भाग 23 / अंक 2 अप्रैल 2019 त्रैमासिक पत्रिका

TEC
दूरसंचार अभियांत्रिकी केन्द्र
TELECOMMUNICATION ENGINEERING CENTRE

टी ई सी संचारिका
NEWSLETTER

MoU between TEC, New Delhi and ITI Ltd., Naini

A MoU was signed between TEC and ITI Ltd. Naini on 17th January, 2019 at ITI Naini in presence of Secretary (T), DoT. TEC would extend administrative & technical support to ITI Ltd. for utilisation of various test labs by ITI such as QM-333, transmission and RF test facilities at ITI Raebareli, Mankapur and Naini. The TEC would also give support for setting up of test facilities in the field of Safety, EMC/ EMI and other technical requirements etc. and their accreditation.

A MOU singed in presence of Smt. Aruna Sundararajan, Secretary, DoT

Telecom News: At a Glance

1. **02 Technical Reports were released by Hon'ble Minister of State for Communications (IC) on "Design & Planning of Smart Cities by using IOT/ICT" and "Recommendations for IOT/ M2M Security" in an event held in TEC on 08-01-2019.**
2. **An MoU was signed between TEC and ITI Ltd. Naini on 17th January, 2019 at ITI Naini for utilisation of various test labs by ITI such as QM-333, transmission and RF test facilities at ITI Raebareli, Mankapur and Naini.**
3. **India Telecom 2019- An Exclusive International ICT B2B Expo was organised on 12-02-2019 in New Delhi. Shri Suresh Prabhu Hon'ble Minister of Commerce & Industry, Civil aviation and Shri Manoj Sinha, Hon'ble Minister of State for Communications (IC) Inaugurated the event.**

Technical workshop on "Unleashing of 5G potential in Indian perspective"

A one-day Technical workshop on "**Unleashing of 5G potential in Indian perspective**" was organized on19th March 2019 in TEC, New Delhi. The objective of the workshop was to provide a common platform for dialogue between the proponents of the technology and the users of the technology and to disseminate the information across verticals and also to encourage capacity building. Technical subject matter experts from the industry and manufacturing/ R&D organizations shared their knowledge on various topics related to 5G Technology. Officers from DOT, TEC, NTIPRIT, other Ministries, TRAI and PSUs participated in the workshop and interacted with the subject matter experts in order to expand their knowledge base and understanding about various aspects of 5G technology and their use cases, which could be utilized effectively in various industry verticals

Inauguration of one day programme on "Unleashing of 5G potential in Indian perspective"

Digital Ledger Technology (Blockchain) - An Introduction to technology and use cases

1.0 Introduction

Distributed ledger technologies or Block chains are immutable digital ledger systems implemented in a distributed fashion (i.e. without a central repository) and usually without a central authority. This technology became widely known in the beginning of 2008 when it was applied to enable the emergence of electronic currencies where digital transfers of money take place in distributed systems. Various digital currency systems such as Bitcoin, Ethereum, Ripple, and Litecoin are only an example of this technology.

Block chains are distributed digital ledgers of cryptographically signed transactions that are grouped into blocks. Each block is cryptographically linked to the previous one after validation and undergoing a consensus decision. As new blocks are added, older blocks become more difficult to modify. New blocks are replicated across all copies of the ledger within the network, and any conflicts are resolved automatically using established rules.

2.0 Terminologies in block chain technologies

i. Node: Any computer running block chain software is called nodes.
ii. Mining nodes: Subset of nodes and set of computers running block chain software
iii. Full nodes: The job of a full node is to store the Blockchain data, pass along the data to other nodes, and ensure newly added blocks are valid.
iv. Lightweight nodes: Lightweight nodes do not need to store full copies of the Blockchain and often pass their data on to full nodes to be processed. Lightweight nodes are generally found on smartphones and Internet of Things (IoT) devices i.e. devices with limited computational and/or storage capability
v. Miner: A miner is a participant in a Blockchain that participates in securing the network and validating new transactions. The mining and validation process happens via competitive, voting or luck-based methods dependant on the consensus protocol chosen.
vi. Cryptographic Nonce: An arbitrary number (usually randomly selected) that is used once.

3.0 Blockchain Architecture

At a high level, Blockchains utilize well-known computer science mechanisms (linked lists, distributed networking) as well as cryptographic primitives (hashing, digital signatures, public/private keys) mixed with financial concepts (such as ledgers). Blockchain usually comprises of following components:

3.1. Hashes

A cryptographic hash is a method of calculating a relatively unique fixed-size output (called a message digest, or just digest) for an input of nearly any size (e.g., a file, some text,

or an image). Even the smallest change of input (e.g., a single bit) will result in a completely different output digest. A hashing algorithm used in many Blockchain technologies is the Secure Hash Algorithm (SHA) with an output size of 256 bits (SHA-256).

3.2. Transactions

A transaction is a recording of a transfer of assets (digital currency, units of inventory, etc.) between parties. Each block in a Blockchain contains multiple transactions. A single transaction typically requires at least the following information fields:

- Amount – The total amount of the digital asset to transfer.
- Inputs – A list of the digital assets to be transferred (their total value equals the amount).
- Outputs – The accounts that will be the recipients of the digital assets. Each output specifies the value to be transferred to the new owner(s), the identity of the new owner(s), and a set of conditions the new owners must meet to receive that value.
- Transaction ID/Hash – A unique identifier for each transaction. Some Blockchains use an ID, and others take a hash of the specific transaction as a unique identifier.

3.3. Ledgers

A *ledger* is a collection of transactions. A ledger implemented using a Blockchain will be copied and distributed amongst every node within the system instead of 'centralized' mechanism.

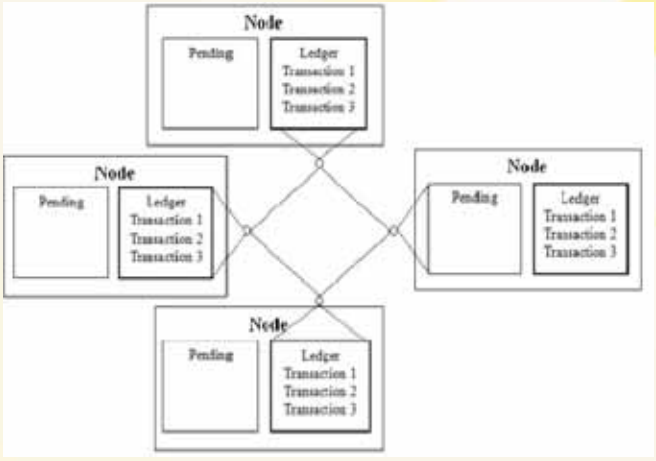

Fig 1: A Simple network maintaining a copy of ledger across nodes (Ref: Draft NISTIR 8202)

3.4. Blocks

A block contains a set of validated transactions. Validity' is ensured by checking that the providers of funds in each transaction (listed in the transaction's 'input' values) have each cryptographically signed the transaction. This verifies that the providers of funds for a transaction had access to the private key which could sign over the available funds. After creation, each block is hashed thereby creating a digest that represents the block Transaction are added to Blockchain when mining nodes publishes a block.

3.5. Addresses

A user's address is a short, alphanumeric string derived from the user's public key using a hash function, along with some additional data (used to detect errors). Addresses are used to send and receive digital assets. There are two keys which are used in this technology namely public key and private key.

Private Key is essentially a randomly generated number which is analogous to a password. Public Key is analogus to the 'To Address' in the transaction. Every address on the Blockchain comes attached with a Private key and a Public key. These together form the pillars of security in the Blockchain network. Private and Public keys always work in a pair. Every time a transaction occurs, it has to be signed by both public key and private key of person authorizing the transaction. It also includes public key of receiving party. After signing it gets added to ledger of that Blockchain and also includes Timestamp and a unique ID number. When this transaction occurs, it's broadcasted to a peer-to-peer network of nodes and to other digital entities that acknowledge that this transaction has occurred and adds it to the ledger.

4.0 Operation of Blockchain

Blockchainis maintained through the consensus of set of computers (mining nodes) running Blockchain software. There is no central authority determining which node publishes the next block on the Blockchain.

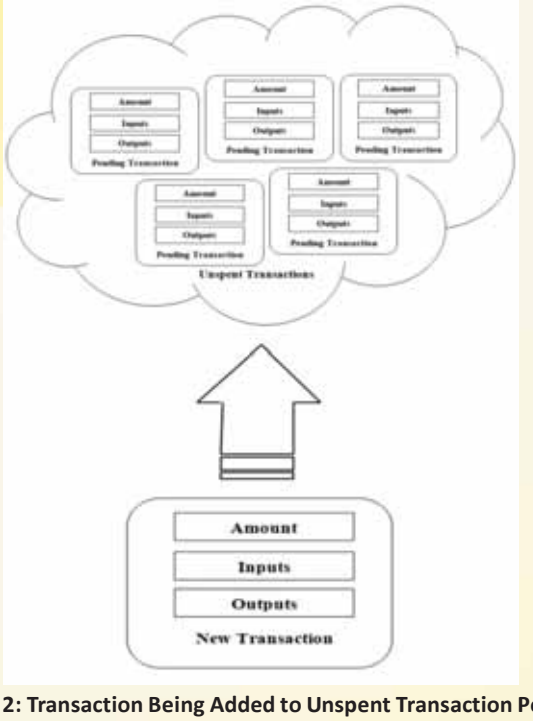

Fig. 2: Transaction Being Added to Unspent Transaction Pool (Ref: Draft NISTIR 8202)

Each node maintains a copy of the Blockchain and may propose a new block to the other mining nodes. Any node may propose new transactions, and these proposed transactions are propagated between nodes until they are eventually added to a block.

When mining nodes put together a new candidate block, they include a set of unspent transactions. They may take a combination of older transactions that have been waiting for some time and newer transactions that offer a higher payment (in the form of a transaction fee paid by the user who submitted the transaction). The mining node checks that each transaction is itself valid since the other nodes would reject the block if it included invalid transactions.

5.0 Consensus

Block chains use a variety of consensus models that enable a group of mutually distrusting users to work together. When a user joins the block chain system, it has to agree to the initial state of system which has recorded only preconfigured block, the genesis block. After genesis block, every block must be added to block chain only after mutually agreed consensus method. In a Blockchain there is no need to have a trusted third party to give the state of the system instead every user within system can verify the system integrity. The different consensus models as adopted by Blockchain technology are as follows:

5.1. Proof of work Consensus Model

In this model, every user gets right to publish the block only after solving a computationally intensive puzzle. The solution to this puzzle is the "proof" that they have performed work. The puzzle is designed such that solving the puzzle is difficult, but checking that a solution is valid is easy. This enables all other mining nodes to easily validate any proposed next blocks, and any proposed block that did not satisfy the puzzle would be rejected. Bitcoin is an example where this consensus model is being adopted.

5.2. Proof of Stake

This model is based on concept of stakes of user in the system. i.e The more the amount of stakes in the system, the more likely the system will succeed in putting the blocks in the system. Mainly there are three ways through which system can use the stakes such as random selection of staked users, to multi-round voting, to a coin aging system. In random selection of staked users, the Blockchain system will look at all users with stake and choose amongst them based on their stake to overall system stake ratio. So, if a user had 45% of the stake they would be chosen 45% of the time; those with 1% would be chosen 1% of the time. In multi round voting system, Blockchain system will select several staked users to create proposed blocks. The system will then ask all staked users to vote for the next block. After several rounds of this voting, a new block is decided upon. This method allows all staked users to have a voice in the block selection process for every new block.

5.3. Round Robin Consensus Model

In this case, there is no need for a complicated consensus mechanism to determine which participant adds the next block to the chain. This consensus model is often used for private Blockchains and is called round robin, where nodes take turns in creating blocks. To handle situations where a mining node is not available when it is their turn, these systems may include an element of randomness to enable available nodes to publish blocks so that unavailable nodes will not cause halt in block production. This model ensures no one node creates the majority of the blocks, it benefits from a straightforward approach, it lacks cryptographic puzzles, and has low power requirements.

6.0 Forking

Forking is updation in Blockchain technology. Since Blockchains systems are decentralised system, updation is an extremely difficult task. Changes in Blockchain software and implementation is called forking.

6.1. Soft Fork

A soft fork is a change to the technology that will not completely prevent users who do not adopt the change (e.g., an update to the latest version) from using the changed Blockchain system. Since non-updated nodes will recognize the new blocks as valid, a soft fork can be backwards compatible, only requiring that a majority of nodes upgrade to enforce the new soft fork rules.

6.2. Hard Fork

A hard fork is a change to the technology that will completely prevent users who do not adopt it from using the changed Blockchain system. Under a hard fork, the Blockchain protocol will change in a manner that requires users to either upgrade to stay with the developer's "main fork" or to continue on the original path without the upgrades. Users on different hard forks cannot interact with one another. Any change to the block structure, such as the hashing algorithm choice, will require a hard fork.

7.0 Blockchain Use Cases

As the Blockchain technology is maturing the number of use cases are increasing and every industry is exploring new options for implementing this technology. Some of use cases developed till now is mentioned below:

7.1. Banking

During the scenarios when multiple banks want to join together and want to share a selective private data or any other transaction details to participating banks, this technology provide the ability to record transactions from each bank in a way that is visible to the participants, but

not the public. However, to do this as a private Blockchain (to avoid having to use an expensive proof of work algorithm), each bank takes turns signing the blocks under a distributed consensus algorithm. If there was some major disaster or exception situation, the banks could coordinate to roll back the Blockchain and write a different transaction. Additionally, the transactions would not be anonymous because a banking ID would be required to join. "ICICI Bank successfully executed its first two transactions using Blockchain technology in October 2016. Yes Bank has implemented a multi-nodal Blockchain transaction in January 2017 to provide efficient services to customers. Kotak Mahindra Bank and Axis Bank have announced interest and started conducting pilot transactions.

7.2. Insurance and Healthcare

Whenever someone visits a care provider, a myriad of transactions take place behind the scenes. Administrative transactions from nurses, doctors, staff, medical providers, insurance companies, and pharmacies could all be written to a Blockchain. Transactions (such as checking benefits, eligibility, coverage, and the available medicine supply) could be read from the Blockchain.

7.3. Energy Industry

One of use cases in energy industry of Blockchain usage is in recording certificates in mainly in smart grids. There are different power plants generating energy and creating certificates that attest to the amount of energy produced for subsequent exchange. Currently, there are problems such as emission certificates being spent twice, as well as the need to address regulatory challenges and provide more uniform access for everybody in the market. A Blockchain can effectively track the issuance and spending of these energy certificates. Another example of applicability of Blockchain in the energy industry is in the trading of excess renewable energy. Buildings can be wired with devices measuring energy usage and recording it to a Blockchain, enabling excess energy to be sold and bought on a market.

7.4. E-voting

Another application for Blockchain technology is voting. By casting votes as transactions, a Blockchain is created which keeps track of the tallies of the votes. This way, everyone can agree on the final count because they can count the votes themselves, and because of the Blockchain audit trail, they can verify that no votes were changed or removed, and no illegitimate votes were added. By using a Blockchain code, votes can be casted via smartphone, tablet or computer resulting in immediately verifiable results.

8.0 Blockchain in Telecom

Service providers (SPs) have traditionally owned the end-to-end telecoms value chain for both consumers and businesses – spanning network infrastructure, provision of core voice and data connectivity, and related consumer services. However, in an environment of heightened competition in an increasingly digital world from infrastructure light over the top (OTT) players, together with decreasing revenues from voice and increasing costs due to the high band-width demands, there is a need to both reduce costs and find new sources of revenue. Following are the cases or scenarios where this technology can be used:

8.1. Fraud Prevention

Blockchain can be a good solution for significantly decreasing the cost of fraud e.g. in roaming and in identity management. Identity fraud can occur when a person uses false identification to obtain services such as a physical SIM card. Blockchains inherent public key cryptography capability can be used to link a mobile device to the owner's identity. Instead of broadcasting the IMSI to the network to identify the device, the phone generated public key can be broadcasted. The device generates this public key from the private key that is stored securely on it. Neither the carrier nor any other third party needs to know the private key. Meanwhile, roaming fraud could be mitigated by implementing a permissioned Blockchain between every pair of operators that have a roaming agreement. Every time a subscriber triggers an event in a visiting network, a micro contract and the terms of the agreement between the roaming partners are executed. Automatic triggering of a roaming contract based on call/event data enables near instantaneous charging and reduction in roaming fraud.

8.2. Identity as a service

Service providers can create new sources of revenue by providing identity and authentication as well as data management solutions to partners, enabled by a Blockchain. Currently, every time during signing up, proof of identity or credentials are required. PII (Personal Identity Information) is required even though most of the information would not be needed by every vendor; the vendor would only need a subset of that information. A Blockchain can be used as the shared ledger that stores identity transactions. When a subscriber opens an account with a SP, it creates a digital identity. The private key associated with this identity is stored safely on the eSIM. The SP creates a virtual identity, using the public key from the digital identity and adds a set of standard fields (name, address, etc.) as required. It then adds a digital signature using its own private key. A pointer to this virtual identity along with necessary descriptors is then added to the Blockchain. If the subscriber now visits a partner website, say an e-commerce site, the site will need to know their identity, so the merchant site starts running the corresponding app on the phone to provide the identity. A copy of the ledger entry is sent to the e-commerce site app. Now the e-commerce app can look at all entries for that same virtual identity. Once the virtual identity is established, the e-commerce site needs to know that the virtual identity

belongs to the subscriber so its app takes the public key from the virtual identity, encrypts a challenge and sends it to their app which decrypts it (because it has the associated private key) and responds. Now the e-commerce site generates an e-commerce virtual identity which is then stored in the ledger itself. The next time the subscriber visits the same e-commerce site, he can be authenticated using the same mechanism. Also, the ledger already holds his transaction history and hence knows his preferences. The e-commerce site can use related insights for a recommendation engine. The subscriber can also use the same e-commerce virtual identity to login to a completely different e-commerce site using the same mechanism.

8.3. Enablement of 5G

5G technology implementation is another example to potentially benefit from the Blockchain to streamline processes. To realize the 5G promise of ubiquitous access across various networks, SPs will need to handle heterogeneous access nodes and diverse access mechanisms. Selecting the fastest access node for every user or machine will be a central challenge in the future. Blockchain can enable a new generation of access technology selection mechanisms to build sustainable solutions. ANDSF, which stands for Access Network Discovery and Selection Function, is an entity within the EPC (Evolved Packet Core) which helps in the discovery/selection of access networks, such as Wi-Fi, WiMAX, and LTE, in the device vicinity, providing them with rules policing the connection to these networks.

The 3GPP (LTE, GPRS) and non-3GPP (WiMAX, WLAN, Wi-Fi) access networks in a given area can be networked via a Blockchain where each access point (Wi-Fi router, SP cell tower, etc.) can serve as a node in the network monitoring the devices. Rules and agreements between the various access providing networks can be coded as smart contracts. These contracts can be dynamic in nature wherein any time a policy needs to be changed, only the contract code needs to be changed. When a device broadcasts its identity, it is accepted into the network by the corresponding SP cell. Once the device broadcasts its location, the access node that can best provide service to the device is called upon to do so. This also allows for seamless rating and charging of all services between the various access nodes.

9.0 Conclusion

DLT or Blockchain has become one of disruptive technologies with great potential to change our economy, culture and society. DLT enables innovative financial/non-financial decentralized applications that eliminate the need for third party intermediaries. This technology is introducing new data management infrastructure that will accelerate a services revolution in industries (for example, banking and finance, government, healthcare and super logistics) based on telecommunications. These are a significant new avenue for technological advancements, enabling secure transactions without the need for a central authority.

Approvals from JAN-19 to MAR-19

Sl. No.	Name of the Manufacturer/Trader & Name of Product & Model No.
A	**NEC Technologies India Private Limited**
1	PABX For Network Connectivity, SV9100
B	**TP-Link India Private Limited**
2	Wi-Fi access Point, TL-WR840N
3	Wi-Fi access Point, Archer C20AC750
4	Wi-Fi access Point, EAP225
C	**Progility Technologies Pvt Ltd**
5	ABX With network connectivity, HP-190
6	ABX With network connectivity, HP-1000
D	**Nxvalue Solutions India Pvt. Ltd.**
7	G3 FAX Machine/Card, SL-FAX2501
8	G3 FAX Machine/Card, Xpress M2876FD
9	G3 FAX Machine/Card, SNPRC-1806-1
10	G3 FAX Machine/Card, SNPRC-1804-02
11	G3 FAX Machine/Card, SNPRC-1803-02
12	G3 FAX Machine/Card, SNPRC-1803-01
13	G3 FAX Machine/Card, LEX-M15-001
14	G3 FAX Machine/Card, SEOLA-1803-00
15	G3 FAX Machine/Card, CLX-FAX160
16	G3 FAX Machine/Card, BOISB-0703-01
E	**ITI Limited**
17	Permanently Lubricated HDPE Telecom Ducts, PLB HDPE TELECOM DUCT 40/33 mm dia PIPE
F	**Accord Communications Ltd.**
18	PABX with Network connectivity, ADX 600(N)

Activities at NTIPRIT (JAN-19 to MAR-19)

1. ITEC Course:

Indian Technical and Economic Cooperation Programme (ITEC) is a bilateral assistance programme sponsored by MEA, Govt of India. It is a demand-driven, response-oriented programme that focuses on addressing the needs of developing countries through innovative technological cooperation between India and the partnering nations. The 3 ITEC Courses conducted in 2018-19 are as follows:

S. No.	Course name	Duration, From - to	No of participants/ countries
1	Telecommunication Licensing & Regulation	2W, 21st Jan-1st Feb 2019	11 from 8 countries
2	Mobile Technologies: GSM, UMTS,&LTE	2W, 25th Feb-8th Mar 2019	14 from 7 countries
3	Optical Transmission Technologies	1W, 25th Mar-29th Mar 2019	18, from 12 countries

Total 43 Participants 20 member countries, namely - Afghanistan, Chad, Cambodia, Colombia, Egypt, Honduras, Jordan, Lebanon, Mauritius, Mongolia, Mozambique, Myanmar, Nigeria, Peru, Palestine, South Sudan, Srilanka, Suriname, Tanzania, Tunisia attended these programs. In addition to the Technical and domain related topics, sessions like Incredible India- an Introduction, "Current Telecom scenario in India", were included to give insight about the rich heritage and culture of India as well as the positioning of India as one of the leaders in Telecom in the Global telecom space. Apart from the theoretical sessions which were handled by the experienced Faculty of NTIPRIT and the Guest faculty, Subject Matter Experts from DoT HQ, TEC, CDoT, TRAI and Industry, visits were also arranged to different labs in ALTTC and CDOT as part of the training courses.

ITEC Participants and faculties of NTIPRIT with Member (S)

2. Foundation Course

Fifteen Week Foundation course is the part of Induction Training of ITS and P&T BWS cadre trainees. NTIPRIT has commenced 15 weeks Foundation course for ITS-2014 batch (15 OTs) and P&T BWS-13/2015 batch (2 OTs) w.e.f. 17-12-2018. This course for said batches concluded on 29.03.2019.

3. Induction Training of the following batches of Officer Trainees of ITS/BWS and JTO probationers were conducted during the period:

i. P&T BWS-2013 (1 Officer)
ii. ITS-2014 batch (15 officers)
iii. P&T BWS-2015 batch (1 officer)
iv. ITS-2016 batch (34 officers)
v. P&T BWS-2016 batch (3 officers)
vi. P&T BWS-2017 batch (2 officers)
vii. JTO-2016 (RL) batch (2 officers)

Various training programs like technical modules and Field Attachments with LSAs/ field units, Attachment with ITPC, BSNL for ITS/ BWS batches, were conducted during this period as per training calendar.

Mandatory Testing and Certification of Telecom Equipment (MTCTE)

Extension of date for mandatory Certification of Telecommunications Equipment

An order for extension of Mandatory certification of Telecommunications Equipment has been issued vide order no. TEC/2018-TC dated 12th March'2019. It has now been decided that certification of all Telecom equipment under MTCTE shall be mandatory with effect from 1st august' 2019.

Brief of Stakeholders meeting

A meeting of stakeholders was organised in TEC on 16.01.2019. The meeting was chaired by Sh. Ravi Kant, Member (Services), Digital Communication Commission. More than 100 participants comprising of various stakeholders viz. representatives of OEM companies, test labs, importers, Telecom Service Providers and industry associations participated interactively participated in the meeting. Representatives of OEMs and industry associations emphasised the need to end uncertainty about the date of implementation of MTCTE, citing various reasons, including non-availability of sufficient number of test labs in TEC. Member(S) informed them that the dates shall be notified very soon. The industry was informed about the ongoing status of setting up of labs in ITI and by private parties, and it was emphasised that adequate number of test labs will become available as soon as the MTCTE is actually rolled out. A number of queries raised by stakeholders were answered and clarified in the meeting.

A demo of the latest version of MTCTE portal was made in the meeting wherein emphasis was mainly upon demonstration of newly added features of the portal.

Brief of Zonal workshop

A zonal workshop with objective of spreading the awareness among the various stakeholders of MTCTE was held at Mumbai on 21st January'2019 and 22nd Januray'2019. To have focused and dedicated discussion, workshop for labs was held in afternoon session of 21st Januray'19 at BSNL complex, Juhu Danda. Whereas workshop for various stakeholders viz. representatives of OEM companies, importers, Telecom Service Providers and industry associations was held on 22nd January'19 at Centre for Excellence in Telecom Technology and Management, Powai. Both the meetings were widely participated by the respective stakeholders. Participants were mainly from Western Zone and many of them were first time attendee of Zonal workshop meeting. Queries raised by the participants were clarified by DDG (TC) and DDG (MRA). Demo of the portal to aim the demonstration of the newly added features and to address the queries related to portal was made. The outreach programme was much appreciated by the participants.

Important Activities of TEC during JAN 19 to MAR 19

Brief About TEC

Telecommunication Engineering Centre (TEC) functions under Department of Telecommunications (DOT), Government of India. Its activities include:

- Issue of Generic Requirements (GR), Interface Requirements (IR), Service Requirements (SR) and Standards for Telecom Products and Services
- Field evaluation of products and Systems
- National Fundamental Plans
- Support to DOT on technology issues
- Testing & Certification of Telecom products

For the purpose of testing, four Regional Telecom Engineering Centers (RTECs) have been established which are located at New Delhi, Bangalore, Mumbai, and Kolkata.

For more information visit TEC website www.tec.gov.in

Meeting/Seminar, webinar attended

- Technical Advisory Group (TAG) at ISRO Bangaluru.
- Meeting (F2F) for discussion on standards in M2M/ IoT domain on 28th January 2019 in TEC.
- Meetings of NWG-20 was held on 26th Feb and 26th March 2019 using audio conference bridge, for preparing / finalizing contributions for ITU-T SG 20 meeting, Geneva, April 2019.
- Meeting of the Committee constituted for finalizing IoT standards for Smart cities, was held using audio conference bridge on5thMarch 2019.
- ITU-T SG-13 meeting on Cloud computing held in Zimbabwe

CAB Designation

- Technical evaluation completed for 12 CAB designations.

Study/white paper issued

- Embedded System Security, EMF consideration in 5G.
- Safety and Surveillance in IOT/M2M.
- Machine to Machine Communication (M2M) / Internet of Things (IoT) Enabling Smart Infrastructure: An overview
- C- V2X Technology for Intelligent Transport System – Challenges and Way ahead.
- MEO based satellite communication Networks.
- PPDR Communications Systems, AI & Big data for telecom
- 5G key capabilities and applications

GRs/IRs/SDs/ERs issued

- GR on Ethernet Traffic Analyzer 100G Handheld
- GR on UPS System, GR on G.fast equipment
- IR on VSAT based Mobility Services
- IR on ISDN-NT 1, IR on ISDN CPE
- GR on Multifunction portable device for Biometric authentication/ e-KYC, Digital KYC and Bill payment at Point of Sales (PoS)
- GR on Intrusion Detection System
- GR on Intrusion Prevention System

Contributions submitted to ITU-T/R/D

- Two contributions were submitted to Study Group-17 of ITU-T:

i. Suggestion for inclusion in X.str-dlt (Security threats and requirements of digital payment services based on distributed ledger technology.

ii. Proposal for modifications in revised baseline text for X.itssec-2: Security guidelines for V2X communications

- Two contributions related to Smart Cities have been submitted in March 2019 for ITU-T SG 20 meeting, from April to June 2019. These contributions have been presented remotely by DDG (IoT).
- 5 contributions related to 'IMT-2020 in Public Safety', 'IMT Experiences in different countries' and 'IMT for Narrowband and Broadband Machine-Type Communication' were submitted to ITU-R SG-5 and related Working Party meetings in the period of Jan 2019 to Mar 2019.

Presentation/Training/Seminar/Meetings/workshop webinar

- A presentation on Post Quantum Encryptor was given by CDoT
- One day workshop on IoT / M2M on 8th January 2019
- Presentation on Global SAR limits and regulations by M/s SEMTECH
- Presentation on SDN & NFV given by M/s Spirent

Other Activities

- IPv6 Ready logo lab in TEC is upgraded as per new release of IPv6 Ready logo forum.
- A delegation having members from DoT, TEC and NITPRIT headed by Member (Services), DoT visited STMicroelectronics, Greater Noida on 17th January 2019 to see Da Vinci Gallery having prototypes related to IoT domain, pilot Site for Solar Smart Street Lighting on wireless technology and Smart Street Lighting on Power Line Communication (PLC) technology.
- IoT Experience Centre: - For establishing IoT Experience Centre in TEC, MoUs have been signed with five industry organizations viz M/s STMicroelectronics, M/s TCL, M/s SenRa, M/s Sensorise and M/s Trusted Objects for creating use cases in real time in TEC.

Suggestions/feedback are welcomed, if any for further improvement.

टी ई सी संचारिका : दूरसंचार अभियांत्रिकी केन्द्र
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