updated as move forward in our implementation plans.

We believe a roadmap is much more than just posting a few key milestones with approximate quarterly dates. An informative roadmap is one that not only lists the key milestones, but also explains the strategic direction of the project that will help achieve the vision.

Our approach is to move towards our goal in six stages—ideation, initiation, evolution, stability, growth and revolution — with each phase having its own distinct purpose and goal.

1. Ideation [2015 / 12 months]

Goal: Understand the problem, understand the users, and understand the markets.

The start towards building a mobile mesh networking platform actually goes back to mid 2014, when our development team in Bangladesh created a mobile app prototype (in their own free time) that allowed peer to peer messaging and file sharing amongst themselves without requiring an internet connection. What was even more fascinating was the fact that they had built this prototype to address their own problem of slow and unpredictable connectivity. They were creating a better and more efficient way of connecting with each other.

And that was the beginning of this journey. Rationalizing that there would be areas similar to Bangladesh that require a better way to connect, our first step was developing and launching a mobile application called YO! that allowed direct content sharing between friends, and which grew to 1M+ downloads in countries such as Bangladesh, Colombia, Guatemala, India, México and Cuba.

While YO! is different from RightMesh and did not use our current mesh networking technology, it provided tremendous insights into smartphone user behavior in different markets and into the different ways users connect today.

Figure 9. Talking to university students in Bangladesh in 2015

2. Initiation [2016 / 12 months]

Goal: Design and build the core foundation for RightMesh

In the year of testing and iterating YO!, we went to various markets to talk to people about the app — end users, businesses, and institutions — and, interestingly, everyone had their own idea of how they could use the application to solve a unique problem they had. We slowly began to understand that it wasn't really the application, but the underlying technology which allowed users to communicate directly, that was extremely valuable.

Our "aha!" moment came soon after, in October 2015, when we realized that we needed to build a platform — a platform that developers could use to integrate mesh networking technology into their own apps in a simple way. We also realized that building a platform and a new networking protocol was not easy, and that we needed the best technical skills in the world to design a platform like this.

Fortunately, soon after that realization, we met Dr. Jason Ernst, a Ph.D in Wireless Mesh and Heterogeneous Wireless Networks from the University of Guelph, who was incidentally just wrapping up his own venture and looking for his next challenge. After a few discussions and a visit to our office, it did not take much time for Jason to pack his bags and move to the West Coast to take on this mighty responsibility as Chief Networking Scientist for the RightMesh platform.

It was in this first year of initiation that the core foundation of the mesh networking protocol was designed and built. The core networking libraries that allowed discovery of nodes and routed messages between nodes were created using Wi-Fi as the underlying network link between devices. Initial demo apps were created to test the stack, and an internal alpha release of the library was released to our apps team in Bangladesh to start creating their own apps.

It was in August of that same year, 2016, that we first started getting immersed in the blockchain, and in Ethereum specifically. Our first entry into Ethereum was actually to solve our problem of determining unique node identities in the mesh network; however, that eventually led us down that path of exploring how the blockchain could be used as a platform to provide trust in the network and how tokens could be used as economic incentives for participation. And we haven't looked back since.

3. Evolution [ETA 18–24 months]

Goal: Complete all features of the platform including the necessary tools for developers to start using RightMesh. Build experimental apps and test.

We are currently in the midst of the evolution stage as we work towards completing the platform features and getting it ready for a public beta release.

Over the past year, the platform has grown from a set of libraries to a full-fledged developer SDK, including a developer portal and associated APIs. The SDK was launched into private beta in late 2017, and our apps team has been building initial, experimental apps such as Flare — a RightMesh enabled emergency app designed to provide offline communication when ISPs and telecom providers are down.

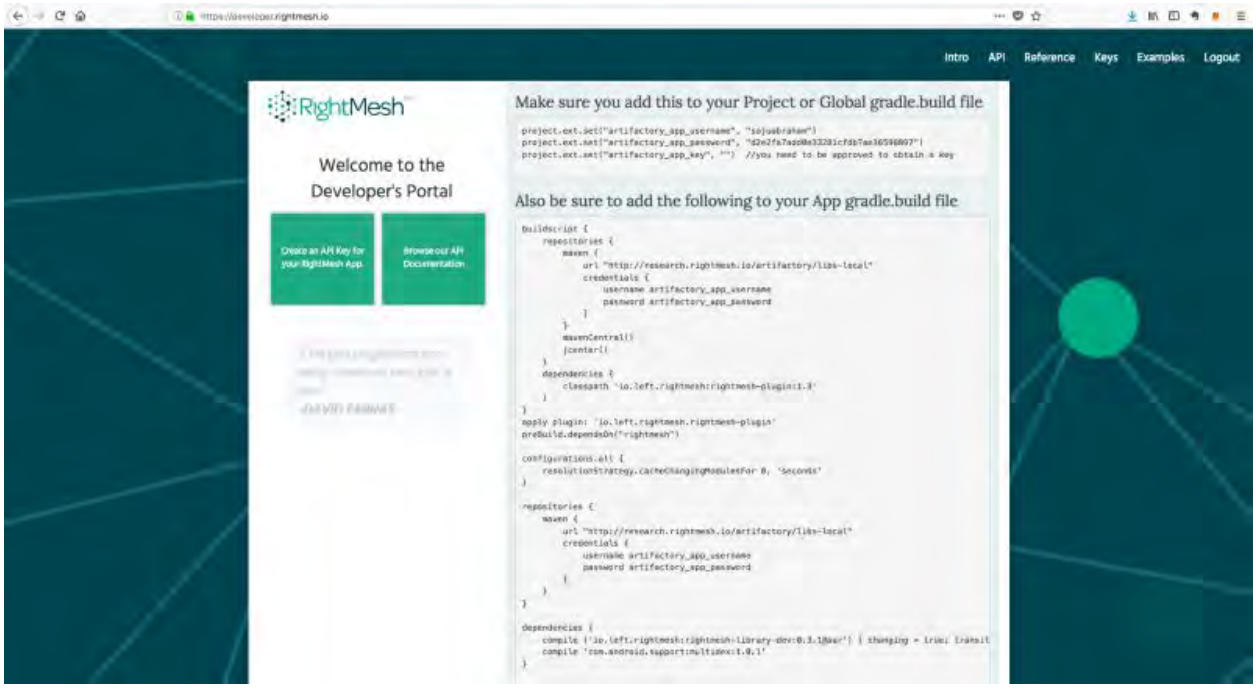


Figure 10. RightMesh Developer Portal

Much work was also done on the MESH token protocol and on a design that would allow micropayments to occur on the network. While initial work was based on a sidechain design, the design eventually shifted to a µRaiden based payment channel design that would allow all RightMesh nodes to be completely decentralized.

Work completed so far, explained in more detail by Jason in this year-end summary post:

- Adding Bluetooth and Wi-Fi Direct to the link layer in the networking stack
- Routing and data transfer optimizations
- Developer Portal & SDK
- End-to-end encrypted data between nodes
- Superpeer node development
- Communication between disparate meshes
- Payment channel design
- Experimental apps being developed.
- Work in progress and to be completed leading to the SDK public beta release include:
- Autonomous node role selection
- Completion and integration of token protocol into the RightMesh stack
- Development of RightMesh wallet and settings UI in Android
- Automated testing & performance evaluation framework
- Testing of experimental apps in Bangladesh and Northern Canada.

4. Stability & Fit — [ETA: 12–18 months]

Goal: Harden the mesh network and mesh token protocols. Find token-utility fit in developing markets.

The next essential steps involve necessary refinement of the networking and token protocols post field testing and finding token-utility fit for the platform. The intent will be to focus on a few key

markets or constrained regions to determine stability and fit on localized mesh apps before growing to further regions. As Bangladesh and Canada are home markets to RightMesh, they are natural markets to start with.

Some of the main projects that will be part of this stage include:

Platform Upgrades: This entails the deployment and testing of more RightMesh networks in the field and gathering data and analytics to monitor network performance and token usage. Data gathered will be published to the community along with a series of proposals for enhancements and protocol upgrades that will be determined based on community feedback and consensus. As refinements are made to both the networking protocol and the token protocol, the software should also improve in stability, reliability and in its function to scale.

Token-Utility Fit: Equally important to the technical stability of the platform is ensuring token-utility fit. Similar to product-market fit, token-utility fit ensures the purpose of the MESH token and the associated token economic models are effective to incentivize and reward participants in the ecosystem — RightMesh nodes, end users, Superpeers, developers, content providers, and others — while encouraging network growth. As with the networking protocol, token economics will also involve testing, gathering data and refinement of the model, again based on community consensus.

Growing the Developer Community: Advancement to developer tools and growing the developer ecosystem through community events such as hackathons and meetups will be key to platform adoption. The more developers who are brought onto the platform, the more localized RightMesh apps that are made available, which in turn will encourage more users to join the network.

Partnership Development: While the platform develops and matures, it will also be critically important to form strategic partnerships with entities and organizations that can benefit from RightMesh technology and in turn contribute to the growth and adoption of the network such as:

- Apps, brands, and agencies wanting to reach extend their reach or enter into previously unreachable markets
- Non-profits and NGOs with specific use cases for underserved parts of society
- Charitable institutions offering mesh-enabled smartphones for the unconnected
- Decentralized and blockchain projects whose success depends on being able to digitally reach previously unconnected users.

4. Growth — [ETA: 24–48 months]

Goal: Global growth of RightMesh nodes and community networks.

Once the platform is technically stable to scale, and token-utility fit has been achieved, the next step will be to focus on growth of RightMesh networks across devices, regions and users. Growth of the network and ecosystem can be looked at from a few dimensions:

Evolving New RightMesh Functions: The first RightMesh networks will be most suited to lightweight communications such as text alerts and low bandwidth applications. However, with the protocol more stable and with the collaboration of other peer-to-peer protocols such as IPFS, new types of data functions can be built into the network that will allow for richer communication. Another new function is projected to be general-purpose internet sharing — the ability for a user in the mesh network to perform any internet function and not just within the constraints of an app.

Extending RightMesh to IoT and Other Devices: While R&D work on porting RightMesh to other languages, devices and platforms will have started in the previous phase, this phase will entail taking these developments to the field to test multi-device interoperability in RightMesh networks.

Growth of Regional Mesh Networks: In the growth phase, mesh networks will begin to form more quickly and be more prevalent at certain 'hotspots' (i.e. locations of high density) where localized apps will thrive. Expanding developer ecosystems to new communities and regions will accelerate the growth of mesh networks in greenfield locations.

Backward Integration with Decentralized ISPs: While RightMesh is initially focused on building mesh networks for the last mile, the journey to attain complete decentralization will not be complete unless the source of external networks into RightMesh is from a decentralized network. This could involve RightMesh collaborating with like-minded projects such as Althea, Ammbr, Orchid, or goTenna to form an interoperability standard, publishing an RFC or IETF draft around interoperability, or extending the project to introduce Superpeers as service providers.

OEM Partnerships: We believe integration of the RightMesh stack at the OEM and smartphone layer will be a vital element towards widespread adoption and growth of the network. Partnership efforts will begin early on towards meeting this goal, and the hope is that by this time we will have enough analytical data to show adoption of regional RightMesh networks to be attractive to OEMs.

5. Revolution [2024 and beyond]

Goal: The existence of vast and available decentralized mobile mesh networks — across all markets and across all devices.

This stage represents the fulfillment of our vision — to have an ecosystem of mobile mesh networks thriving across developing and developed regions and across a variety of devices. From Smartphones to IoT, we believe in a world connected. These mesh networks could then be interconnected through the RightMesh superpeers to form a global mesh network.

Devices will have autonomous capabilities to perform different functions in the mesh, whether that is to relay information through the network, negotiate with other devices for collaborative work, offer processing power or storage capacity into the network, or fetch media or files from IPFS or the decentralized web. These devices could include smartphones, IoT devices, sensors, connected vehicles, and more. In all of these scenarios, the token-based transactions between devices and entities that represent an exchange of value on the network will automatically be facilitated by the underlying protocols while being completely transparent to the end users. It just happens.

It is this phase that is the most fascinating to us at RightMesh, because while we are builders, we are also dreamers, and we love to dream big about future possibilities that seem impossible in today's world. We realize achieving this dream will take years — perhaps 6 years or more — But achieving this dream requires incremental and well-executed steps that will lead us to the next step. Slow and steady will win the race.

The RightMesh Ecosystem

Today's market for mobile applications is imbalanced. End users need to pay connectivity fees to telecommunication companies and network providers, which could either be expensive or inadequate due to a lack of proper infrastructure. With exception of a few very popular

applications, most service developers face huge challenges in getting users to discover their apps amid the millions of other applications that exist on app stores controlled by heavyweights.

Developers who get traction must rely on ad revenue models to cover their costs; as a result, they tend to focus more on those models instead of the actual services they provide. As a result, users are subsequently spammed continuously with advertisements to access so-called “free services”. In this market, it is the telecommunication companies, network providers, and massive internet companies that reap most of the benefits with little benefit for service providers and end users.

In contrast, all participants in the RightMesh ecosystem have important roles to play to the benefit all participants, and in turn each are rewarded for their contribution and impact they have.

The ecosystem is largely comprised of network nodes, the devices that form the infrastructure, the service providers, the entities who supply services and content to be used over the network, and the end users who utilize the service over a RightMesh network.

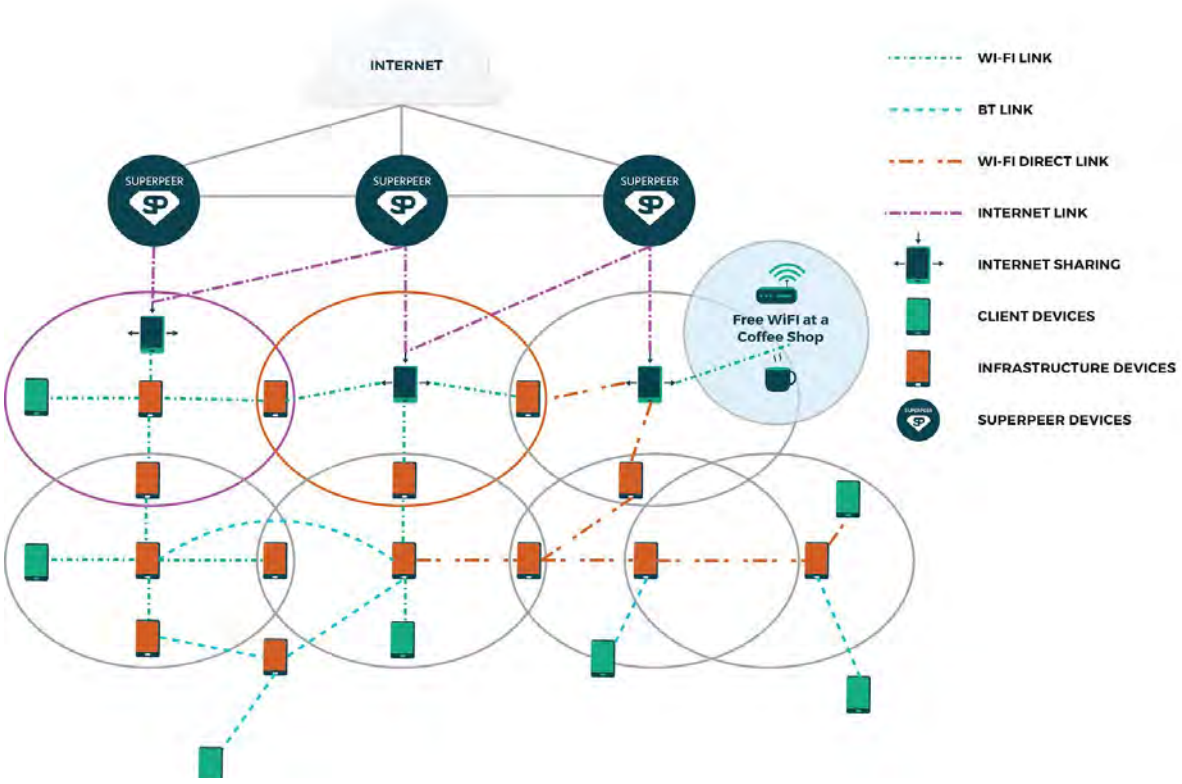
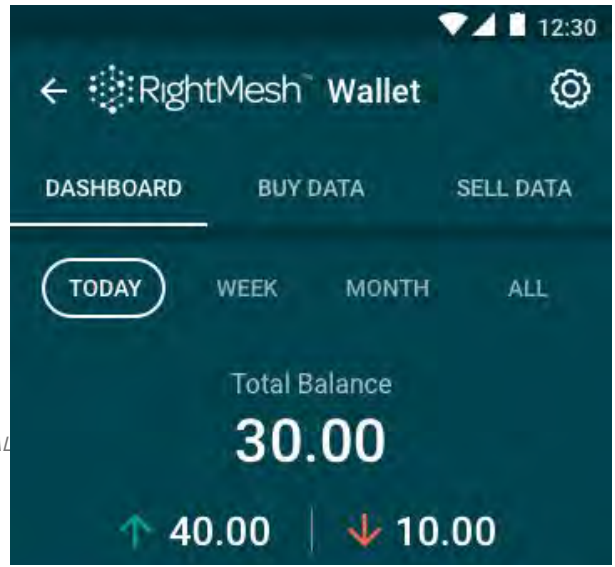


Figure 11. The RightMesh ecosystem

RightMesh Network Nodes

In the RightMesh network, the mobile devices themselves provide the infrastructure in place of ISPs. As such, there are key devices that provide critical and valuable functionality/infrastructure to the rest of the devices in the mesh. The user can determine (via a configuration panel within any RightMesh-enabled application) whether they would like to sell their



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Internet, participate as a intermediary node, or just remain as a client.

The four key roles within a network are defined below:

Key Network Nodes (Superpeer Proxy Devices)

These key network nodes ("Superpeers") would be run by RightMesh itself, app publishers and content creators, or others in the community who have fast and reliable connectivity.

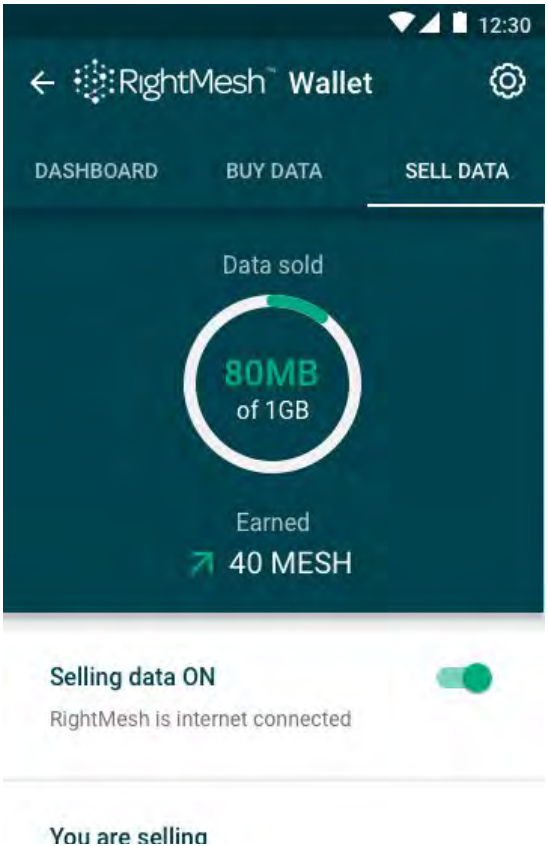
Superpeer proxy devices run either on AWS, Google, Azure, or by community partners with good hardware and fast Internet connections. These devices act as proxies and translation units between Internet traffic and RightMesh data requests. They run both RightMesh and full Ethereum nodes and execute transactions on behalf of RightMesh devices within the network (until phones advance and become more capable of doing so completely themselves). RightMesh will be open sourcing the software that runs the Superpeer network and will encourage others to set up and manage community nodes. Superpeers will be rewarded with tokens for all MESH token transactions that they execute, and they will have an opportunity to set pricing for data flow through the Superpeer network.

Internet Sharing and Seller Nodes (Data Sharing Devices)

Data Sharing Devices, also known as "Seller Nodes", which provide Internet access to the rest of the mesh are the most valuable and should be incentivized the most for providing service into the network. This value should be market driven. Any device within the network can become an Internet Sharing Node (ISN). A user can configure each device with a minimum price for what the user wants to charge for access. It is likely that a user would want to set the minimum to at least what it costs for their own data access. It may be possible in the future for RightMesh to collaborate with upstream networks in order to have reduced or zero-rated traffic.

Data Requestor and Buying Nodes (Client Devices)

Client devices, also known as "Buying Nodes", including though not limited to smartphones, provide no infrastructure functionality. They are simply participants in the network consuming or receiving data. Within RightMesh-enabled apps, client devices can configure according to how much he/she is willing to spend per MB, with limits set for how much should be consumed. Fiat pricing information could be presented in this location.



A client device may also be a local storage endpoint on which data is stored, or it may be a content creator creating consumable content and sensor data for use by others within the network or external to the mesh. For example, a client device could be a Filecoin or Storj storage device. In short, anything that the client device does to create value can be contributed back into the mesh and consumed by other mesh users.

A client device does not need data-sharing functionality to communicate across the mesh to other local client devices. For example, a mesh-enabled game that allows users on a commuter train to interact and play with other travellers involves one or more client devices plus optional intermediary routing nodes. This is also performed by a device-to-device app updating function

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where one client device updates a second client device as the applications determined (autonomously) that one version is newer than the other.

Routing or Intermediary Nodes (Infrastructure Devices)

Infrastructure devices, also known as “Intermediary Nodes”, are nodes which are not sharing the Internet directly, but are still forwarding packets on behalf of others. For clarification, these would be intermediary nodes between a client device that requested the data and the data sharing device providing the Internet access. Depending on the design moving forward, these devices may or may not be able to set their price. The initial implementation will see this device receive a percentage of an overall infrastructure fee for transmission.

RightMesh Token Model

Token: RMESH

Utility and Purpose

The RightMesh (RMESH) Token, an ERC-20 token, is the native token of the RightMesh network used by different participants:

- It is the economic incentive for nodes in the network to provide 'connectivity' between devices, and to manage and sustain the network.
- Certain nodes in the network (Superpeers) will be required to stake/bond RightMesh tokens in order to be a provider for the network.
- It can be used by end users to pay for connectivity, and for premium services or data from providers or from other nodes (e.g., sensor data)
- It can be used by the content providers to incentivize users to consume content
- It is a specific token that will only work on the RightMesh network when nodes are not connected directly to the Internet.

The RMESH token is essentially the fuel that powers the mesh network, and without it the mesh network cannot operate.

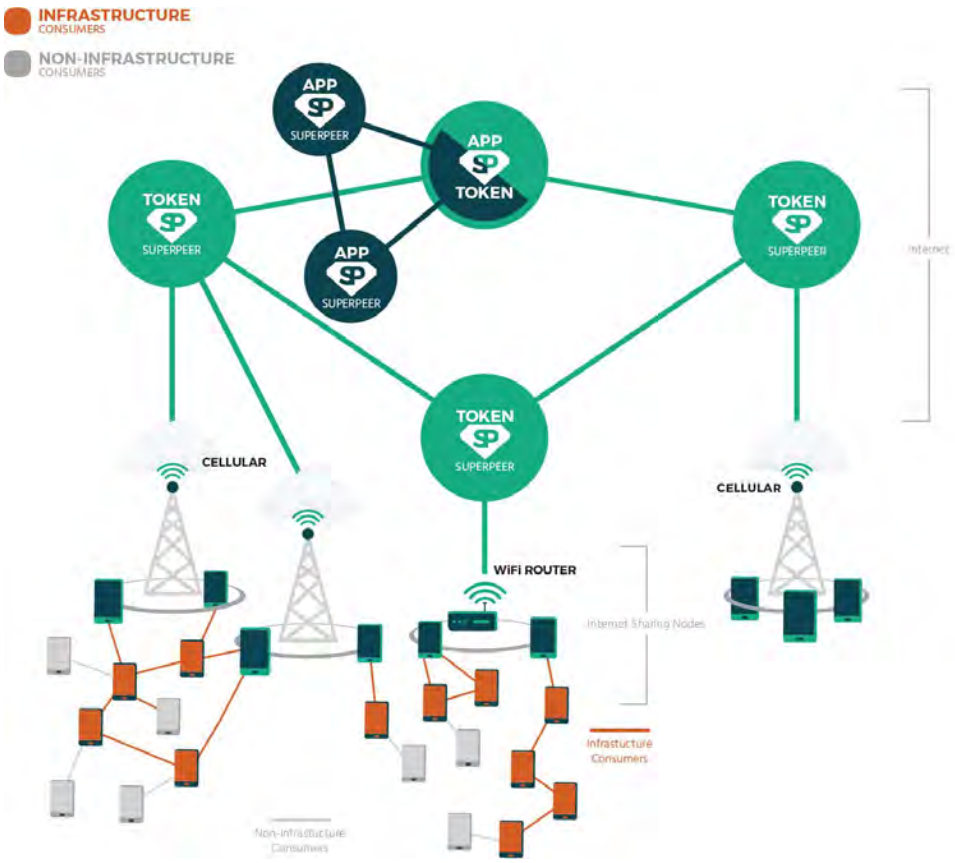

Figure 12. The RightMesh ecosystem

Network Nodes and Primary Usage of Token

Network Node	Function	Primary Usage of RMESH
Superpeer Layer (Fixed)	This layer consists of fixed nodes with dedicated connectivity (e.g., laptop or server), and could provide either of two services (or both): ● Token superpeer - for creating and maintaining payment channels between seller nodes and buyer nodes, for relaying Ethereum transactions from the mesh network into the main Ethereum network (primarily for creating and closing payment channels) and for routing packets between geographically disparate mesh networks. ● App superpeer - Developers can deploy app superpeers as 'trusted interfaces' for their respective apps to do specialized functions such as interface with centralized servers or databases, or decentralized resources such as IPFS links or DApps. Alternatively an app superpeer could be deployed by content providers to distribute content to its mesh network and sponsor payment channels.	**Staking Token -** Devices will need to stake RMESH tokens in order to function as superpeer devices (either as a token superpeer, app superpeer, or both), and as result will be able to support and facilitate payments between buyer, seller and intermediary mobile mesh nodes in the network. and the number of RightMesh mobile nodes that can be supported by a superpeer will be proportional to the amount of RMESH tokens that have been staked. In addition, each superpeer could earn transaction fees for all transactions that are processed by that node. This will be set by each superpeer and each can compete using market forces. RightMesh intends to operate the initial superpeers.
Seller node (Mobile)	This mobile node sells internet data (or any other future mobile resource such as collated data, storage, processing, etc) at a rate determined by the seller.	**Payment Token -** will earn RMESH tokens based on the services provided on the mesh network.
Intermediary node (Mobile)	This mobile node acts as a relay node in the network and contributes its device resources to the transmitting data across the mesh network.	**Payment Token -** will earn RMESH tokens based on the services provided on the mesh network.
Buyer node (Mobile)	This end user mobile node pays for the services consumed in the mesh	**Payment Token -** will pay (or earn) RMESH tokens based on the

	network - which could be mobile data or other resources (storage, processing, etc) at a protocol level - and other services at an application level. In addition, buyer nodes could also be rewarded with tokens for consuming content from content providers.	services consumed on the mesh network.
App Developers	Developers create the apps that provide a specific service to be used by end users in the mesh network.	**Payment Token -** developers do not need to utilize tokens necessarily in their app, however are welcome to charge users or reward users with tokens for specific actions taken in the app. Developers can also choose to deploy app superpeers that provide added functionality, and can pay RMESH tokens on a per usage basis for specific functionality. would need to pay RMESH tokens to deploy app superpeers to provide added functionality . Alternatively they could earn RMESH tokens for enabling in-app features, or for showing ads from content providers.
Content Providers	Content providers (which could be brands, advertisers, and other digital content providers) provide content that can be consumed at the choice of the user for a reward in return.	**Payment Token -** content providers can supply content into a mesh network, and reward users with tokens for taking action on that content. Content providers can also choose to deploy app superpeers that provide added functionality (such as tracking conversions), and can pay RMESH tokens on a per usage basis for specific functionality. Content providers would need to pay RMESH tokens to deploy app superpeers for added functionality (such as tracking conversions, etc).

App Developers, Publishers, Advertisers, and Partners (Service Providers)

Additional participants in the RightMesh ecosystem include app developers, content publishers, advertisers, and enterprise clients (including government agencies and non-governmental organizations (NGOs). These participants are the ones for whom the RightMesh tokens have immediate utility as they want to communicate or connect with edge-of-network and previously unconnected users and devices.

As documented well by Jana in their emerging markets analysis, by the year 2020 there will be 5.5 billion emerging market consumers, who will generate $24 trillion in economic consumption spurred on by $330 billion in advertising expenditure.[31] This will represent a doubling in consumption in over a ten-year period. Yet reaching consumers in emerging markets remain challenging with limited connectivity. Today, the incumbent advertising and app distribution middlemen are extracting huge sums to connect with emerging market consumers. RightMesh can flatten this distribution.

In order for a service provider or publisher to communicate with users on the mesh, they will need to obtain tokens either during the initial RightMesh utility token generating event or from existing token holders after the event.

A few use cases include:

- A mobile gaming company who wants to enable their app users to access the Internet over the mesh (e.g., to obtain unlock tokens or pay for an app upgrade),
- An app publisher who wants to incentivize app installation, and thus needs to pay mesh users to distribute the app to nearby, unconnected users
- A consumer packaged goods company that wants to display advertisements to mesh users
- An NGO that wants to distribute multimedia messages about a health epidemic
- An enterprise that wants to update a smart appliance
- A music studio who wants to promote a latest song

The data selling nodes elect whether to collect tokens for delivering services into the mesh, setting their own price for the resources they make available. While initially it will be the data selling nodes who will only have this functionality, the goal is to enable all participants, including infrastructure nodes, to collect tokens for providing mesh services.

RightMesh Data Sharing

The sharing economy ushered in a new wave of marketplaces that allowed users to sell their surplus resources [SUPPLY] to others who required those services [DEMAND]. This included notable companies like Airbnb in the private accommodations sharing market and Uber and Lyft in the ride-sharing markets. The next generation of these services will be decentralized without middlemen to facilitate the transaction.

[31] Jana, (Source: http://www.jana.com/insights)

What these companies had in common is that those who had Supply were able to make money for something they would not otherwise be using (a spare room in a house, or an idle car in the driveway). Eventually, entire economies emerged around these technologies where new entrepreneurs would become a full-time ride-sharing driver. Each driver or host became a microcosm of free market economics, and "surge pricing" has become a conversation starter at cocktail parties.

What these companies have done to the $106 billion alternative accommodations market[32] and the $125 billion taxi and limousine markets,[33] RightMesh will do to the $2.2 trillion telecommunications market.[34]

With RightMesh, users can enable their devices to make use of public/shared Wi-Fi networks and extend their range into the mesh, so people who normally are not connected to the Internet can be. RightMesh users can also share their cellular Internet or home Wi-Fi connections into the mesh as their data plans permit. Essentially, everyone has the option of being an ISP/data entrepreneur.

Until recently, it was not possible to incentivize a user to share their Internet connection or provide their battery life to forward packets on someone else's behalf, at least not in a scalable and trustworthy manner. We believe that combining the principles of blockchain, such as consensus, distributed ledgers, and cryptography with a heterogeneous wireless network will allow RightMesh to be the first commercially-viable, ad hoc mobile mesh network. This will ensure RightMesh is one of the first monetized infrastructureless p2p network, where participants are compensated fairly for their role in moving data from one person to another, or from one machine to another, opening up an entire market to cryptocurrencies previously unreachable. Further details on the importance of blockchain can be found in the technical whitepaper.

Data Selling

Device users which provide Internet access to the rest of the mesh will be able to set the rate at which they wish to resell data. Those who are selling data from their mobile plans, who also have a limit for the month, will likely set their price to be the highest. Those who are sharing unlimited plans, home Wi-Fi, or public Wi-Fi may set it to free or nearly free to compete. In the end, market economics will allow each "Data Seller" to set the price that the market can handle. Currently, RightMesh (without incentivization) chooses paths within a local mesh by selecting the route that uses the least number of hops. With incentivization this could be combined so that it selects the least cost, and cheapest path.

It should be noted that it is not a one-way sales relationship. The data seller sits in the middle of those who want to access and consume data—and app providers, publishers, and advertisers, who want to push content through to a user only available via the mesh (e.g., for an app update).

Load Sharing for Speed & Energy Savings

RightMesh technology could maintain multiple paths to the Internet and can spread the load across many Internet connections simultaneously. That is, imagine a scenario where a group of users are in

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[32] Tnooz, *Private Accommodations Travel Bookings to Reach $106 Billion by 2018*, January 2017, (Source: http://bit.ly/2iwokKL)

[33] Rani Molla, Bloomberg Gadfly, *How Big Can Uber Be?,* January 2016, (Source: https://bloom.bg/2tOydJU)

[34] Insight Research Corporation, *The 2015 Telecommunications Industry Review*, (Source: http://bit.ly/2tCWl1l). Note: A Parks Associates industry report estimates global mobile data revenue will increase from $386 billion in 2015 to $630 billion in 2020, with most of the revenue growth in the Asia & Pacific region and the rest of the world. (Source: http://bit.ly/2sGwaar)

a room all of whom have Internet connectivity via a 3G or 4G LTE connection. If one user wants to accelerate content to their device, they could use their nearby mesh devices to request content from an Internet-connected Superpeer. The content is transmitted locally and reassembled on the requester's device. This process can dramatically accelerate content delivery to a network's edge.

Not only would this approach speed up content delivery, the company believes that it could save a significant amount of energy as well. The company is currently exploring options to fund research to measure the economic and environmental savings per device. Early research from RightMesh's engineering team calculates that if all 6.8B mobile phones were using mesh technology to optimize connectivity, there could be upwards of $12.5B in annual cost savings as well as 156,400 GWh in energy savings (this is equivalent to 30 large hydroelectric dams and power generation stations).[35]

Geographically Separate Meshes

The current version of RightMesh supports joining geographically separate meshes using the Internet so that the same app in two separate meshes appears as one network. For example, on one mesh you could have a network of gamers playing a local game across a mesh, connecting to a network of other gamers playing the same game on a separate mesh on the other side of the world.

Distributed App Installation Network

Over half of the world's first-time smartphone users (i.e., those who are most willing to experiment with new apps) are from two emerging market countries: India and China. According to AppAnnie's 2016 year-end retrospective*, "India grew from more than 3.5 billion downloads in 2015 to more than 6 billion last year. The country's smartphone penetration stands at only 30 percent, so there is a massive chance for more growth."*[36]

The average cost per install via Google Play (Android) for Asian app users is $0.74/install and is increasing YoY.[37] This is a blend of all apps, many of them free and many of them from emerging market consumers. The global app economy is expected to be a $101 billion market by 2020.[38]

Currently, app distribution programs are limited to distributing apps one hop away from the infrastructure (i.e., the receiving users must be directly connected to the Internet via Wi-Fi or cellular network. With RightMesh, this reach can be extended out into the next 4 billion users, opening up a massive market of first time smartphone users. With RightMesh tokens circulating within the platform, nodes that participate in the distribution process can also receive compensation, enabling people to become virtual mobile app stores.

Consumers in these markets are willing to pay for apps: it is the current network speed and the cost of the data that is slowing adoption. In many countries, including Bangladesh, India, and Cuba, people pay a small amount of money each month to receive apps and content transferred directly onto a device's external SD card or portable hard drive. This is because it can often be more expensive to download the app using the Internet than the perceived value. Using RightMesh as an app distribution platform allows these existing app sellers to resell free apps actively or passively

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[35] Dr. Jason Ernst, *How to connect all the things without using all the power (Green Communications for IoT),* September 2016, (Source: http://bit.ly/2xMpVRX)
[36] App Annie, *Worldwide app downloads grew 15% and revenue soared 40% in 2016,* January 2017, (Source: http://bit.ly/2h4qm5P)
[37] BusinessOfApps, *How Much Does it Cost to Get an App Install?,* April 2016, (Source: http://bit.ly/2tL7CuV)
[38] AppAnnie, *The App Economy Could Double to $101 Billion by 2020,* February 2016, (Source: http://bit.ly/2qlgrbh)

wherever they go. Furthermore, by downloading an app, everyone who continues to participate can also earn tokens by passing the app onto another user, and so on, and so on, and so on. Now, rather than just paying for a free app with expensive data, consumption turns into entrepreneurism.

App Developers, who plan on distributing apps to the next 4 billion users through the RightMesh platform, may wish to contribute tokens during the initial token distribution to ensure adequate supply.

Distributed Advertising Networks

Currently, many free-to-play games and apps make their money when people view advertisements (such as videos) to unlock virtual goods. The mobile games market generated $40.6 billion in worldwide revenue in 2016, a sum equivalent to all global box office sales during the same period. This represented a 18% growth rate over the year before, much of it coming from advertising revenue. Mobile games now account for half of the entire global digital games market.[39]

Companies that wish to have their ads shown to offline consumers would purchase RMESH tokens. The tokens would be exchanged every time an ad unit is consumed on a device. This process would be transparent since the records of the consumption could be stored using the distributed ledger system. The ad would further be able to remain on the device, so that devices which are completely offline may also be reached. Client Devices who store and transmit the ad can be paid in RightMesh tokens for their distribution services. This creates another way for mesh users to earn tokens while connecting advertisers to the fastest growing consuming class.[40]

The unlocking of the virtual good uses very little data, but consuming video ads consumes quite a lot. This makes it expensive to people who cannot afford Internet access, but are willing to pay with their attention. With this distributed advertising network, RightMesh can reach billions of consumers not presently (or not always) connected.

Advertisers, who may wish to reach the next 4 billion users, may wish to contribute tokens during the initial token distribution to ensure adequate supply.

Network Effects & Marketing

Mesh Network Loop

Marketing efforts will be focussed predominantly on supporting the developer ecosystem, providing token incentives and our mesh software development kit to encourage adoption of our platform. An SDK will be provided to developers for free. A developer could deploy a mesh application in just a few lines of code (that is, reconfigure an existing application to support mesh network connectivity).

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[39] Unity Technologies, *Mobile Games Generated More Than $40 Billion in 2016, February 2017, (Source: http://bit.ly/2tLnspd)*

[40] "Over the next two decades, the middle class is expected to expand by another three billion, coming almost exclusively from the emerging world. By 2030, so many people will have escaped poverty that the balance of geopolitical power will have changed completely, and global trade patterns will also be unrecognizable." EY, *Middle class growth in emerging markets: Hitting the sweet spot,* August 2013, (Source: https://go.ey.com/2nQaVOh)

We believe that focusing on the developer will allow us to jumpstart our Mesh Network Loop, defined in the following figure:

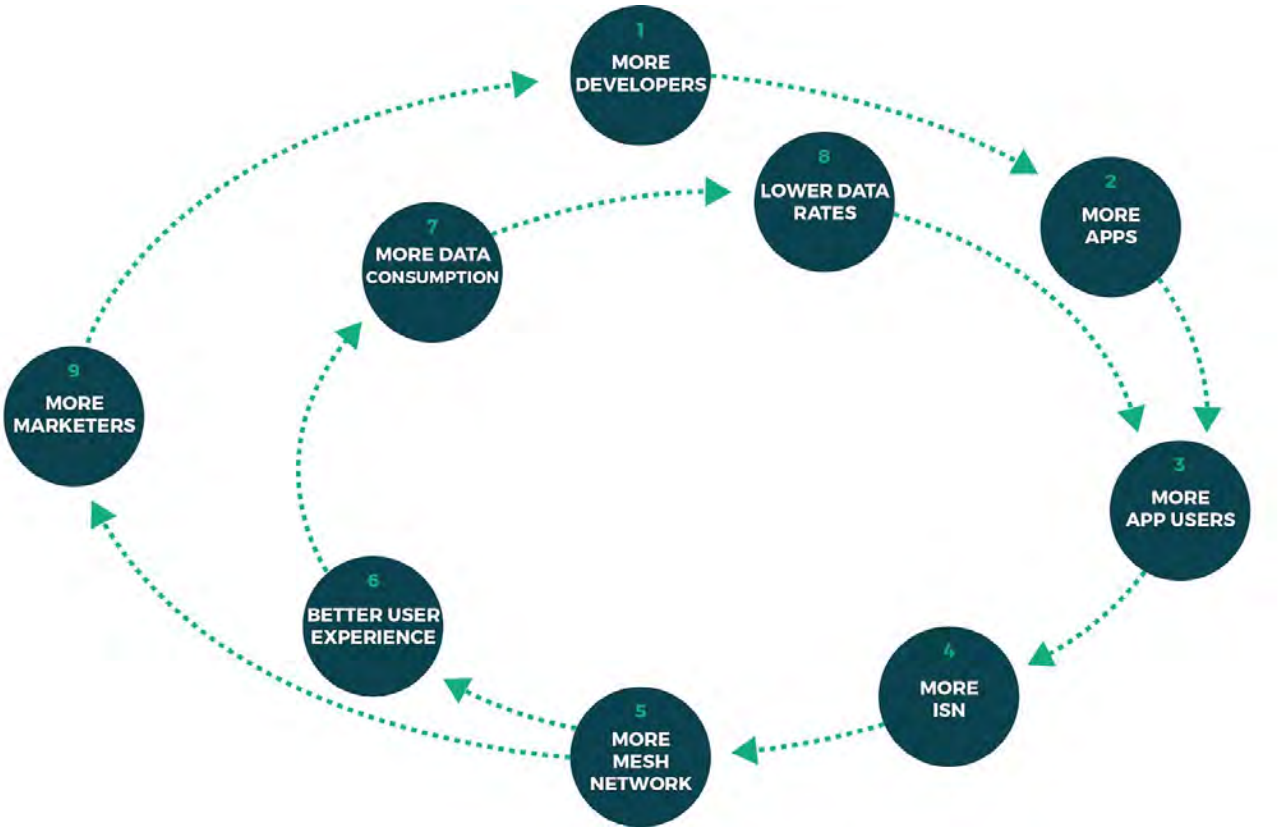

Figure 12. The RightMesh Network Effects Loop starts with Developers building mesh applications.

The primary network loop is as follows:

1. Developers are given the SDK for free and encouraged to build or retrofit apps
2. More apps means more users are attracted into the ecosystem.
3. More app users means there are more opportunities for participants/nodes to earn tokens for selling their connectivity or resources to other mesh nodes.
4. As the number of Internet Selling Nodes (ISN) increase, the availability of Internet/data increases, meaning more and larger mesh networks are formed.
5. As more mesh networks are formed, users receive better coverage and network quality of the network as well as better opportunities for users to make money either as an infrastructure node or by selling digital goods.
6. As the mesh network grows its density, the user experience improves for all participants, and as a result increases user engagement for each app.
7. As the app engagement increases, data/internet consumption on the mesh increases.
8. More data/internet consumption will lead to decreased data rates on the mesh. Lower data rates will attract more users

A secondary network loop also exists:

9. More mesh networks (and more mesh users) means more opportunities available for marketers or providers to share digital content (apps/ads etc.) to more app users.

10. This results in more spending by marketers/providers who buy tokens from the general market to reach previously unconnected users.

Kickstarting a Token Economy

The initial token economy will be kickstarted by selling utility tokens to app developers, publishers, advertisers, and other enterprise clients. After all, it will be these organizations who receive early utility from the platform as they achieve their business goals and reach into new markets.

To illustrate, consider this second network loop:

1. At the center, a publisher (inclusive of app creators, advertisers, service providers, etc.) participates in the initial token generation event
2. The publisher will pay a mesh user for their resources, namely their storage and connectivity
    a. The mesh user sets the price for which they are willing to sell resources
    b. If the publisher sees value at the price being set, the transaction occurs
3. The mesh user earns revenue as per their agreed upon contract
4. As mesh users earn revenue for participation in the network, more mesh users will be attracted to join the network the more money there is to be made
5. With more mesh users participating, it creates more distribution reach for publishers and a stronger mesh network
6. More mesh users increases the number of participants using the mesh networks
7. More publishers are attracted to a growing network of previously unconnected users
8. Publishers buy more tokens to reach these users

And the cycle would continue, transferring value from publishers and app distributors into the hands of the mesh users who are facilitating distribution. And in effect, western dollars flow into emerging markets (giving everyone value for this utility) and onto a platform in which the recipients receive new value and can have tokens for use within the economy.

The RightMesh Team

RightMesh is a subsidiary of Left, a 110+ person technology company with headquarters in the suburbs of Vancouver, Canada. The company was formed in 2010 with a mission to do things right. Left is a certified B-Corp, which means the company is committed to using business as a force for good. Combined, the team has decades of experience in mesh technologies and a track-record of building successful businesses—regardless as to how you measure success.

The RightMesh project started years ago when our team in Bangladesh began working on the first generation of the technology to solve their existing problems: the Internet was slow and overburdened. Today, More than 40 people are working full time on the RightMesh platform, its business operations, and on building applications that are powered by the technology. The company is rapidly growing, self-sustaining, and has been recognized nationally for its workplace culture and community engagement programs.

A few of our technical and business leaders include:

Technical Leadership

Dr. Jason Ernst

CTO and Chief Networking Scientist

Jason is the CTO and co-founder of RightMesh, a subsidiary of Left Technologies Inc. Jason is also an adjunct professor at the University of Guelph in computer science. Recently RightMesh raised $30M in an ICO to support the RightMesh project. In conjunction with the University of Guelph professor, Dan Gillis, Jason was awarded a $2.13M MITACs grant to support RightMesh being applied to address connectivity challenges in rural and remote regions including the north of Canada. Jason holds a PhD in the field of Mesh Networking and Heterogeneous Wireless Networks as well as a M.Sc. on Scheduling Techniques for Wireless Mesh Networks, both from the Applied Computing faculty at the University of Guelph. Jason has more than 30 published papers on wireless networks, cognitive agents, FPGAs, and soft-computing topics and has presented his research at international conferences around the world. Prior to joining Left, Jason was the CTO of Redtree Robotics, which designed robots that made use of multiple radio technologies to ensure pervasive connectivity to each other and their operators.

Dean Neumann

VP Research and Development

Dean Neumann is the VP Research and Development at RightMesh AG. He is a Senior Member of the Institute of Electrical and Electronics Engineers and a member of the IEEE Systems Council and the IEEE Computer Society Technical Community on Wearable and Ubiquitous Computing.

In his 30+ years of industry experience Dean has served as CEO of technology companies and held senior positions in multi-national companies including NetApp and Intel Corporation. His focus has been fault-tolerant mission-critical and safety-critical systems development, ISO 9001 quality systems, and commercialization of products in the embedded and communications sectors. He holds B.Sc. and M.Sc. degrees in Computer Science from Simon Fraser University.

Saju Abraham

Chief Product Officer

Saju is a seasoned professional in the realm of mobile and wireless technologies having worked with customers, partners and teams across 19 countries in organizations such as Lucent Technologies, Movius, NEC, OnMobile and Telefónica. His passion for building great products stemmed from his multifaceted experience as a software engineer, architect and product manager, and he currently thrives in bringing multiple cross-functional and cross-cultural teams together to cohesively execute the product strategy for RightMesh. An engaging speaker, Saju has spoken and lead workshops at the BC Tech Summit, the New York OSLO Freedom Forum, India Blockchain Week, and more. His credentials include a Bachelor's degree in Computer Science and Engineering and a Postgraduate degree in Management from the Indian Institute of Management, Bangalore.

Rakibul Islam
Co-Founder and CTO of Left

As a Co-founder and CTO for Left Technologies Inc., and CEO for Left Technologies International Ltd, Rakib leads the application development initiatives for internal and external stakeholders, including key recruitment of engineering and mobile technologists. The team's expertise resides in big data, mesh applications, IoT, blockchain, as well as web and mobile applications. An active member of BASIS Bangladesh Association for Software and Information Services), he frequently travels abroad to present an example of the 'new' Bangladesh and speak about economic empowerment. Rakib's credentials include a Master's Degree in Computer Science and Applications from Pune University, India, as well as being a participant in the US Department of State Professional Fellows Program for Young Entrepreneurs at the University of Oklahoma, USA.

Business & Marketing Leadership

John Lyotier
Co-Founder & CEO, RightMesh

John is one of the co-founders and is a key contributor to the global strategy, vision, and technology roadmap for RightMesh, its parent company Left, and all its subsidiary brands. While John received a Bachelors of Arts from the University of British Columbia (English and Art History), he has a unique ability to engineer growth while understanding technical parlance having spent more than 20 years in enterprise software, marketing, and technology startups. Under his leadership, the parent company, Left, has gained a national reputation as being a "Best Workplace" award winner while being the first back-to-back recipient of the BC Tech Association's *Tech Impact Award for Community Engagement*, recognizing the best company in BC for balancing "Work, Life, and Play". With RightMesh, he is focused on bringing connectivity to the next billion.

Chris Jensen
Co-Founder & COO, RightMesh

Chris began his career in the UK working for multinationals and banks and continued in the banking and brokerage industry upon moving to Canada. He has a strong understanding of the finance markets and has lived the pain of raising capital for early stage companies during the beginning stages of growth, from 25 to 80+ employees. He has founded several start-up companies in his career. In his role as CEO for the parent company, Left, and COO for RightMesh, Chris thrives on understanding the big picture and on moving the levers that drive the company forward. This includes financing, strategic partnerships, and corporate development. Chris holds a BSc (Honours) in Economics and History from Queen Mary University of London.

Alyse Killeen
Executive Strategist

Alyse is Managing Partner of StillMark Co. and StillMark Capital, and is one of the very first traditional venture investors to participate as an investor and advisor in the blockchain and cryptocurrency ecosystems. In 2015, the UN Foundation named her a Top 70 Bay Area Digital Leader, and in 2016, Singapore University of Social Sciences (SUSS), a university under the ambit of Singapore's national Ministry of Education, appointed Alyse as a Fintech Fellow. In 2017, International Business Times (IBT) recognized Alyse's contribution to the development of the blockchain ecosystem by including her in the 4th position of IBT's "VCs Powering the Blockchain Boom" List, following Tim Draper, Mark Cuban, and Naval Ravikant of AngelList and MetaStable. Alyse has presented internationally, been featured in many reputable publications, authored a book chapter in the award-winning Handbook of Digital Currency titled "The Confluence of Bitcoin and the Global Sharing Economy", and in 2017 contributed to the next book in the series, Handbook of Blockchain, Digital Finance, and Inclusion (2017), co-authoring "Global Financial Institutions 2.0" with Dr. R. Chan of the World Bank. In her role as Executive Strategist, Alyse consults with the executive team, including on the development of the team's network within the blockchain community and introduction to ecosystem leaders.

Melissa Quinn
Director of Corporate Strategy Manager

Melissa's passion to empower people through technology is why she has immersed herself in a mission driven organization that strive to do business as a force for good. Heading up Corporate Strategy for Left, and supporting with Left Travel and RightMesh, Melissa is focused on moving the businesses forward by working with regulators, lawyers, and partners around the world to ensure the company can scale and provide value for all stakeholders. Melissa collaborates with the teams to ensure this value translates to overall business success. A She has been awarded an Emerging Influencer Award and has been named BC Business's 2019 Top 30 Under 30. She started her journey with a BBA from SFU, and a background in HR.

Tracy McDonald
Director, Talent & Culture

Tracy is Director of Talent and Culture at Left, a tech innovations company with 160+ employees spread across Canada, Bangladesh, the United States, Switzerland, Singapore, India, and Kenya. Tracy's strong HR directorship has led the company to be recognized as one of Canada's Top Employers in 2019, adding to a string of culture awards during her tenure including the 2018 BambooHR High Impact HR Award, 'Best Workplace in BC' and, for 2 consecutive years, 'Community Engagement Winner' from the BC Tech Association.

In 2016, Tracy's passion for using business as a force for good saw her initiate Left's successful B-Corp certification. In 2017, she led the company to a 108% employee growth rate while maintaining the unique corporate culture, based on 10 core values that have guided the company since inception. Tracy shares her drive to create inclusive and authentic workplaces by sharing her expertise as a speaker/panelist at HR industry conferences and events. A champion for creating dynamic teams that inspire and enable people to reach their full potential, Tracy is recognized for her ability to lead with compassion, integrity, and trust.

Brianna MacNeil
Manager of Global Partnerships and Strategy

Brianna MacNeil is the Manager, Global Partnerships & Strategy at RightMesh. She aims to connect the dots between groups and ideas so that they can use RightMesh to extend connectivity to the next billion. Brianna is a speaker and has given talks about global connectivity, blockchain and cryptocurrency at Mars, Hunter College, Palace of Fine Arts Theatre, and for private group trainings including the BC Innovation Council. She is deeply passionate about blockchain for social impact, and has evangelized the humanitarian applications of mesh networks and cryptocurrencies at the US Institute of Peace, UN in Geneva, UN in New York City, at Techfugees in France, and the University of British Columbia. She has been featured in Thrive, CoinDesk, and Swaay.

Caryl Longden
Operations Director

Caryl is Operations Director for RightMesh. Prior to this role, she was the Chief Operations Officer for Left Travel, a wholly-owned subsidiary of Left, where she was responsible for day-to-day operations. When first joining Left in 2015 she was Senior Project Manager bringing some 15+ years of experience in technology project management. Caryl has an MSc in E-commerce from Huddersfield University, and she has been PMP certified since 2010. When not whipping the RightMesh team into peak operational efficiency, you can find her cheering on runners at the Left Running Club, a group she started in 2015. She was involved for several years volunteering with the YWCA mentoring program in Vancouver, helping women return to the workforce.

Advisors

Agnes Budzyn, *Office of the Founder, Managing Director at ConsenSys*

Agnes works directly with the CEO on the growth strategy and ensuring business alignment across the regions. Agnes also focuses on relationships with regulators, institutions and reviews of potential business acquisitions. She has also spoken on the impact of blockchain and its potential applications at events held by the FDIC and the World Economic Forum.

Previously Agnes was a member of the Financial Markets Advisory special situations team at BlackRock, where she advised clients on managing their capital markets exposure and balance sheets, working with institutions and regulators during the financial crisis. She also advised on regulatory and strategic challenges and performed country-wide financial reviews while working with the European Central Bank and other central banks.

Boris Mann, *Co-founder, Frontier Foundry Corporation*

Boris Mann is a long time Vancouver tech community builder as both company founder, advisor and investor, including founding the first Canadian startup accelerator, Bootup Labs. He is the CEO of Frontier Foundry, a blockchain-focused venture creation studio building global platforms.

Daniel Gillis, *Associate Professor, Statistician, Director of PSEER*

Dan has spent the bulk of his training and career working on multidisciplinary teams which have focused on public health assessment, and natural resource management. This has included collaborative projects with the Public Health Agency of Canada, Statistics Canada, Health Canada, Environment Canada, B.C. Cancer Agency, the Government of Brazil, the SON, McGill University, Laurentian University, and numerous departments within the UG including Integrative Biology, Cell Biology, the O.V.C.'s Biomedical Sciences, and the School of Engineering. He is the co-founder of Farm To Fork, the co-creator of ICON, and a fellow lead on the RightMesh project in Rigolet in collaboration with the CIRA.

Jason Butcher, *Founder, Parallel Payments*

Jason is a native of BC and is a serial entrepreneur with nearly three decades of experience building businesses globally in diverse industries and markets including Canada, Australia, The Caribbean, South and Central America, Hong Kong, Monaco, Malta, United Kingdom, and others. Jason is often referred to as a thought leader, connector, strategist, evangelist, deal maker, coach, mentor, firefighter, customer champion, decision maker and problem solver. Jason is the founder of Parallel Payments, the COO for CoinPayments, and an advisor to the Blockchain Association of Canada.

Les Borsai, *Mobile Growth & Licensing*

Les spent the first decade of his career in the music and entertainment industry focused on touring and artist management. This led him to become one of the top digital music entrepreneurs with a focus on mobile, apps and games, and founding businesses such as gridMob and Songlily. Les is a leader in business development, content and music licensing, branded products, strategic marketing and all things mobile. His passion for innovation and leadership has led him to serve as an advisor for Ripple, and consultant to Giphy and Shazam, among many other roles.

Nir Kshetri, *UNCG Professor and Author*

Nir Kshetri is Professor at The University of North Carolina-Greensboro. He has authored seven books on ICTs and entrepreneurship in developing countries and cybersecurity. *Choice* Magazine selected one of his books as an Outstanding Academic Title. Nir has also published about 110 journal articles. He has been interviewed and/or quoted in over 150 TV channels, magazines and newspapers. Relevant reading: Can blockchain technology help poor people around the world.

Scott Robinson, *Founder, Plug and Play Technology Center*

Scott Robinson is the founder and VP of Plug and Play FinTech, the financial technology focused startup innovation platform in partnership with BNP Paribas, Santander, Credit Suisse, Deutsche Bank, TD Bank, Sberbank, USAA, Mitsubishi, Capital One, Sumitomo, Intuit and many more global financial institutions. Scott has worked with Plug and Play, a global startup accelerator headquartered in Silicon Valley, for the past three years managing a number of FinTech, Blockchain, and Bitcoin-related initiatives. Additionally, Scott is the founder of Plug and Play Bitcoin, the

co-organizer of the world's oldest Bitcoin Meetup and founder of the first nationally syndicated Bitcoin Job Fair.

Stefan Jespers, *CEO of IMSolutions & Cryptocurrency Expert*

Stefan is an expert in online marketing and worked on projects for some of the biggest travel agencies in Europe. In late 2013 he got into Bitcoin and became very passionate about cryptocurrencies. He is better known by his pseudonymous Twitter handle "@WhalePanda" under which he published very successful articles on Bitcoin and Ethereum. Stefan is mostly focused on cryptocurrency trading right now and tries to educate new people on the dangers and pitfalls of the current blockchain ecosystem.

Micha Benoliel, *Co-Founder at Open Garden Inc.*

Micha is a visionary and serial entrepreneur focused on technologies of communications and exchange to bring the world together. At age 8, Micha taught himself how to code and subsequently wrote his first games on a Texas Instrument TI 99 4A, ATARI 512ST and Amiga 500. After being a pioneer in VoIP and having launched several telecommunications services, he enabled Skype to start SkypeIn and SkypeOut. In 2011, Micha co-founded Open Garden to build a new generation of mobile networks leveraging the smartphone infrastructure. While at Open Garden, he created FireChat, the first off-the-grid messaging app, leveraging peer-to-peer mesh networking technologies. FireChat was built for Burning Man and eventually got used during many other festivals, music events and pro democracy events like the Hong Kong Umbrella revolution in September 2014 when half a million people installed the app in a week to coordinate their movement and stay connected.

Mohamed Elkasstawi, *Founding Partner of zk Capital*

Mohamed Elkasstawi is the founding partner of zk Capital, a research-focused blockchain investment fund. He is focused on building blockchain communities and sits on the board of various organizations in emerging markets that are working on developing and deploying blockchain solutions.

Elkasstawi is a serial entrepreneur with extensive experience in digital assets investment and he is an early investor in different blockchain projects. He holds a BSc in Industrial Engineering from Northern Illinois University.

Nicolai Oster, *Head of ICO at Bitcoin Suisse*

Nicolai Oster is the Head of ICO, leading the ICO Department at Bitcoin Suisse, and Advisor for several ICOs. Bitcoin Suisse, established in 2013, is a world leading regulated crypto financial company, based in Crypto Valley, Zug, Switzerland. Bitcoin Suisse has successfully assisted, facilitated and executed many ICOs, such as Melonport, OmiseGO, Streamr and many more - dating all the way back to the ICO of the Ethereum Foundation.

Who is Left?

Left™ is the 110-person parent company of RightMesh. Over 75% of the company's employees are working full time to execute the RightMesh vision and build apps for within the ecosystem. Established in 2010, Left is a global media and innovations company that uses technology to solve some of the world's biggest problems. The biggest problem that Left has identified is connectivity in emerging markets. Left believes that if it can solve connectivity, it can reduce poverty, improve health outcomes, spread education, and lift up entire economies. Left is a certified B Corp and is recognized as one of the best workplaces in British Columbia, Canada, and consistently wins awards for Community Engagement.

Another Left subsidiary, Left Travel Inc., is profitable and has allowed the company to invest more than $7M in the research and development of the RightMesh platform since 2014. Left Travel is a data-driven travel company that specializes in converting high search intent traffic into quality bookings. Left Travel's big data marketing engine uses predictive analysis AI to drive $450 million in gross travel booked annually.

Mesh Enabled Applications Built by Left

YO! - Off-grid messaging, sharing and content discovery app.

The initial impetus to create RightMesh arose via internal needs for the Left team that lives and works in Bangladesh (Left has a team of 60+ people in Khulna & Dhaka, Bangladesh…mostly engineers and application specialists). Here, connectivity is slow, expensive, and inaccessible to many of the country's 161M people. As such, in 2014 the team created an early prototype of an off-grid communication and sharing application that could allow people to share files and chat with others nearby – without using the Internet or data. This was the genesis for the company's interest in mesh-based technologies.

YO! (www.yo.com), which is available in both English and Spanish, has garnered more than one million installs and is used predominantly in emerging economies, including: India, Bangladesh, Mexico, Colombia, Guatemala, and more. It was the company's work in Cuba—where connectivity is poor to nearly non-existent—that saw the technology recognized by the Wireless Broadband Alliance as the winner of the *Best Wireless Innovation and Excellence in Social Impact Award* in 2016.[41] The company and technology has also been recognized as the *Most Innovative Use of WiFi* in 2015 by the WIS (WiFi Innovation Summit). YO! is presently being migrated for use with the next-generation RightMesh platform with a target release of Q1 2018.

Other Applications

Left's team in Bangladesh, Left Technologies Pvt Ltd, consists of more than 70 mobile application engineers and programmers. More than half of this team is focussed on building applications for use with RightMesh. These applications will not only help seed the market with interesting apps and games, but they will provide valuable feedback on the needs of the developer community.

[41] WeAreBCTech, *Left™ Wins 2016 Wireless Broadband Alliance Industry Award,* November 2016, (Source: http://bit.ly/2tKdxSF)

About Being a B Corp and Doing Things *Right*.

At Left, we do things right. What this means is that the team believes business should be used as a force for good, and that great companies can change the world. To live this mantra with full transparency, Left joined the B Corp community[42] and became a *Certified B Corp* in March of 2017. B Corps are for-profit companies certified by the non-profit B Lab to meet rigorous standards of social and environmental performance, accountability, and transparency.

As a subsidiary corporation to Left, RightMesh is governed by the same principles and policies, and the group holds itself to the same standard of operations. Left scored an overall *B Score* of 101 in our Annual B Impact Assessment. This gives us an insight into the areas that we can improve over the coming months and years ahead. You can view Left's B Corp Assessment here: https://www.bcorporation.net/community/left

Additional Resources & Links

- Technical White Paper: https://www.rightmesh.io/technical-whitepaper
- Website: https://www.rightmesh.io
- Developer Portal: https://www.rightmesh.io/developers/
- Corporate Blog: https://www.rightmesh.io/news/
- Twitter: https://twitter.com/Right_Mesh
- Telegram: https://telegram.me/RightMesh_Official
- GitHub: https://github.com/rightmesh

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[42] See: https://www.bcorporation.net

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Legal & Regulatory

The RightMesh team is aware of potential risks associated with a decentralized mesh networking platform and the associated tokens. As of the date of publication of this White Paper, RightMesh Tokens have no known potential uses outside of the RightMesh platform ecosystem and are not permitted to be sold or otherwise traded on third-party exchanges. This White Paper does not constitute advice nor a recommendation by RightMesh, its officers, directors, managers, employees, agents, advisors or contractors, or any other person to the recipient of this White Paper on the merits of participation in the public contribution offering. Participation in the public contribution offering carries substantial risk and may involve special risks that could lead to a loss of all or a substantial portion of such contributions. Do not participate in the public contribution offering unless you are prepared to lose the entire amount you allocated to contributing in exchange for RightMesh tokens.

RightMesh tokens should not be acquired for speculative or investment purposes with the expectation of making a profit or immediate re-sale. No promises of future performance or value are or will be made with respect to RightMesh tokens, including no promise of inherent value, no promise of continuing payments, and no guarantee that Rightmesh tokens will hold any particular value. Unless prospective participants fully understand and accept the nature of RightMesh and the potential risks inherent in RightMesh tokens, they should not participate in the public contribution offering. RightMesh tokens are not being structured or sold as securities. RightMesh tokens are not participation in RightMesh and RightMesh tokens hold no rights in RightMesh.

RightMesh tokens are rewarded as a functional good and all proceeds received by RightMesh may be spent freely by RightMesh absent any conditions, save as set forth in this WhitePaper. This Whitepaper is not a prospectus or disclosure document and is not an offer to sell, nor the solicitation of any offer to buy any investment or financial instrument in any jurisdiction and should not be treated or relied upon as one.

Holders of RightMesh tokens assume risk when participating in trading activities and such activities have inherent risks. Unforeseen problems could result in the loss of all of a RightMesh token holder's funds RightMesh token value.

All information here that is forward looking is speculative in nature and may change in response to numerous outside forces, including technological innovations, regulatory factors, and/or currency fluctuations, including but not limited to the market value of cryptocurrencies.

CAUTION REGARDING FORWARD LOOKING STATEMENTS

This white paper contains forward looking statements or information (collectively "forward-looking statements") that relate to RightMesh's current expectations and views of future events. In some cases these statements can be identified by words or phrases such as "can" / "may" / "will" / "expect" / "intend" / "plan" / "believe" / "potential" / "is/are likely to" / "continue" or the negative of these terms or other similar expressions intended to identify forward looking statements. RightMesh has based these forward looking statements on its current expectations and projections about future events that it believes may affect its financial condition, results of operations, business strategy, financial needs, or the results of a token event or the value or price stability of RightMesh.

In addition to statements relating to the matters set out here, this white paper contains forward-looking statements related to RightMesh's proposed technology and operating model; such statements speak to RightMesh's objectives only, and is not a forecast, projection, or prediction of future results of operation.

Forward-looking statements are based on certain assumptions and analysis made by RightMesh in light of its experience and perception of historical trends, current conditions and expected future developments and other factors it believes are appropriate, and are subject to risks and uncertainties. Although the forward-looking statements contained in this white paper are based upon what RightMesh believes are reasonable assumptions, these risks, uncertainties, assumptions and other factors could cause RightMesh's actual results, performance, achievements, and experience to differ materially from its expectations expressed, implied or perceived in forward looking statements. Given such risks, prospective participants in this token event should not place undue reliance on these forward-looking statements.