# TERMS OF REFERENCE

## Procurement of ISDN/IP Telephone System Upgrade

The Energy Regulatory Commission (ERC) intends to engage the services of a Contractor, as IT Services[1] Provider, duly authorized and with the necessary expertise, experience, and capacity to supply, delivery, installation, and configuration of Internet Protocol Private Branch Exchange (IP-PBX) system while utilizing the existing Integrated Services Digital Network Primary Rate Interface (ISDN PRI E1) line with the following detailed requirements:

## I. BACKGROUND

Unified communications (UC) solutions — equipment, software and services — provide multiple enterprise communications channels, such as Voice, IP Telephony calling, Instant Messaging, Desktop Sharing, Presence, Web Conferencing, Audio Conferencing, and Video Conferencing to interact together in a virtually seamless way. This can also include control, management and integration of these channels. UC products and services can also be integrated with networks and systems, IT business applications and, in some cases, consumer applications and devices.

As the demand of ERC's services to consumers and stakeholders arises, the need to have a more convenient, cost-effective and more reliable means of communication must be established. Hence, the procurement of IP-PBX Telephone System is utmost important.

[1] **IT services** refers to the application of business and technical expertise to enable organizations in the creation, management and optimization of or access to information and business processes.
(Gartner, https://gtnr.it/2DFjojl)

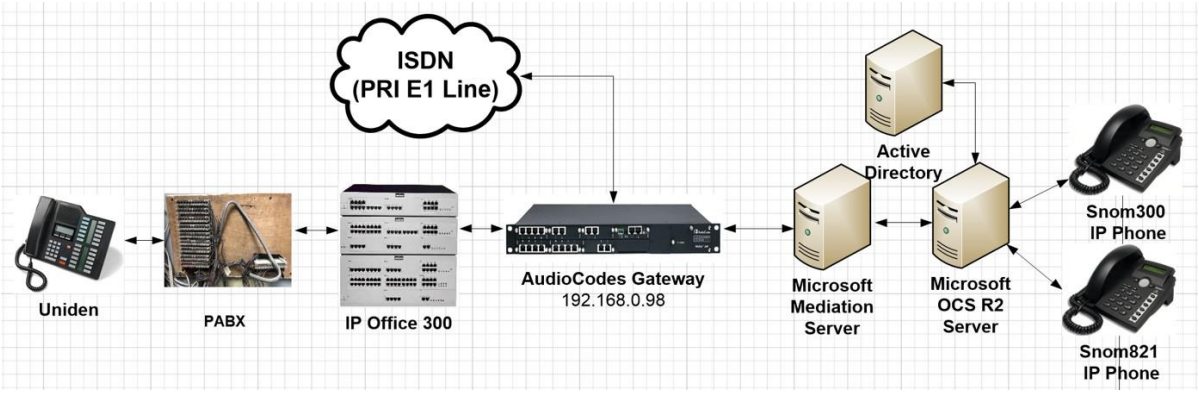


Figure 1. Existing ERC Telephone System

The ERC utilized the PLDT's ISDN-PRI E1 line for telecommunications service. Based on the figure above, the ERC implemented analog equipment and digital equipment for telephone system using Avaya IP Office 300 and Audiocodes Mediant 1000 respectively. The said telephone system is being utilized for more than nine (9) years.

The upgrade is necessary because both equipment and software (MS Mediation Server, MS OCS R2 server) are already end-of-life or obsolete. Further, the project aims to address the Commission's increasing needs for communication services.


Figure 2. Proposed ERC Telephone System Upgrade Diagram

## II. CONTRACT PERIOD

The contract period shall cover ninety (90) days upon receipt of Notice to Proceed (NTP).

## III. APPROVED BUDGET FOR THE CONTRACT (ABC)

1. The Fund for this engagement shall be sourced from the General Appropriations Act (GAA) for the fiscal year 2020 of the ERC.
2. The ABC for the project is **Eight Million (PhP8,000,000.00)** inclusive of all government taxes and other fees and charges.

## IV. MODE OF PROCUREMENT

The Procurement of the Energy Regulatory Commission's ISDN/IP Telephone System Upgrade (Project) shall be undertaken through Competitive Bidding pursuant to RA No. 9184 and its 2016 Revised IRR.

## V. QUALIFICATIONS OF THE SERVICE PROVIDER

The Contractor should have the necessary eligibility, experience and expertise in providing the service, with the following credentials:

1. Must be a certified integrator/equipment provider with at least 5 years experience in Unified Communications infrastructure. The Service Provider must submit proof/s to support their five (5) years of experience in proving Unified Communications infrastructure (e.g., notarized undertakings, list of contracts, etc);
2. Must be a Certified solutions partner.
3. Must have at least 3 Unified Communications Engineer certified by the manufacturer of the brand being offered.

## VI. MINIMUM TRACK RECORD

The ERC desires a Contractor who has completed, within the last five (5) years from the date of submission and receipt of bids, a single largest contract that is similar to the Contract to be bid. A similar contract must be a contract the value of which must be at least fifty percent (50%) of the Approved Budget for the Contract (ABC).

## VII. SCOPE OF WORK AND DELIVERABLES

### A. Activities:

| Activities | Estimated Working Days |
|---|---|
| 1. Delivery of the appliance | **60 Days** |
| 2. Evaluation and discussion of the network setup | **3 Days** |
| 3. Installation, configuration and testing | **20 Days** |
| 4. Transfer of knowledge to end-users | **7 Days** |

### B. Detailed Specifications:

**1. IP-PBX SYSTEM**

**a. General Features:**

1) PSTN connection using one (1) E1 PRI
2) 108 units IP phone and 1-unit PC-based attendant console
   a) 41 units of IP phones of executive level IP phones w/ VPN capability
   b) 65 units of entry level IP phones
   c) 2 units enterprise grade IP conference phone

3) Extension licenses consisting of the following:
   a) 248 voicemail licenses
   b) 248 unified communications client licenses
   c) 248 softphone licenses
   d) 248 instant messaging licenses
4) 108 mobility licenses
5) 11 SIP trunk licenses
6) At least 90 auto attendant ports
7) 10 audio conferencing ports
8) 10 web collaboration ports

Please see **Annex "1"** for the features of the above listed IP phones
Please see **Annex "2"** for the deployment list
Please see **Annex "3"** for more details on the IP-PBX features
Please see **Annex "4"** for more details on the unified communication functionalities

## b. IP-PBX SYSTEM HARDWARE

1) Supply, delivery, and installation of six (6) units enterprise grade PoE switch
2) Supply, delivery, and installation of 19-inch rack cabinet
3) Must be 19 inch rack mountable in design
4) Busy Hour Call Completion (BHCC) of at least 50,000 calls
5) Must be capable to support third party SIP endpoints
6) Must be solid-state in design and not based on hard disk technology
7) Must be fully scalable. Upgrade should be seamless.
8) Fully redundant system or CPU for high availability during server or gateway failure
9) Dual local area network (lan) ports for the IP-PBX's voice hardware for provide high availability
10) Main IP-PBX and branch gateways must be able to function as a single image system and can be managed in a centralized location
11) Standard local survivability on branch gateway side in case of WAN outage

12) IP PBX should have the capability to survive (make and receive calls) even if main server fails
13) Support for N+1 Redundancy
14) Supports Simple Network Management Protocol (SNMP)
15) Must have paging output interface

Please see **Annex "5"** for more details on the network hardware requirements

## c. IP-PBX SOFTWARE

1) Licenses can be used for all types of phones
2) Licenses must be transferrable in any site of the deployment
3) All system licenses (e.g. extension, application and device) should be perpetual and must not be renewed monthly or annually. The ERC recognizes that any upgrade on the software assurance beyond the one (1) year warranty period may not be included.
4) Patches, bug fixes, minor and major software upgrades for the proposed system during warranty period should be included at no additional cost
5) Has a single management interface for administration and monitoring of all applications including conference bridge and mobility server
6) Management system can be accessed via a web browser
7) Initial setup and configurations shall be done by the service provider
8) The entire configuration, management and reporting should be managed centrally by a single management portal. Configurations done in the main site should automatically be replicated at remote sites. It should also provide a single view of the entire VOIP network of all sites.
9) The IP-PBX management system should be able to display connectivity and service status for all gateways and IP phones in any site of the deployment
10) The IP-PBX management system should be able to monitor all ERC sites under a single application window
11) Administrator/s should get an email notification in the case of any minor or major failure within the IP-PBX System
12) Should have the capability to manage and control the bandwidth of voice calls that goes in/out on the main site or

remote branches
13) Must have real-time monitoring for all PSTN trunks
14) Must have user readable reporting

## 2. SUMMARY of IP-PBX TELEPHONE SYSTEM REQUIREMENTS

| Items | No. Units | Remarks |
|---|---|---|
| 1. PSTN Connection | 1 | Existing (PLDT ISDN PRI E1) |
| 2. IP-PBX Hardware | 1 | To be delivered by Contractor |
| 3. IP-PBX Software (including all licenses) | 1 | |
| 4. IP Telephone | 108 | |
| 5. PC-based Attendant Console | 1 | |

## 3. OTHER INCLUSIONS

a. Documentation of the IP Telephone System upgrade to include at the minimum:
   1) Manual of operations
   2) Connection diagrams

b. Trainings:
   1) Administrative - three 4-hour sessions
   2) End-user - seven 4-hour sessions

## C. Other Requirements

Contractor must ensure that service providers are physically and mentally fit to perform the work and compliant with ERC Health protocols.

## VIII. WARRANTY and MAINTENANCE

1. One (1) year warranty on hardware and software
2. One (1) year onsite and phone support
3. Project management and support of IP Telephone System Upgrade within ninety (90) days

## IX. PAYMENT SCHEME

1. 20% of the payment shall be released upon delivery of the equipment on the site. For the equipment to be delivered on the site, please refer to Summary of IP-PBX Telephone System Requirements under Section VII.B.2.
2. The remaining 80% will be released upon 100% completion of the project including all administrative and user training(s).
3. Upon cancellation, the 20% initial payment must be returned to ERC.

## X. LIQUIDATED DAMAGES

1. Where the service provider refuses or fails to satisfactorily complete the work within the specified contract time, plus any extension time duly granted and is hereby in default under the contract, the service provider shall pay ERC for liquidated damages, and not by way of penalty, an amount, as provided in the conditions of the contract, equal to one tenth (1/10) of one percent (1%) of the cost of the unperformed portion for every day of delay. The maximum deduction shall be ten percent (10%) of the amount of the contract, of which ERC shall have the discretion to terminate the contract without prejudice to any other action or remedy it may take to recover the losses incurred as a result of the service provider's failure/non-performance, including but not limited to forfeiture of performance security and/or blacklisting of the latter.

2. For entitlement to such liquidated damages, ERC need not prove the damages actually incurred. Said damages in any amount shall be deducted from any money due or which may become due the service provider under the Contract and/or collect such liquidated damages from the retention money or other securities posted by the service provider at the ERC's convenience.

## XI. RESERVATION CLAUSE

The Energy Regulatory Commission (ERC) reserves the right to reject any end all bids, declare a failure of bidding or not award the contract at any time prior to contract award in accordance with Section 41 of R.A. 9184 and its IRR, without thereby incurring any liability to the affected bidder or bidders.

**ANNEX "1"**

**Features of Different Type of IP Phone**

**A. 41 Units of IP Phones of Executive level IP Phones w/ VPN capability with the following features:**

1) Colored graphics display;
2) Minimum of 8 Call appearances;
3) Must support industry standard SIP protocol
4) Must have standards-based codec support for the following codecs: G.711 uLaw/aLaw and G.729a; G.722; G.723; and G.726 codecs;
5) Support for Power over Ethernet (PoE);
6) Speakerphone capability;
7) Must have Dual Ethernet (at least 10/100/1000 Mbps) line interface, Secondary Ethernet interface (at least 10/100/1000 Mbps);
8) Feature keys:
   8.1) Transfer;
   8.2) Conference;
   8.3) Hold;
   8.4) Call History;
   8.5) Voicemail;
   8.6) Directory;
   8.7) Volume; and
   8.8) Mute.
9) Message Waiting Indicator;
10) Visual Voicemail;
11) Ring tone selection;
12) Supports Secure Real-Time Transport Protocol (SRTP);
13) Supports at least 6 octaves of sound quality; and
14) Embedded VPN client.

**B. 65 Units of Entry Level IP Phones (2 Liner) with the following features:**

1) Backlit display;
2) 2 Call appearances:
3) Must support industry standard SIP protocol;
4.)Must have standards-based codec support for the following codecs: G.711 uLaw/aLaw and G.729a; G.722; G.723; and G.726 codecs;
5) Support for Power over Ethernet (PoE);
6) Speakerphone capability;
7) Built-in Headset port;
8) Must have Ethernet (at least 10/100 Mbps) line interface, Secondary Ethernet interface (at least 10/100 Mbps);
9) Feature keys:
   9.1) Transfer;
   9.2) Conference;
   9.3) Hold;
   9.4) Redial/History;
   9.5) Voicemail;
   9.6) Directory;
   9.7) Volume; and
   9.8) Mute;
10) Ring tone selection;
12) Voicemail;
13) Supports Secure Real-Time Transport Protocol (SRTP);
14) Supports at least 6 octaves of sound quality; and
15) Embedded VPN client.

**C. 2 Units Enterprise Grade IP Conference Phone with the following features:**

1) Colored graphic display;
2) Gesture-based, multitouch-capable capacitive touch screen;
3) Must support industry standard SIP protocol or Microsoft Lync 2013/Skype for Business SIP;
4) Must have standards-based codec support for the following codecs:
   G.711 uLaw/aLaw; G.729ab; G.722; G.722.1; G.722.1C; G.723; and G.726 codecs;
5) Support for Power over Ethernet (PoE);
6) Shared call/bridged line appearance;
7) Aside from being an IP endpoint, the conference phone should also support
   both wired and wireless connection via USB and Bluetooth;
8) Two-port gigabit Ethernet switch;
9) 802.11 a/b/g/n (Wi-Fi) network connectivity; and
10) Can be upgraded to become a videoconferencing system.

**D. 1 Unit PC-Based Attendant Console**

1) Drag and drop transfer;
2) Click to Answer;
3) Conference;
4) Intercom;
5) Contacts list;
6) Presence or Availability Status;
7) Call History;
8) Queued Calls Information;
9) Queue Call Pickup; and
10) Add, edit and view notes to calls.

*Note:* This unit will be placed at the Data Center

**ANNEX "2"**

## I. List of Deployment

| Typr of IP Phone | Service/Division | Number of Users |
|---|---|---|
| 1. Executive Level (41) | OCCM | 5 |
| | OED | 1 |
| | SD | 7 |
| | DC | 27 |
| | COA | 1 |
| 2. Entry Level (65) | OCCM Sec. | 8 |
| | OED Sec. | 1 |
| | SD Sec. | 7 |
| | COA Sec. | 1 |
| | IAD | 1 |
| | OGCS (CRD=2; BAC=1) | 3 |
| | FAS (HRMD=2, GSD=2, AD=1, BD=2) | 7 |
| | LS (LDCC=1, LDNRC=1, LDRC = 1) | 3 |
| | PPIS (PID=1, PD=1, IDMD=1, MISD=2) | 5 |
| | ROS (SD=2, IED GenCo=2, IED DU=2, IED Adju=2, TRD=3) | 11 |
| | MOS (MD=1, CSD=3, VAOD=2, MAOD=2) | 10 |
| | CAS (MD=1, CSD=3, VAOD=2, MAOD=2) | 8 |
| 3. Conference Phone (2) | Boardroom | 1 |
| | BAC | 1 |

**ANNEX "3"**

**IP-PBX System Features shall include but not limited to the following:**

1. Account Codes;
2. Automated Attendant;
   - 2.1. At least two hundred (200) channels to support PSTN trunks
   - 2.2. Backup Auto Attendant in case the main AA source fails
   - 2.3. Dial by name functionality
   - 2.4. Scheduled Greetings (On and Off Hours, Holiday)
3. Automatic Call Distribution (ACD) with Reports;
4. Call Forwarding;
5. Call Pick-up;
6. Call Waiting;
7. Call Recording;
8. Conferencing (6-party);
9. Direct Inward Dialing (DID);
10. Redial;
11. Music on Hold;
12. Paging (Global via overhead PA systems or selective via IP Phone speaker);
13. Transfer;
14. Point-to point video calling via softphone;
15. Web conferencing (Desktop sharing during audio conferencing session);
16. Call detail reports (User, Trunk, LAN/WAN reports);
17. Access for remote phones or softphones of teleworkers;
18. Voicemail;
19. Call quality reports (Packet loss, MOS, Jitter and Packet (Capture); and
20. Call Distribution (Circular, Longest Idle, Simultaneous (Ring).

**ANNEX "4"**

**Unified Communications (UC) Functionalities for all users shall include but not limited to the following:**

1. UC desktop client (Windows and MAC);
2. Presence or Availability Status;
3. Instant Messaging;
4. Voicemail;
5. Office Applications Integration for Microsoft Outlook;
   - 5.1. Voicemail integration
   - 5.2. Calendar integration
   - 5.3. Contacts integration
   - 5.4. Presence integration
6. Directory integration via Microsoft Active Directory or LDAP;
7. Call History;
8. Conference bridge visibility and control;
9. Web and application dialer; and
10. Add, edit and view notes to calls.

**ANNEX "5"**

**NETWORK REQUIREMENTS**

**Enterprise Grade PoE Switch Features:**

1. 24 ports 10/100/1000BASE-T, 4 SFP combo, 41GbE unpopulated SFP upgradable to 10GbE SFP+;
2. Support for up to 128Gbps switch bandwidth and 95.2Mpps frame forwarding rate;
3. 1GB system memory and 4GB Flash memory;
4. Support 802.3ad Link Aggregation, 802.1w RSTP, 802.1s MSTP and PVST+;
5. Support for up to 128 load sharing trunks, up to 8 members per trunk;
6. Support Multi Chassis link aggregation group to address bandwidth limitations and improve network resiliency;
7. Support up to 4000 Port-based or Protocol-based or 802.1Q or 802.1ad VLANs;
8. Support Private VLAN, VLAN Translation, and VLAN aggregation;
9. Support IP static routing, RIP v1/v2 routing features;
10. Support 4 active OSPF and OSPFv3 interfaces;
11. Support Equal Cost Multi Path for IPv4 and IPv6;
12. Support IGMP v1/v2/v3 and PIM snooping;
13. Support PIM-SM Edge, PIM-SSM Edge;
14. Support static multicast routing;
15. Support IPv6 static routing and RIPng;
16. Support ITU-T G.8032 Ethernet Ring Protection Switching or equivalent with sub-50 ms recovery;
17. Support IEEE P802.1Qaz DCBX (Data Center Bridging eXchange) to exchange configuration information with directly connected peers;
18. Support framework of event-driven activation of CLI scripts which can leverage any system event log message as an event trigger, the most popular use cases are time/user/ location-based dynamic security;
19. Support Kerberos snooping to work with Microsoft Active Directory to allow access and track users in the network. The switch can retrieve IP, MAC, VLAN, computer hostname, and port location of the user;
20. Support sFlow or Netflow;
21. Support 802.1ag L2 Ping and traceroute Connectivity Fault Management;
22. Support ITU-T Y.1731 Frame delay measurements;
23. Support SNMP v1/v2/v3, RMON, SMON, XML management interfaces;
24. Support Network Time Protocol server and Client;
25. Support IEEE 802.1AK Multiple Registration Protocol and Multiple VLAN Registration Protocol to share VLAN information and configure the needed VLANs dynamically within a layer 2 network;
26. Support 802.1BA AVB to enable reliable, real-time audio/ video transmission over Ethernet for today's high-definition and time-sensitive multimedia streams with perfect Quality of Service (QoS);
27. Support OpenFlow to provide an external OpenFlow based SDN controller to access and control the forwarding plane of the switch;
28. Support up to 4 mirroring instances;
29. Authenticate multiple users on a single port via 802.1X, Web or MAC at the same time to secure and provision network resources based upon the role the user or device plays within the network;
30. Support the ability to authenticate multiple users on a single port via 802.1X, Web or MAC at the same time;
31. Support a framework for implementing security, monitoring, and anomaly detection. The framework allows you to specify certain types of traffic that require more attention. After certain criteria for this traffic are met, the switch can either take an immediate, predetermined action, or send a copy of the traffic off-switch for analysis;

32. The switch operating system must support scripting capability to allow automating regular management tasks in scripts and deploy configurations such as QoS, rate limiting and ACLs;
33. Provide following IPv6 features:
    33.1. IPv4 and IPv6 dual stack and DNS client;
    33.2. Ping, Traceroute, Telnet and SSH-2;
    33.3. ICMPv6 and Neighbor Discovery;
    33.4. Stateless Address Auto Configuration;
    33.5. DHCPv6 Relay;
    33.6. IPv6 Access Control List;
    33.7. RA (Router Advertisement) Filtering;
    33.8. Provide RFC 6106 DNS option for Router Advertisement;
    33.9. Support 6to4 Tunnel and 6in4 Tunnel;
34. Operating system must be highly resilient and modular;
35. Operating system must allow the upgrading of individual software modules and restart unresponsive process;
36. Operating system must support self-healing process recovery via process restart;
37. Support use of same switch operating system image across the proposed access switches models for ease of management and
38. Support external redundant power supply.