**Q&A from Learning Series Events- BIF Connectivity Accelerator**

1. Is there any specification for access points to work under PM WANI framework or any access point can be integrated?  
   **Response**: TEC GR For Wi-Fi Access Point is work in progress. However, it is not mandatory for TEC approved specs to work under PM-WANI framework. Any WAP (Wi-Fi Access Point which is IEEE 802.11 compliant can work)
2. When will the PDOA's be enabled for AAA, so that they can control bandwidth and broadband speed for subscriber on their own access point region?

**Response**: The Authentication and AAA functionality as well as the Roles of each Network Element viz. PDOA/PDO/App Provider is clearly explained in the PM-WANI Framework Document 2.0, which is put up on the DoT website

1. What are some of the white spaces/top opportunities for startups to build/solve for around this space?  
   **Response**:
2. Proliferation of Public-Wi-Fi across the country
3. Build awareness about PM-WANI everywhere
4. Seamless roaming across different Wi-Fi Networks
5. Facilitate suitable and easy payment mechanisms-integrated with UPI
6. Respected Sir, just a query, as you talk about the opportunity in each and every aspect like retailers, ISP providers, traders and manufacturer. As my firm named Strix Systems based at Ahmedabad, Gujarat. we are the manufacturer of wireless access points and hotspot device. Just to ask as we are viewing for PM WANI project only a single company is promoting the PM WANI access point. Is there some process where we as a manufacturer need to register for providing our access points for this project?  
   **Response**: As explained by Mr. S.K. Singhal, DDG-DS, DoT during his address/talk on Saturday-19th February during the event, Department of Telecom is planning to come up with a portal or make arrangements in the existing PM-WANI portal to register all other stakeholders of the PM-WANI Ecosystem including WAP hardware manufacturers so that they are all networked with each other
7. Do PM-WANI allow only HOTSPOT or can be allowed to provide FIXED Broadband also in nearby areas of PDO? Also, we are getting many queries regarding the PM WANI captive portal.  
   **Response**: The Registered PDOA (with the Central Registry) under PM-WANI is only permitted to provide Public Wi-Fi through an interconnected network of PDOs and App Provider as per the protocols and call flows as defined in the PM-WANI Framework.  
   PM-WANI captive portal is aWeb page that the user of the PM-WANI network is obliged to view and interact with before access is granted. Though it is defined as a separate entity in the current architecture, it could be integrated inside the App Provider’s app. For Call Flows between the Captive Portal and other Network Elements, please refer to PM-WANI Framework 2.0 on the PM-WANI portal.
8. Is there any specification for access points to work under PM WANI framework or any access point can be integrated, as we know that only two Max/Wayu is approved?  
   **Response**: This is a repeat of Q1
9. Can we use any hard ware for PM WANI? Please send a letter about PM WANI to state secretory.

**Response**: YES-As long as it is IEEE 802.11 compliant

1. Please Address Challenges of PDO/PDOA in setup Business.   
   **Response**: BIF Connectivity Accelerator Program will help you in this regard
2. What is lawful intercept and WAP hardware?  
   **Response**: Lawful interception refers to the facilities in telecommunications networks that allow law enforcement agencies to selectively access communication (voice & data) of any individual subscribers.  
   A WAP server is just a standard web server that hosts a WAP site's contents like WML and XHTML MP documents. Some combined products are available which combine a web server plus a WAP gateway.
3. Central Registry: These shall be the agencies which will maintain the Central Registry. The Lawful interception agencies which shall take care of lawful requirement in Public Wi-Fi network proposed in the scheme. please address on above question.  
   **Response**: C-DoT has been nominated as the CR for the time being. Lawful Agencies are pure Govt intelligence agencies whose role is different from the Central Registry. Their role is to provide intelligence for National Security purpose
4. There is a lot of confusion at ground level to choose the best device for hotspot. Every company is trying to convince the customer for their products. Just need an insight for procurement of devices.  
   **Response**: As explained by Mr. S.K. Singhal, DDG-DS, DoT during his address/talk on Saturday-19th February during the event, Department of Telecom is planning to come up with a portal or make arrangements in the existing PM-WANI portal to register all other stakeholders of the PM-WANI Ecosystem including WAP hardware manufacturers so that they are all networked with each other.
5. Last mile connectivity cost is very high in rural area – how do we go about this.

**Response**: Tie-up with a Rural ISP/TSP viz. BSNL in a revenue sharing mode with zero upfront costs

1. Anything on rain attenuation and on forming out for regional rain map to avoid the technical challenge on microwave?

**Response**: Microwave in the lower spectrum bands viz. 6Ghz, 11 & 13 Ghz are fairly stable from rain attenuation p.o.v. Also, in most of these bands, the impact of rain attenuation in central regions is not high.

1. Please Address about DOT/CDOT -Approved WAP/WAYU. Can we use any hardware and configure in CDOT?

**Response**: (i) There is nothing called DOT approved WAP/WAYU (ii) Yes CDOT has its own WAP. However, there are other WAPs too which are available in the market and the customer is free to choose any hardware (iii) Yes-any hardware can be made compliant to PM-WANI for which a software upgrade is required. This could be either purchased from CDOT or some other PDOAs also.

1. How do we get internet access to remote villages? (Similar to last mile connectivity question).

**Response**: Internet Access is achieved by connecting the nearest Fibre PoP (Point of Presence) or nearest Aggregated Node (using Wireless Middle Mile Technologies viz. E band, FSOC, UWB, etc.) to each remote village using Public Wi-Fi

1. Please share small information relating to the reliability to Indian terrain. Cost per GB Transmission now and Range typically achieved at coastal environment.

**Response**:

(i) Mix of Fiber/Wireless Middle Mile Tech (E band, FSOC, UWB, etc) and Wi-Fi in the last mile is ideal for providing high quality broadband access in the rural and remote areas of India

(ii) Since Cost per GB is an input cost to the PM-WANI ecosystem, it is a factor of what is the commercial tariffs made available by the ISP/TSP in the local area. Typically, today this could vary between Rs. 10 to Rs. 15 /GB

(iii) Range for Wireless Middle Mile Technologies are different for different technologies. While are some are less impacted due to environmental factors, others maybe slightly more. If Fiber is available to each of the GPs or the nearest POP (for Bharat Net Fiber) , it is not affected at all by the environmental conditions. Last Mile access through Public Wi-Fi is not majorly impacted due to the environment.

1. How do we handle the speed and latency issues found in satellite broadband delivery compared to cable?

**Response:**

In Satellite based broadband, Speed and latency are a factor of (i) Space Technology Used –GEO vs LEO (ii) Ground Technology used and (iii) compression methodology used.

Since Satellite -Terrestrial Integration is on the anvil in 5G itself, the two can coexist with each other and help supplement each other.

1. Returning from foreign country when you don't have Indian number, how to get OTP to avail wi-fi service?

**Response:**

International Roaming is not currently envisaged in PM-WANI. However, the same can be developed to operate in a seamless manner both for national & international roaming. International Standards for Roaming viz. Passport 2.0 (developed by WBA) are available to help facilitate such use cases.

1. In the earlier session, I had asked a question that whether PDOA will be provided complete access to AAA server so that he can control the bandwidth speed using MAC Binding through Firewall features. Against this question, the reply said that everything has been mentioned in PM WANI Document 2.0. I had gone through the entire document but there is no clarity on this. Kindly help us with this so that we can have our own business model.

**Response:**

Authentication, Authorisation & Accounting (AAA) functionalities are not an intrinsic part of the PM-WANI Architecture. AAA Server hence is not part of the PM-WANI Architecture. If the PDOA/App Provider so wishes, he may provide the same as an add-on service, so that all AAA functionalities can be performed in-house.

Bandwidth speed is impacted by the size and speed of the data pack subscribed from the ISP/TSP who is the bandwidth provider. Typically, AAA servers are not used to configure bandwidth speed. Also, MAC address binding doesn't affect speed in anyway. Speed is limited between the system and the gateway(router/modem). So, unless there is specific blocking of IP or MAC address, there will be no material speed difference.

1. What should be the most optimal data pack cost for open Wi-Fi consumers? Few says Rs 10 while another set of experts put it up at Rs 2.

**Response:**

The optimal cost is best left to the PDO/PDOA to decide and should not be prescribed. It would depend on average data consumption, the tariff plan offered and the consumer’s capacity to pay.