



CASE STUDY

BSNL Rolls out One of The World's Largest Nationwide Wi-Fi Networks on Sterlite Tech Platform

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‘Sterlite Wi-Fi platform has delivered on its promises. It is a highly scalable and agile solution which enabled BSNL to generate new revenue streams from innovative Wi-Fi services that go beyond Wi-Fi offloading and enable BSNL to look at the future of Digital India program with greater confidence’

Anupam Shrivastava - CMD at BSNL

Summary

BSNL is the leading wireline provider in India. As part of the Digital India initiative BSNL wants to provide connectivity to underserved areas in a viable and innovative way. To that effect, BSNL has laid a nationwide fiber network and complementing it with an ambitious carrier grade Wi-Fi deployment. BSNL wanted a Wi-Fi network that is secure, flexible and easy to connect to for current subscribers as well as visitors. To monetize and make the most of its Wi-Fi deployment, BSNL has selected Sterlite Technologies Service management platform which not only helped a smooth and elegant deployment but also the introduction of innovative services such as location based services, advertising and on-demand connectivity . The operational and financial results of such a collaboration have been very positive for BSNL which released some impressive early KPIs.

CASE STUDY HIGHLIGHTS

CUSTOMER:

- ▶ Leading Tier 1 Operator in India

PROJECT DURATION:

- ▶ 5 Months (October 2016 – March 2017)

DELIVERY MODEL:

- ▶ License Supply Installations Integration Implementation

TRAFFIC SUPPORTED:

- ▶ Time and Quota based Wi-Fi access

BACKGROUND

Despite much progress in the last few years, India remains well behind its regional peers when it comes to broadband penetration.

Indeed, India ranks 134th in the 2017 ITU ICT Development Index and still has less than 25% broadband penetration today while Internet Penetration in rural areas is less than 16% in 2017 and that's not even fast broadband. This low broadband penetration reflects the huge challenges still faced by the country to realize its full potential as a digital country

The Telecom Authority reported about 325 million broadband subscribers in Q3 2017 with only 10% being wired broadband. DSL accounted for almost three-

quarters of fixed broadband subscriptions, with fiber representing less than 2 per cent. There are over 1 million kilometres of optical fiber in the national backbone.

Wi-Fi has a unique advantage to reduce the digital gap in the country especially when combined with sufficient backhaul capacity through fiber. Wi-Fi has seen exponential growth everywhere due to the abundance of free spectrum and lower costs access points but not in India yet, why?

There are number of reasons why Wi-Fi has not been deployed to its full potential yet. Those include (but are not limited to):

- ▶ Lack of incentives for operators to invest in Wi-Fi networks as

Wi-Fi is often perceived as a free service so operators may not know how to monetize it.

- ▶ Lack of a framework on roaming between Wi-Fi networks and difficulties in on boarding and making payments for Wi-Fi access leading to a poor customer experience
- ▶ Limited availability of facilities-based fiber or copper broadband especially in suburban and rural areas, constrains availability of Public Wi-Fi.

Indian regulatory authorities including the TRAI are looking into ways to reduce the barriers to Wi-Fi deployments to support the government telecom objectives such as Digital India.

Digital India

Digital India is a flagship government program with a vision to transform India into a digitally empowered society and knowledge economy. It is an umbrella initiative covering a number of government agencies and departments and centered on three key areas:

- ▶ Digital infrastructure as a utility for every citizen;
- ▶ Governance and services on demand;
- ▶ Digital empowerment of citizens.

BSNL INITIATIVE

To give impulse to the Digital India project, BSNL has set to tackle the challenge with an ambitious nationwide rollout of Wi-Fi access points, leveraging its position as the largest backbone/fiber operator in the country.

ABOUT BSNL

Bharat Sanchar Nigam Limited (BSNL) is fifth largest telecom operator in India with more than 60% market share in fixed telephony and broadband services. BSNL offers a wide range of services including fixed landline, broadband, GSM cellular, IPTV, VoIP, FPH, VPN, ACC, PRM and UAN. BSNL envisioned to expand its current business and network by offering country wide Wi-Fi access to all its current subscribers as well as non-BSNL subscribers. BSNL aims to deploy 100,000

access hotspots by March 2018 out of which the first phase will be of 35,000 hotspots. The operator wanted to achieve an edge over its 4G competitors by offering high quality Wi-Fi services to both existing and visitors as well as contribute to reducing the urban-rural digital divide in the country. Following a public, the project was awarded to the consortium of L&T, Cisco and Sterlite Tech. L&T with Cisco being responsible for the hardware including access points while Sterlite Tech would cover the software layers. The project

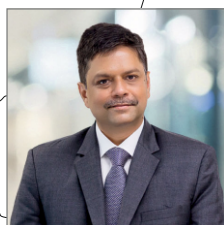
plan included various phases with the first phase in major five cities Chennai, Noida, Bangalore, Pune and Kolkata. The hotspot services will eventually be extended across the 22 circles of BSNL network operations.

THE REQUIREMENTS

BSNL needed a robust Wi-Fi service management platform that could enable to expand beyond its existing customer base to include its own broadband and mobile customers, as well as walk-in users, occasional users, visitors and roamers. Different use cases for authenticating and on-boarding each type of users to BSNL network were identified and required in the newly selected software platform.

The list of requirements for the right platform are presented below:

- ▶ Offload BSNL 2G/3G subscribers to the hotspot network using their prepaid or post-paid balance.



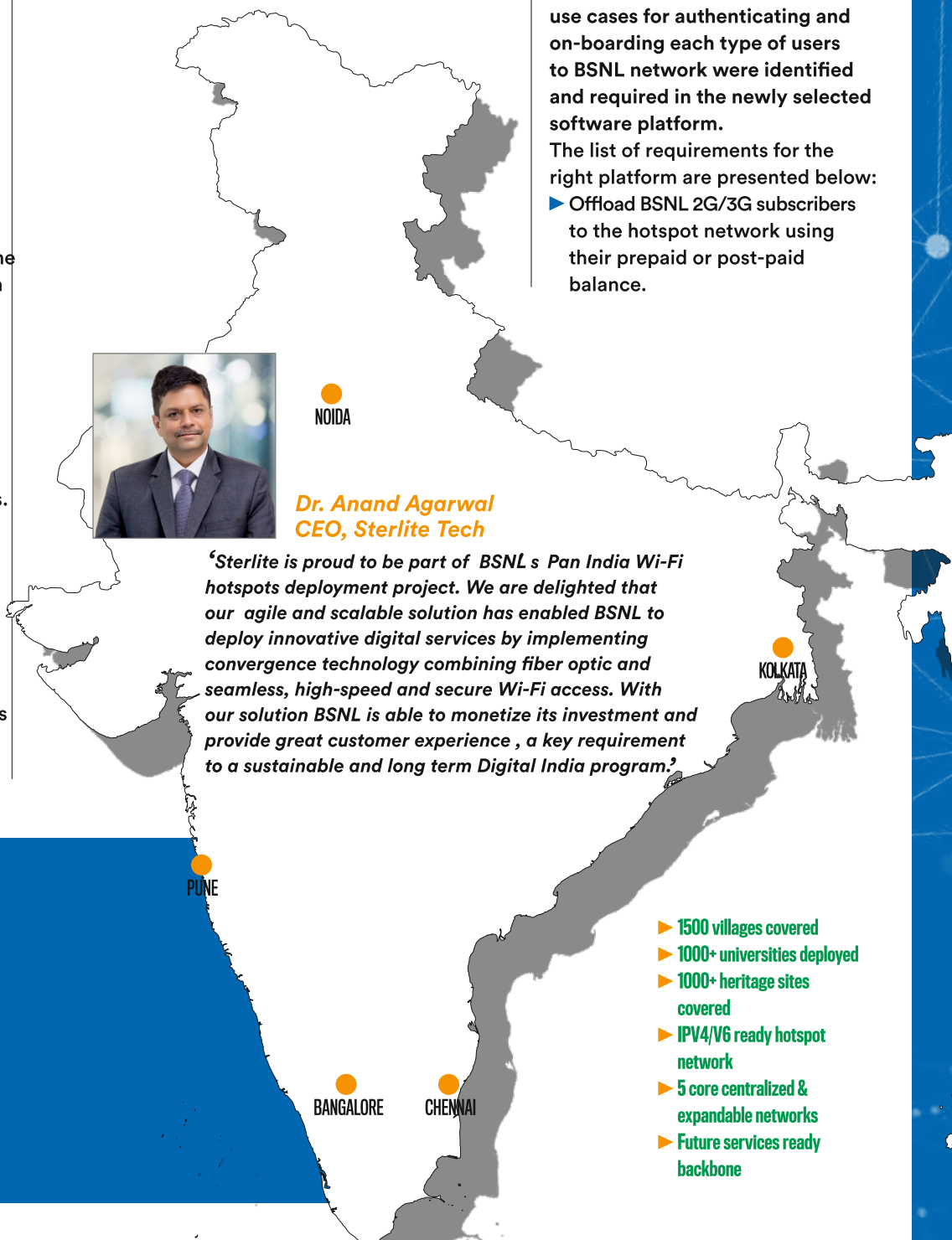
Dr. Anand Agarwal
CEO, Sterlite Tech

'Sterlite is proud to be part of BSNL's Pan India Wi-Fi hotspots deployment project. We are delighted that our agile and scalable solution has enabled BSNL to deploy innovative digital services by implementing convergence technology combining fiber optic and seamless, high-speed and secure Wi-Fi access. With our solution BSNL is able to monetize its investment and provide great customer experience, a key requirement to a sustainable and long term Digital India program.'

DEPLOYMENT HIGHLIGHTS:

- ▶ 1 of the world's largest deployment
- ▶ 60k AP to be deployed
- ▶ 15k already deployed
- ▶ 9k daily user registration
- ▶ 600k logins per month
- ▶ 100 MB of free quota
- ▶ 1000k+ registered users

- ▶ 1500 villages covered
- ▶ 1000+ universities deployed
- ▶ 1000+ heritage sites covered
- ▶ IPV4/V6 ready hotspot network
- ▶ 5 core centralized & expandable networks
- ▶ Future services ready backbone





Digital India *cont...*

- ▶ On-board existing broadband customers from their broadband account to access the hotspot network from any portion of the network
- ▶ Generate customizable coupons through which Walk-in customers or Non-BSNL users can access the hotspot network.
- ▶ Provide login mobile apps for Wi-Fi users including offload and walk-in subscribers by which they can seamlessly login across BSNL hotspots without the need of authenticating over browser.
- ▶ A mobile app which could enable broadband resellers to get updates about their network and business.
- ▶ Support broadband reseller model by which retail outlets, corporates and internet service providers can leverage BSNL hotspot network for their users
- ▶ Enable Wi-Fi monetization models and location aware services by which captive

portals & mobile apps based advertisement can be rolled out.

- ▶ In depth analytics of the network and business reports which BSNL team and management can analyse the actionable data.
- ▶ Integrate easily with the payment gateway and network components, if required.

In order to meet all the requirements of BSNL, Sterlite Tech offered its feature rich and modular architecture based Wi-Fi Service Management platform. The platform is robust enough to support a broad variety of uses cases, business models and customer profiles to make this deployment not only viable but profitable indeed.

MAJOR SOLUTIONS OFFERED

Sterlite Tech's Wi-Fi Service Management is a single converged platform that enables operators to offer differentiated services including:

- ▶ Innovative commercial offers to walk-in users at hotspots
- ▶ Seamless 3G / 4G mobile data offload plans
- ▶ Monetization services across different business segments
- ▶ Location based services and mobile applications for the ease of access
- ▶ Highly scalable and flexible solution which has been designed to cater 0.5 million concurrent subscriber sessions.

WI-FI SERVICE MANAGEMENT PLATFORM (SMP)

The Wi-Fi SMP provides seamless authentication to a broad base of users including 2G/3G mobile data users, broadband customers as well as walk-in users. The platform consists of AAA, subscriber management, voucher management, captive portal, policy control and many more functions. The solution is capable of offering dynamic captive portal for different regions, networks, user groups, etc. With the help of centralized Wi-Fi SMP in the core networks, BSNL is able to seamlessly authenticate users from any BSNL hotspot.

WI-FI MONETIZATION SOLUTION

The Wi-Fi monetization solution enables BSNL to showcase different types of ads on the captive portal (login page) as well as mobile app through which users can access the latest offers, discounts, and promotions in their location. Sterlite Tech's Wi-Fi Monetization solution comes with an ad server and mobile app on which advertisement and promotions can be rolled out. The ad server and monetization solution has the capability to dynamically change the content based on the location, duration and network, as defined in the system. BSNL can generate additional revenue from these location and context-aware advertisements showcased through their Wi-Fi platform and enable enterprise and brands to leverage the mass Wi-Fi platform to promote their products and services.

Digital India *cont...*

AD SERVER SOLUTION

Sterlite Tech offers a feature rich Ad platform with a comprehensive Ad campaign management tool to advertise on web pages and mobile app. Advertisement campaign can be served on web using Captive Portal login pages which supports any operating system and on smart devices using Elite Connect mobile App which supports iOS, Windows & Android OS.

WI-FI OFFLOADING SOLUTION

In order to provide seamless Wi-Fi experience to existing 2G/3G subscribers, Sterlite Tech's Wi-Fi offload solution enables BSNL to offer seamless offloading platform. Integrated with the BSNL's map gateway, the offload solution authenticates EAP SIM based subscribers and seamlessly on-boards them to the hotspot network. With the help of offload solution, BSNL mobile subscribers will be able to access high quality Wi-Fi services using their existing SIM credentials. This reduces the overall cost of 3G infrastructure for BSNL and improves overall user's experience. The extensive reach and coverage offered by Wi-Fi network will help reduce the cost

WI-FI MOBILE APPS

The app simplifies the connectivity process by intelligently detecting the operator's Wi-Fi network, prioritizing the Wi-Fi SSID and seamlessly connecting the user onto Wi-Fi thus ensuring a fully automated Wi-Fi on boarding. Sterlite Tech offers

three different types of mobile apps for BSNL by which, 1/ 2G/3G customers can download and latch on to Wi-Fi hotspots without authentication each time they login 2/ Walk-in customers (Non-BSNL users) & broadband users can download and enter the coupon details directly in the app to login 3/ Resellers can avail business updates regarding

usage, coupons sold, etc. using the mobile app.

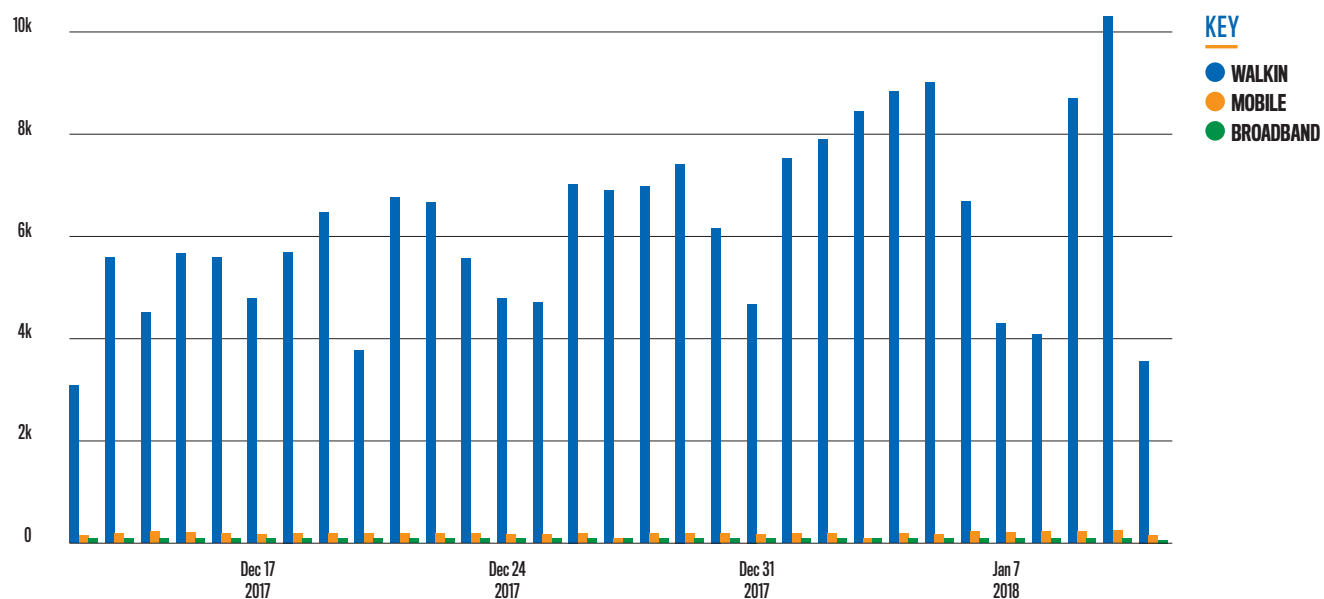
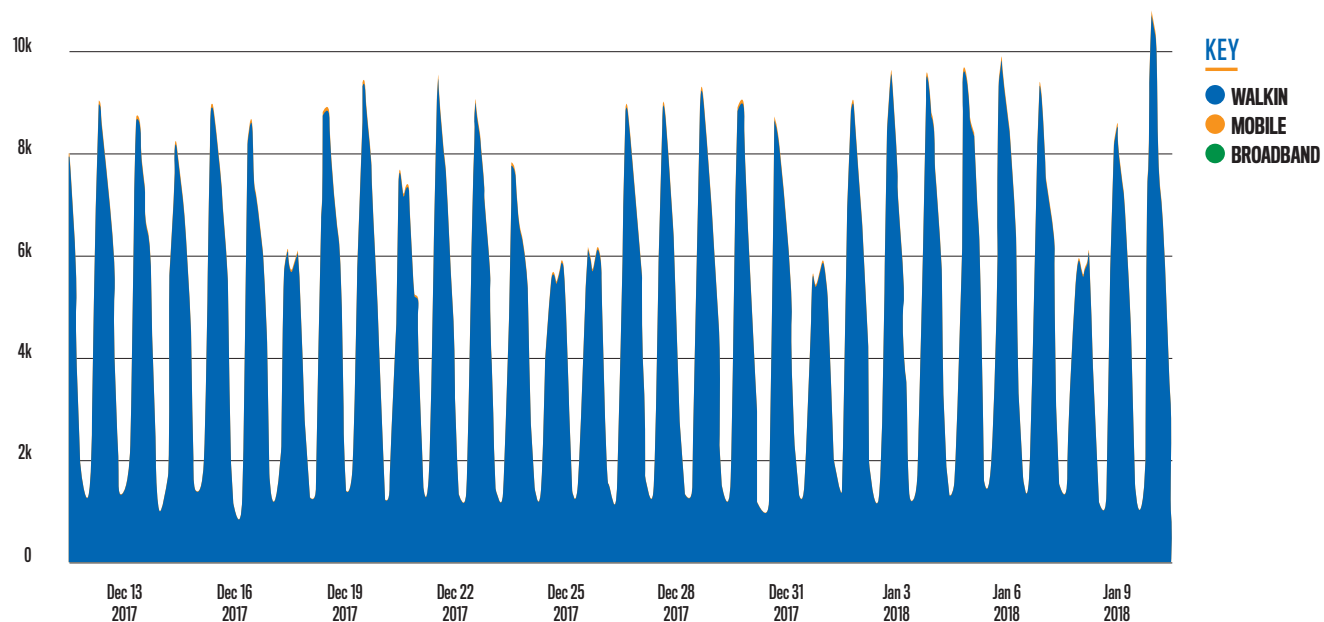
Once installed on the device, and enrolled with single sign-on, the app works in the background to authenticate the subscriber to the Wi-Fi hotspot network without requiring the end user to manually enter login credentials every time. Sterlite Tech understands that mobile apps are the current and basic need of our life using

which users can easily login to Wi-Fi network without the need of remembering multiple passwords. Available on android and iOS app stores, the app requires a single sign-in to initiate the seamless offload from 3G/4G onto operators' Wi-Fi hotspots. Sterlite Tech offers Wi-Fi offload mobile app for BSNL mobile data users by which BSNL mobile users can hop-in to Wi-Fi network without

major login process. Sterlite Tech also offers hotspot finder by which users can identify the nearby hotspots and choose to purchase voucher for accessing Wi-Fi or opt for existing login credentials as BSNL user. Users can avail location based deals, alerts, offers, promotions, advertisement, etc. using the login mobile app provided by Sterlite Tech.

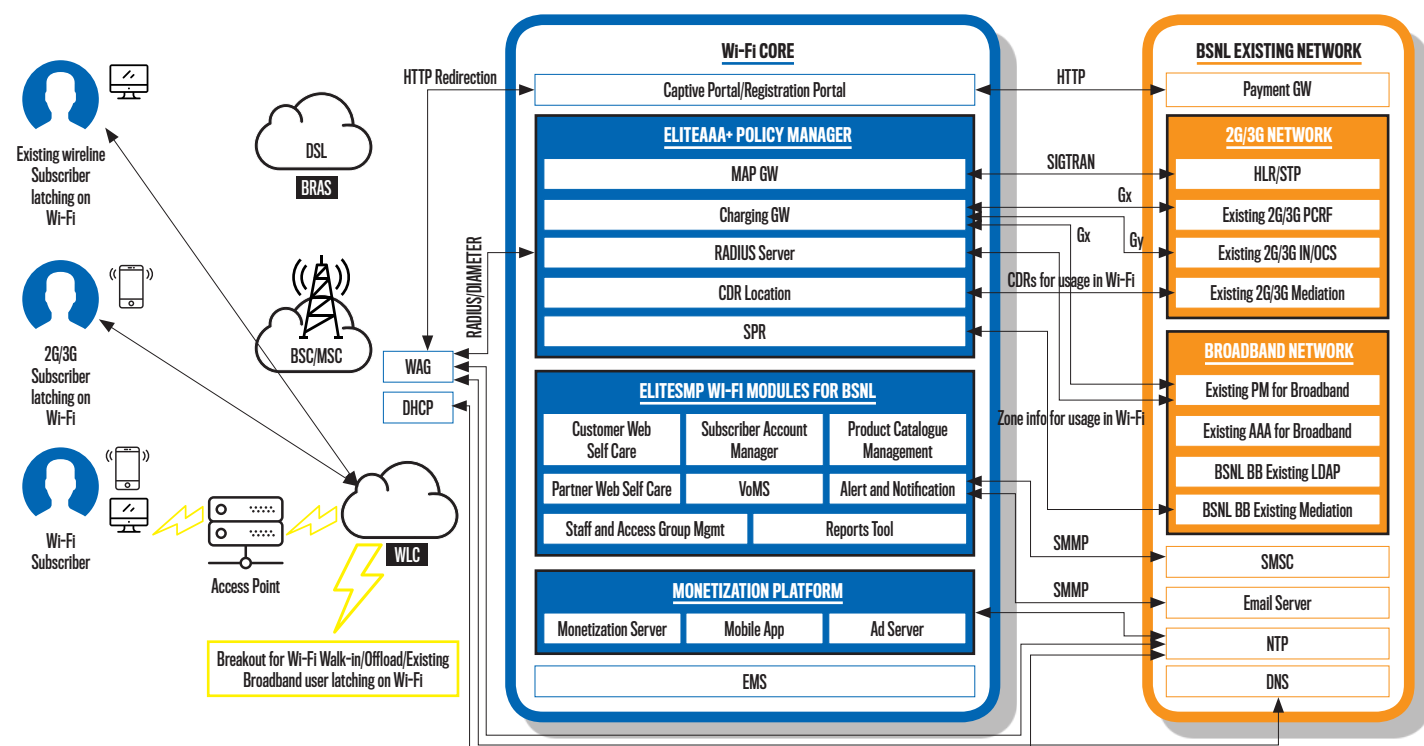


Wi-Fi Analytics



For in-depth network and business analytics, Sterlite Tech has offered Wi-Fi Analytics solution by which BSNL can gain knowledge of the Wi-Fi usage trends at popular public venues like stadiums, malls, tourist locations, etc. With the help of usage trend analysis, BSNL can launch personalized plans and promotional offers to encourage users for premium services as well as festive offers. In addition, BSNL can also enable enterprises and businesses to avail analytics to gain knowledge about in-venue customers and choice of purchase, behaviour, etc. using Wi-Fi platform. Moreover, BSNL can also analyse the business performance using the analytics solution across different regions and circles with comparative data analysis.

Network Diagram



The results

SEAMLESS WI-FI AUTHENTICATION

Sterlite Tech's Service Management Platform seamlessly authenticates varied subscriber base in operator's network. The platform authenticates broadband customers through captive portal or downloadable mobile app. Based on the EAP SIM credentials, 2G and 3G customers are authenticated and offloaded to the hotspot network. Walk-in customers can use the coupon credentials to login the Wi-Fi network. Sterlite Tech's Wi-Fi service management platform is a single converged solution which supports different types of authentication processes and protocols.

FREE WI-FI ACCESS

In order to enable, all the users including existing BSNL and non-BSNL users, can get a feel of the high quality Wi-Fi services, BSNL offers 100 MB free internet on every first login. On choosing free Wi-Fi option, the system will prompt users to enter mobile number on which One Time Password (OTP) will be sent and on successful

authentication of the OTP, user will be allowed to access internet. Once the quota is exhausted, customers will have to use their mobile, broadband or coupon for further access.

CATERING 2G/3G OFFLOAD USERS

To provide seamless access to existing 2G/3G subscribers, Sterlite Tech offload solution enables to download the 4G plus app through android and iOS platform. Users can identify nearby BSNL hotspots and access high quality Wi-Fi even in the areas where connectivity is difficult, anywhere in India. BSNL 2G/3G customers have the benefit of Wi-Fi on mobility and uninterrupted services even on the move. The solution authenticates users based on their existing SIM credentials and deducts the balance from their mobile account.

CATERING BROADBAND CUSTOMERS

As the users data of broadband customers is stored in the SMP, broadband customers can access

BSNL broadband users access their home account from any of the hotspots using the same login credentials. The system has been designed accordingly to calculate the session and quota of access from user's home account only. This enables broadband customers to enjoy internet-on-the move from any hotspot across the nation.

LOCATION BASED SERVICES

The platform identifies user's existing location in real time based on Geography, network attributes, device, Location capture client etc.. Categorizes user locations at granularity based on multiple parameters like user profile, usage, demographic etc. and notifies them with customized & personalized location specific information on promotions, discounts etc. as defined in the system. With the help of location based services, BSNL can promote region based plans, discounts, deals, and promotions seamlessly to existing as well as non-BSNL customers via captive portal and mobile apps.

The results *cont...*

LOCATION BASED ADVERTISEMENT

Sterlite Tech's Wi-Fi Service Management platform also supports location based advertisements over captive portal and mobile apps. Based on the views and clicks, BSNL can generate additional revenue through the ad platform.

WI-FI ROAMING SERVICES

BSNL mobile users as well as broadband users will be able to access Wi-Fi across India even while they are travel using the same account without interruption and additional cost. This enables frequent travellers to avail high quality internet access across different cities and states where mobile data connectivity is weak.

NETWORK AND BUSINESS WI-FI ANALYTICS

With the ability to track user's online behavioural activities and get data insights through proximity technologies and other tools, analytics becomes a key area to herald new revenue opportunities for operators. Designed with keeping big data in mind, it enables business intelligence to operators by collecting data insights from existing Wi-Fi service management platform, combining the Wi-Fi network experience data with subscriber profile data and external third party data, such as those from partners, to provide entire depiction to improve the Wi-Fi business.

INTEROPERABILITY AND INTEGRATIONS

SMP is interoperable and tested with majority of the vendor ecosystem which makes it smooth to integrate with components

at BSNL ecosystem including Bill Desk payment gateway, SMS gateway, and Cisco access controllers.

HIGH AVAILABILITY SOLUTION

In order to provide uninterrupted service to subscribers, Wi-Fi Service management platform has been deployed at two cities in HA model. As soon the primary service management platform experiences failover due to any reason, the secondary platform becomes active automatically and performs as the primary platform. The entire user traffic will be routed through the secondary server until the primary server becomes active, allowing continuous support of services.

Business Benefits (for graphical

representation)

- ▶ Convergent Wi-Fi platform
- ▶ Ready platform for all Wi-Fi services
- ▶ Reseller network for public Wi-Fi
- ▶ Quota sharing facility for 3G customers
- ▶ Accessibility through mobile app and web portal
- ▶ In-depth analytics up to core network and business models
- ▶ Real time online charging
- ▶ Wi-Fi roaming services
- ▶ High availability of Wi-Fi services
- ▶ Future ready network – IPV4/ V6 compliant
- ▶ Compliant to any heterogeneous radio network
- ▶ Scalability, Transparency, and Digitization

Contact **STERLITE TECH** to learn more about how to monetize your Wi-Fi deployment

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