RESPONSE TO TRAI Wi-Fi CONSULTATION NOTE ISSUED ON 15TH NOV 2016

i2e1 (Information To Every One)

OMNIA INFORMATION PRIVATE LIMITED

EXECUTIVE SUMMARY

The proposed architecture in the consultation paper floated by TRAI has an innovative approach to registration process by democratising it. However, user registration is the first step towards the user adoption. Our data shows that less than 1% of users buy data packs on exhaustion of data limit as they are looking for longer duration plans that can be used anywhere anytime.

To ensure accelerated adoption, there is strong need to focus on customer centric processes (example – an average User does not know how to enter MAC ID?), seamless experiences (by creating a true roaming experience like Telcos or Bank ATMs) and flexibility for entrepreneurs to innovate (example - SSID name can also be used creatively).

Though India has been late in Wi-Fi adoption, the opportunity is now and we can use the late start into an advantage by using the latest technology and architecture. Therefore, we propose a BlockChain architecture which is an affordable, scalable and highly effective solution taking into account the three focus areas we have highlighted.

Here is our opportunity to create a role model ecosystem. By adopting futuristic models, we can definitely choose to create a new future than an unwanted *ellipsism*.

The proposed architecture is a significant step forward in driving public Wi-Fi adoption & penetration in the country by addressing key pain-points. It also draws learnings from successful platforms like UPI and Aadhar.

Key Advantages of the Proposed framework:

1. Seamless authentication by leveraging existing national open APIs like Aadhar & eKYC
2. Ease of Payment enabled through UPI

However, certain additional points need to be looked with more detail to make it truly transformative and user friendly.

1. Portability of data packs across operators – In our experience with over 100 test locations, only 0.1% of customers who used Wi-Fi bought data packs. Rest of the users only consumed the free limit (30 minutes unlimited use). Further research showed that users didn't find value in short term data packs as they were valid only for that particular hotspot and couldn't be used at a later date. There was a clear need for long-term data plans that are applicable across multiple hotspots and days.

   We believe it is imperative to provide data plan portability across hotspot providers for users to get full value of the money spent. The current architecture doesn't allow for this.

2. Customer Centricity:
   a. Ease of logging from multiple devices – While app based login solves for seamless authentication of mobile phone, the process is cumbersome for laptops. As per Point 15 a), user can add more devices to their profile through MAC Ids. We believe it is very hard for an average user to figure out the MAC Id of their device and therefore the process might not work for connecting laptops to the hotspot.

      The process is also not clear for users (like students) who might not have mobile phone but have a laptop to connect to the hotspot.

   b. Roaming experience – The current architecture assumes each hotspot to be a unique instance and carries out authentication at each hotspot with the SSID-public key combinations. In our view, architecture should support seamless authentication across multiple hotspots without the user getting into manual selection of SSID and subsequent authentication process. Once authenticated, one should auto connect to all the hotspots till the time credentials are valid. This is necessary to achieve true roaming experience (e.g. – a mobile user takes a SIM from Airtel but is also seamlessly connected to all the operators where Airtel has a roaming pact)

   c. Foreign Nationals – It is not clear how would foreign nationals connect to Wi-Fi hotspots since they are not covered under Aadhar and eKYC.

3. Business Innovation – We believe that public Wi-Fi can play a transformative role in eradicating information asymmetry in the country. It is very important to keep the architecture open so that entrepreneurs to innovate and create new use cases and financially

sustainable models. As we go through the "consultation note", there are certain points which limit innovation and need to be discussed:

    a. Point 14 a) requires hotspot providers to register their SSID, public keys etc. This will limit innovation as SSIDs can be dynamic and change based on business requirements. E.g. – for Sale period, one might rename SSID to "Sales @ Location XXX" to attract more users to the store.

    b. Point 19 b) refers to the need to create a revenue splitting model since entrepreneurs/ venue owners cannot take up the entire cost. We believe that there are innovative ways to reduce the overall cost of delivery, thereby making the model more economical and empowering the venue owners to bear the entire cost of Wi-Fi hotspot. E.g. – using i2e1 cloud based platform, merchants can create a compliant Wi-Fi hotspot at 1/10th of the usual cost, thereby generating positive RoI. At 1000's of such locations, Wi-Fi is being provided free of cost to the users with positive unit economics. Key is to create value for all stakeholders.

    c. While architecture provides various roles like registration provider, hotspot provider and hotspot service provider, we envisage that a single entity may perform multiple/all these roles. E.g. – payment app might provide KYC but can also setup its own hotspots.

Our Recommendation:

With operators facing huge challenges with optimizing data and voice over limited spectrum bandwidth, public Wi-Fi can play a very large role in enabling fast and stable internet access for millions of citizens when they are outside their homes and offices.

We are at cross-roads in true sense and the path we take from here will define the future of Wi-Fi connectivity in the country as well as create a path for other nations to follow. Therefore, it is important for the architecture to be future ready, scalable and open for entrepreneurs to innovate. This should provide un-interrupted access to internet in an economically viable, secured and customer centric manner.

We propose a policy framework and backend architecture based on the following **guiding principles**:

    a) Future ready from both scale and technology perspective
    b) Customer centric in terms of ease of access (dumb proof)
    c) Create ubiquitous coverage with complete inter-operability
        i. Seamless authentication – once authenticated, all hotspots should accept the certificate
        ii. Data Portability - long term data packs that can be used anytime and anywhere
    d) Open architecture to allow entrepreneurs to innovate and provide more value
    e) Higher efficiency achieved through clear policy framework with minimized role of intermediaries

In light of the principles laid out above, we believe an architecture based on **Blockchain** can support a seamless Wi-Fi experience with a highly efficient settlement mechanism of data/money across hotspot providers. Wi-Fi ecosystem in India is rightly poised to adopt such framework since it would be starting from scratch (and hence no need for uprooting existing infra) and can become the role model for many others to follow this efficient, cost effective and minimalistic architecture used for public welfare.

Blockchain is a disruptive technology platform that uses cryptography and a distributed messaging protocol to create shared ledgers among counterparties. Originally, blockchain technology was used by cryptocurrencies whose popularity gave rise to the idea of blockchains as a means of building consensus. Since then, multiple use cases have emerged in payments, real state, capital markets, clearing and settlement etc.
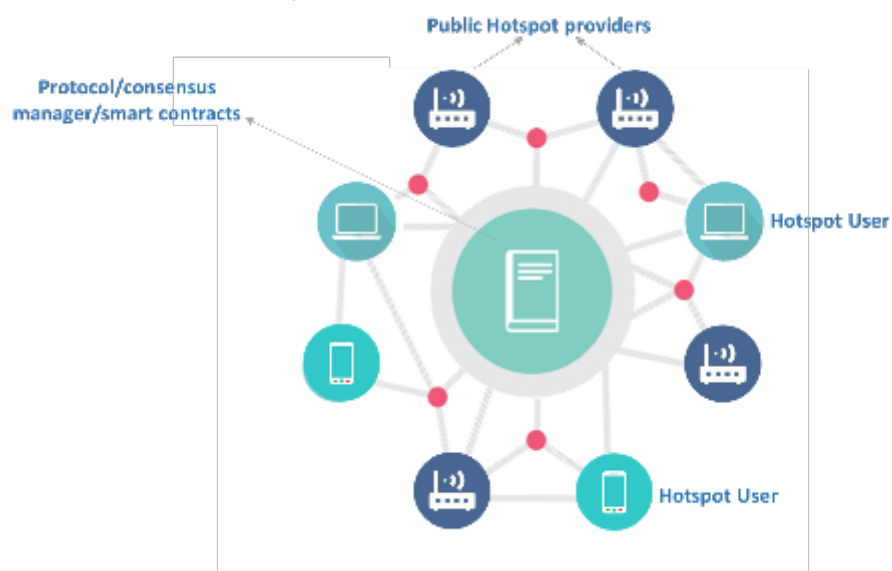
Though a lot needs to be done, we are providing a very brief sketch of how blockchain can transform Wi-Fi adoption in the country.

Imagine each individual entity (hotspot provider, hotspot user) as a block which gets combined to form a blockchain stuck together through a set of protocols via a consensus mechanism. (refer Figure 1)

a. Authentication – User credentials could reside on a block (which could be linked with Aadhar/eKYC). This information is available to all the participants in the blockchain to seamlessly authenticate the user.

b. Fully portable internet data packs – The information on current data pack and data left also can be available within the block itself. This way, each hotspot has full understanding of how much data is available to each user.

c. Seamless payment process – Blockchain ensures seamless transfer of money between two parties directly (without involving any central clearing mechanism) to enable purchase of data backs.

d. Settlement amongst hotspot providers based on "smart contracts"—programmed code that replicates conventional commercial agreements by digitizing business transactions between parties and validating them through a blockchain.

Points a and c have also been addressed well in the architecture proposed in the consultation paper

Figure 1 – Blockchain based Architecture
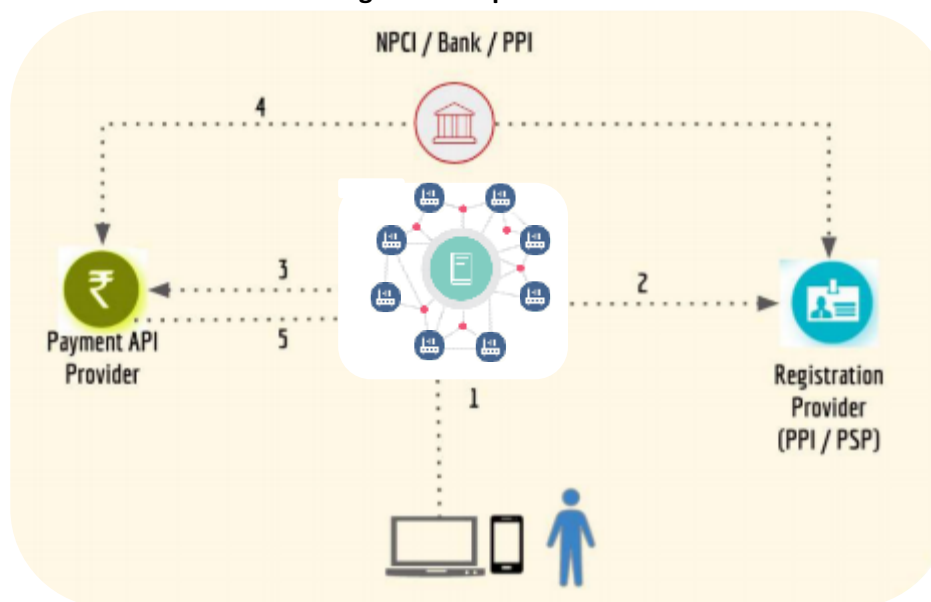

Source: Accenture Whitepaper

Phased launch Plan: We understand that a full-fledged blockchain architecture with participation from end user may take time to evolve. Hence to start with only the hotspot providers can be part of the block chain which ensures settlement and portability of data packs without setting up a large clearing mechanism. Authentication and Seamless payment can be driven by current national open APIs/ Mobile Apps

The following diagram demonstrates the proposed structure (leveraging the structure proposed in the consultation note):

Figure 2: Proposed Structure

RESPONSE TO SPECIFIC QUESTIONS ASKED IN CONSULTATION NOTE

Some part of the questions have been addressed in the above section. However, for the ease of review, **we are repeating a brief summary below against the appropriate question**.

Q1. Is the architecture suggested in the consultation note for creating unified authentication and payment infrastructure will enable nationwide standard for authentication and payment interoperability?

A1. Yes, it broadly addresses the unified authentication and payment infrastructure. However, certain additional points need to be looked with more detail to make it truly transformative and user friendly.

1. Portability of data packs across operators – In our experience with over 100 test locations, only 0.1% of customers who used Wi-Fi bought data packs. Rest of the users only consumed the free limit (30 minutes unlimited use). Further research showed that users didn't find value in short term data packs as they were valid only for that particular hotspot and couldn't be used at a later date. There was a clear need for long-term data plans that are applicable across multiple hotspots and days.
We believe it is imperative to provide data plan portability across hotspot providers for users to get full value of the money spent. The current architecture doesn't allow for this.

2. Customer Centricity:

a. Ease of logging from multiple devices – While app based login solves for seamless authentication of mobile phone, the process is cumbersome for laptops. As per Point 15 a), user can add more devices to their profile through MAC Ids. We believe it is very hard for an average user to figure out the MAC Id of their device and therefore the process might not work for connecting laptops to the hotspot.

The process is also not clear for users (like students) who might not have mobile phone but have a laptop to connect to the hotspot.

b. Roaming experience – The current architecture assumes each hotspot to be a unique instance and carries out authentication at each hotspot with the SSID-public key combinations. In our view, architecture should support seamless authentication across multiple hotspots without the user getting into manual selection of SSID and subsequent authentication process. Once authenticated, one should auto connect to all the hotspots till the time credentials are valid. This is necessary to achieve true roaming experience (e.g. – a mobile user takes a SIM from Airtel but is also seamlessly connected to all the operators where Airtel has a roaming pact)

c. Foreign Nationals – It is not clear how would foreign nationals connect to Wi-Fi hotspots since they are not covered under Aadhar and eKYC.

3. Business Innovation – We believe that public Wi-Fi can play a transformative role in eradicating information asymmetry in the country. It is very important to keep the architecture open so that entrepreneurs to innovate and create new use cases and financially sustainable models. As we go through the "consultation note", there are certain points which limit innovation and need to be discussed:

> a. Point 14 a) requires hotspot providers to register their SSID, public keys etc. This will limit innovation as SSIDs can be dynamic and change based on business requirements. E.g. – for Sale period, one might rename SSID to "Sales @ Location XXX" to attract more users to the store.

> b. Point 19 b) refers to the need to create a revenue splitting model since entrepreneurs/ venue owners cannot take up the entire cost. We believe that there are innovative ways to reduce the overall cost of delivery, thereby making the model more economical and empowering the venue owners to bear the entire cost of Wi-Fi hotspot. E.g. – using i2e1 cloud based platform, merchants can create a compliant Wi-Fi hotspot at 1/10th of the usual cost, thereby generating positive RoI. At 1000's of such locations, Wi-Fi is being provided free of cost to the users with positive unit economics. Key is to create value for all stakeholders.

> c. While architecture provides various roles like registration provider, hotspot provider and hotspot service provider, we envisage that a single entity may perform multiple/all these roles. E.g. – payment app might provide KYC but can also setup its own hotspots.

Q2. Would you like to suggest any alternate model?

A2. Yes, we would like to suggest an alternate model as detailed below:

With operators facing huge challenges with optimizing data and voice over limited spectrum bandwidth, public Wi-Fi can play a very large role in enabling fast and stable internet access for millions of citizens when they are outside their homes and offices.

We are at cross-roads in true sense and the path we take from here will define the future of Wi-Fi connectivity in the country as well as create a path for other nations to follow. Therefore, it is important for the architecture to be future ready, scalable and open for entrepreneurs to innovate. This should provide un-interrupted access to internet in an economically viable, secured and customer centric manner.

We propose a policy framework and backend architecture based on the following **guiding principles**:

I. Future ready from both scale and technology perspective
II. Customer centric in terms of ease of access (dumb proof)
III. Create ubiquitous coverage with complete inter-operability
> a. Seamless authentication – once authenticated, all hotspots should accept the certificate
>
> b. Data Portability - long term data packs that can be used anytime and anywhere

IV.   Open architecture to allow entrepreneurs to innovate and provide more value
V.   Higher efficiency achieved through clear policy framework with minimized role of intermediaries

In light of the principles laid out above, we believe an architecture based on **Blockchain** can support a seamless Wi-Fi experience with a highly efficient settlement mechanism of data/money across hotspot providers. Wi-Fi ecosystem in India is rightly poised to adopt such framework since it would be starting from scratch (and hence no need for uprooting existing infra) and can become the role model for many others to follow this efficient, cost effective and minimalistic architecture used for public welfare.

Blockchain is a disruptive technology platform that uses cryptography and a distributed messaging protocol to create shared ledgers among counterparties. Originally, blockchain technology was used by cryptocurrencies whose popularity gave rise to the idea of blockchains as a means of building consensus. Since then, multiple use cases have emerged in payments, real state, capital markets, clearing and settlement etc.
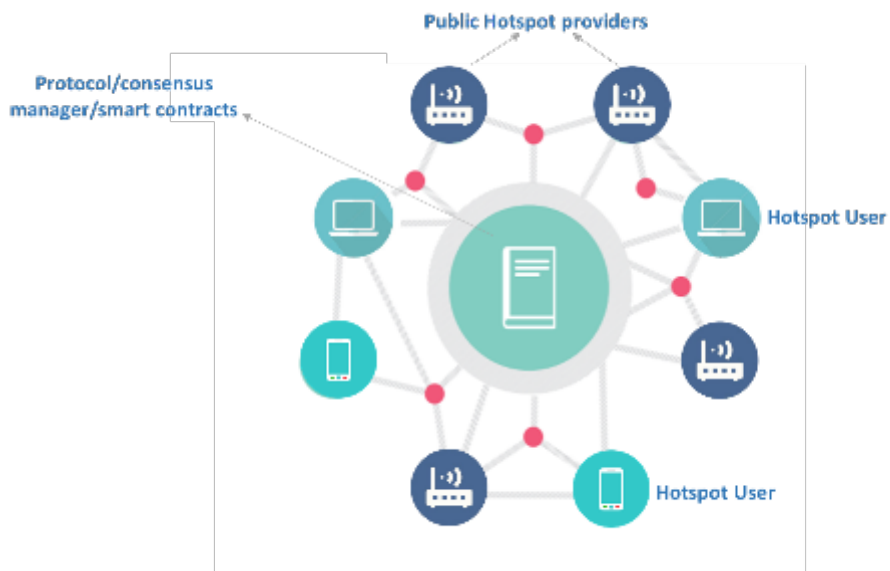
Though a lot needs to be done, we are providing a very brief sketch of how blockchain can transform Wi-Fi adoption in the country.

Imagine each individual entity (hotspot provider, hotspot user) as a block which gets combined to form a blockchain stuck together through a set of protocols via a consensus mechanism. (refer Figure 1)

a) Authentication – User credentials could reside on a block (which could be linked with Aadhar/eKYC). This information is available to all the participants in the blockchain to seamlessly authenticate the user.

b) Fully portable internet data packs – The information on current data pack and data left also can be available within the block itself. This way, each hotspot has full understanding of how much data is available to each user.

c) Seamless payment process – Blockchain ensures seamless transfer of money between two parties directly (without involving any central clearing mechanism) to enable purchase of data backs.

d) Settlement amongst hotspot providers based on "smart contracts"—programmed code that replicates conventional commercial agreements by digitizing business transactions between parties and validating them through a blockchain.

Point a and c have also been addressed well in the architecture proposed in the consultation paper
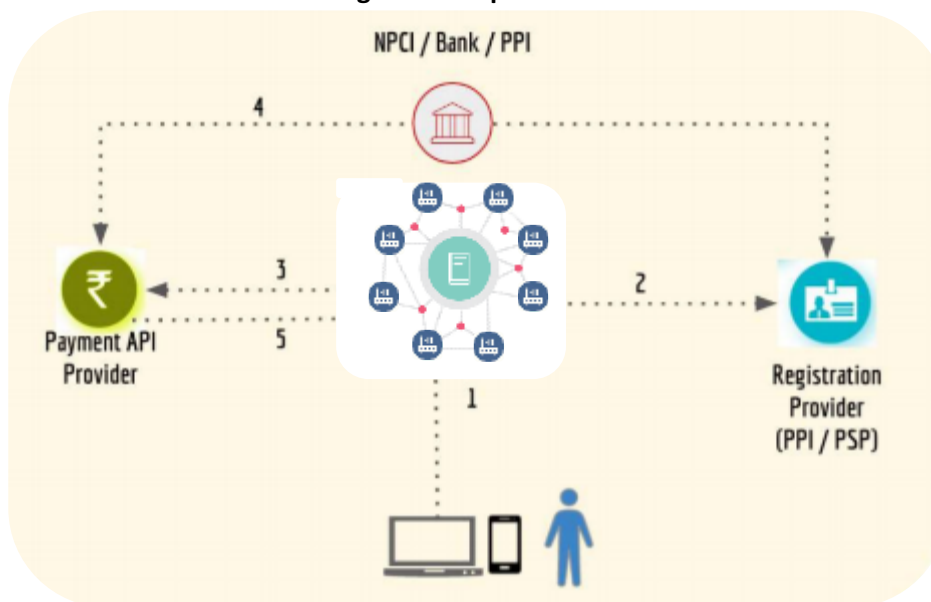
Figure 1 – Blockchain based Architecture

Source: Accenture Whitepaper

Phased launch Plan: We understand that a full-fledged blockchain architecture with participation from end user may take time to evolve. Hence to start with only the hotspot providers can be part of the block chain which ensures settlement and portability of data packs without setting up a large clearing mechanism. Authentication and Seamless payment can be driven by current national open APIs/ Mobile Apps

The following diagram demonstrates the proposed structure (leveraging the structure proposed in the consultation note):

Figure 2: Proposed Structure

Q3. Can Public Wi-Fi access providers resell capacity and bandwidth to retail users? Is "light touch regulation" using methods such as "registration" instead of "licensing" preferred for them?

A3. Yes, public Wi-Fi access providers should be allowed to resell capacity and bandwidth to retail users. Policy framework should enable this method and fuel entrepreneurial ventures in this area. The light touch regulation can be setup on the similar lines as those already defined for Cybercafés.

Q4. What should be the regulatory guidelines on "unbundling" Wi-Fi at access and backhaul level?

A4. Subject to authentication of end user (like in cyber café), there should not be any regulatory guidelines on unbundling Wi-Fi access as this may limit market innovation. With advancement in technology, business models like Airbnb have emerged out of concept of unbundling.

Q5. Whether reselling of bandwidth should be allowed to venue owners such as shop keepers through Wi-Fi at premise? In such a scenario please suggest the mechanism for security compliance

A5. Yes, reselling of bandwidth must be allowed to venue owners. This would ensure financial viability of the model leading to large scale adoption. However, there should be guidelines around security compliance like usage logs which can be done at fraction of a cost using the cloud based technologies.

Q6. What should be the guidelines regarding sharing of costs and revenue across all entities in the public Wi-Fi value chain? Is regulatory intervention required or it should be left to forbearance and individual contracting?

A6. There should be no regulatory intervention to determine sharing of costs and revenues. This should be left for market forces to decide.