

Specifications of hybrid telephony system with capacity of 1000 lines

1- Scope of Work :-

- Supplying and installing of a modern hybrid telephony system (Analogue, and IP) of 750 extension and expandable to 1000 extension including required cabling on the main distribution frame MDF and the switches to operate properly.
- Supply installations and commissioning of computerized Operators console with the necessary headsets and PCs.
- Supply installs and commissioning IP Phone and Analogue phone sets.
- Supplying and connecting optical cable between the building of the old administration(place PABX) and the building of the new administration with the completion of civil work (drilling a path ,laying manholes ...etc).
- All major and minor upgrades for the system must be included for a period of 3years.
- Cloud based & Subscription based solutions are rejected.

2- Specifications :-

The required Telephony system must be complied with the technical specifications shown below: -

Item	Specifications
1.	The system must be delivered with the latest software version.
2.	The system must include a built-in web-based management system with the following features: <ul style="list-style-type: none">- Centralized management for all components regardless of location.- User authentication.- Role-based access control- Secure access via HTTPS, SSH, SFTP, and TLS
3.	Must support now at least 1000 extensions (analogue 600, IP (150) within one single system with future expanding to 1000 extensions
4.	System configuration/customization can be handled by command lines and web interface.
5.	Analog extensions must be supported through a dedicated interface board. Caller ID must be provided on all extensions .

6.	The system should allow IP phones to register directly with the call manager over the IP network using SIP protocol, while also supporting analog phones through the use of analog gateway modules or media gateways, without compromising functionality or voice quality.
7.	The call manager must support group hunting features.
8.	Analogue extension with long distance feature must be supported by the system for (5) KM using 1mm copper cables.
9.	System should support C.O lines by using a dedicated board interface.
10.	The system should support at least the following types of trunks: IP, H.323 IP trunks , SIP trunks , E1/T1 PRI ISDN, E1/T1 with support of Q. SIG, analog trunks, and trunks ISDN BRI, and should be equipped with the hardware, software and licensing required to operate digital trunks E1 R2 Modified
11.	The system should support both centralized and distributed architecture to operate across remote sites via LAN/WAN.
12.	The system must support multiple active servers for redundancy and site survivability.
13.	<p>The used media to support the Network connection between main and remote sites could be:</p> <ul style="list-style-type: none"> • Microwave Link using • Fiber optic • VPN connection provided by an Internet service provider using a Public IP <p>The System should not be affected by the type of the network connection carrying media.</p>
14.	Media gateways need to have 2 LAN connections which can be configured to support network redundancy using a link failover mechanism.
15.	The call manager must operate on a Linux OS with the latest security patches .
16.	The call manager must be deployed in a high-availability configuration with 2 servers and an automatic failover.

17.	The System must be provided in redundant and high-availability configuration, so that in case the main call Control fails, there is another that can assume control of all associated devices. The processing of calls to IP extensions must continue even if based on SIP (Session Initiation Protocol), and analog extensions, with all its associated functionalities and without interrupting the calls established at the time of the failure. And Network redundancy must be supported.
18.	The telephony system shall be powered by 48 VDC power source.
19.	The system should provide Alarm notifications in case of faults.
20.	The system should support a backup mechanism to provide backups on external storage device - flash memory stick, external hard disk.
21.	Main power supply shall be redundant with(N+1).
22.	Proposed telephone system shall include UPS with battery model to get 6 hours backup time at full load busy hour for PABX.
23.	proposed system shall include needed MDF with an based on the capacity of the analogue (750)
24.	MDF shall be protected against over voltage and over current, by an approved type of protectors.
25.	Vendor need to certify the provided MDF
26.	MDF should be installed in proper elegant way and providing it with a proper jumper wires guides
27.	<p>The type of Analogue phones shall be offered as below</p> <ul style="list-style-type: none"> • should support Caller ID detection and display on the screen • Hands-free speaking • one-touch call memories • Redial function
28.	<p>The type of IP phones shall be offered as below:</p> <ul style="list-style-type: none"> • 4.3" or more color display • Wi-Fi connection • Bluetooth • Full duplex speakerphone • Modern design with at least basic IP phones functions.

29.	<p>Fiber optic cable will be as bellow:- Single mode 12-fibers optical fiber Micro-duct Cable Cable specifications:</p> <ul style="list-style-type: none"> • Single-mode OS2, G.652D. • 12-fibers and Loose-tube. • Polyethylene (PE)Outer Jacket. • designed for micro duct applications • Operating temperatures: (-10 to +70c) • With all splicing, terminations and accessories. <p>*** (Brand: Corning Or AFL)</p>
30.	<p>Two-Way Micro duct Future Path</p> <ul style="list-style-type: none"> • Material: HDPE (High Density Polyethylene). • Configurations: 2-way. • Installation/ Application: Direct Installation in Micro Duct. • Pressure resistance minimum 16 bars. • Sizes for pipe: according to (optical fiber Micro duct Cable size) and accepted ratio. • Anti-static inner layer reduces friction caused by static electricity build-up during fiber installation • For Install and running optical fiber Micro duct Cable. • High-quality material. • Operating temperatures: (-30 to +70c). • With Micro duct connectors and all required installation accessories. <p>*** (Brand: Dura-line)</p>

31.	<p>Installation of Cables and Dura-Line In the Micro Trench Install and running ((Two-Way Micro duct Dura-line) and optical fiber Micro duct Cable) in the Micro trench with the following:</p> <ol style="list-style-type: none"> 1. Road cutting: <ul style="list-style-type: none"> • Micro trench should be performed using Wet cut by dedicated equipment. • The Micro Trench shall be applied on routes that involve surfaces such as roads (asphalt), and other concrete-based surfaces. • The Micro-Trench shall be Width (3cm-5cm), Depth (15cm-20cm) according to dura dimensions. • Micro Duct should be cleaning and drying. 2. Installation of Micro duct Dura-line The Micro Trench: The installation will be as the following: 20mm of sand, Micro duct laying, 60mm of sand, Infilling 90mm (asphalt or concrete according to road type) and adjustment. 3. Reinstatement - Infilling and repairing the road or footway surface to its original level and condition. 4. Micro duct Manhole <ul style="list-style-type: none"> • Manhole vault for (optical fiber Micro duct Cable and Two-Way Dura-Line) • Concrete Materials • Internal dimensions: 60cm*60cm*60cm (W*L*D). <p>**Main manhole should be (100cm*100cm*100cm)</p> <ul style="list-style-type: none"> • With cover and cable inlets. • Underground installations. • For joints of optical fiber cable • The distance between 2 Manholes should not exceed 200 m. • The Design Should be submitting to SRC for approval before starting works. <ol style="list-style-type: none"> 5. Use fiber cable blowing machine to blow cables into the micro duct.
32.	<p>12-Fiber Optic Patch Panel(Brand: Corning Or AFL)</p> <ul style="list-style-type: none"> • 12-fiber optical adapter (Single-mode, SC Duplex) and fiber pigtails. • 12 -Fiber Optical Splice Cassette. • 2 x Cables inlet. • Rack-Mounted. <p>*** (Brand: Corning Or AFL)</p>
33.	<p>24-Fiber Optic Patch Panel</p> <ul style="list-style-type: none"> • 24-fiber optical adapter (Single-mode, SC Duplex) and fiber pigtails. • 24 -Fiber Optical Splice Cassette. • 2 x Cables inlet. • Rack-Mounted. <p>*** (Brand: Corning Or AFL)</p>

34.	<p>Cat6a Ethernet Cable, U/FTP</p> <ul style="list-style-type: none"> • 23-AWG Solid Bare Copper conductors. • Individual Shielded Pair: Bi-Laminate tape. • Outer shield: 26-AWG solid tinned copper. • LSZH jacket. • drain wire. <p><input type="checkbox"/> Cables quantity: all cable quantity from the patch panel in Rack cabinet to the keystones in the rooms.</p> <p><input type="checkbox"/> All cables should be running through PVC conduits.</p> <p>*** (Brand: Belden)</p>
35.	<p>Ethernet Wall Socket</p> <p>Including:</p> <ul style="list-style-type: none"> • CAT6A Keystone Jack. • For U/FTP Cable • Keystone Jack Faceplate (White). • junction box. <p><input type="checkbox"/> The locations of Socket will be allocated by SRC during execution.</p> <p>*** (Brand: Corning Or Belden)</p>
36.	<p>24-Port Cat6A Patch Panel</p> <ul style="list-style-type: none"> • Rack mounted. • For CAT6A U/FTP Cable. <p>*** (Brand: Corning Or Belden)</p>
37.	<p>(Should be compatible with above items)</p> <ul style="list-style-type: none"> • PVC Conduits (all quantity from the Rack cabinet to the Ethernet Wall Socket in the rooms, with all junction's box and accessories • All necessary (Cables, connectors, fiber pigtails, Fiber-optic patch cord, CAT6A UTP-patch cords and any others accessories to complete the whole system

3 - Bill of Quantity :-

hybrid telephony system with capacity of 750 extension and expandable to 1000 extensions as below table : -

No.	Description	QTY
1.	2x servers should equipped to be able run the PABX with the maximum required capacity as mentioned in the technical specification.	2
2.	Cisco - C9300L-48T-4X-E - Catalyst 9300L - Network Essentials - Switch - L3 - 48 x 10/100/1000 + 4 x 10 Gigabit SFP+ (Uplink). Dual power supply, With all required licenses(or equivalently model)	2
3.	Cisco Catalyst C3850-24XS-S Switch Layer 3 – 24 SFP/SFP+ - 1G/10G - IP Base - Wireless controller - managed-stackable.	2
4.	Cisco Catalyst 16-Ports POE GE Switch •RJ45 Ports: 16*ports 10/100/1000Mbps POE. •POE Standard: (IEEE 802.3af, IEEE 802.3at) for powering IP Phone. •SFP Ports:2 x 10G uplink. •Total POE Budget:20X (consumption power of IP Phone) •Support: VOIP traffic protocols. •Operating Temperature: (-10c to 50c). •Rack mounted. With:2x Cisco 10GBASE SFP+ Transceiver Module, 10Km Single-Mode Fiber (SMF, G.652), compatible with SFP item-2.	3
5.	Cisco switch, managed, 24 ports (10/100/1000), POE (compatible with IP phones), 2 ports 10 Gigabit SFP+ uplink. With all required accessories.	2
6.	Analogue extensions	600
7.	IP extensions	150

8.	Operator Console, each console is equipped with: (PC: Tower Business PC , Screen: 20 Inch Monitor or higher, USB keyboard kit or equivalent +and an Associated telephone Set and Headset	2
9.	El qsig - 30 channels	2
10.	CO Trunk Line	8
11.	IP phones set	50
12.	Analogue phones set	500
13.	Complete Protected MDF Includes * MDF Frame(750 fuses type over voltage) * Protection Modules * 20 meter MDF cables(Multi Pair Cable)	1
14.	APC UPS with battery model 10KVA or higher single phase input voltage 220-240V AC , output voltage : 220V AC Complete with its batteries to get 6 hours backup time at full load busy hour for PABX.	1
15.	48 U cabinet with the required Patch panel copper and fiber with all accessories.	5
16.	2KVA online UPS 2U Rack Mounted(Additional Accessories) Routable LCD screen, I/O Single Phase 220-240vac output voltage 220vac Built in 4x9AH Batteries.	5
17.	24U cabinet with all required Patch panel: copper (17x16 ports, 3x24 ports) and fiber optic (24 core) with all accessories.	5

18.	<p>Supply and installation of 50 network points to connect 50 IP phones from the patch panel in the cabinets to the IP phones. The network points distributed in different buildings.</p> <p>Supply Including: Cat6 cable, wall boxes with identification labels and cable tray and all accessories.</p>	50
19.	<p>Single mode 12-fibers optical fiber Micro-duct Cable</p> <p>Cable specifications:</p> <ul style="list-style-type: none"> • Single-mode OS2, G.652D. • 12-fibers and Loose-tube. • Polyethylene (PE)Outer Jacket. • designed for micro duct applications • Operating temperatures: (-10 to +70c) • With all splicing, terminations and accessories. <p>***(Brand: Corning Or AFL)</p>	400m
20.	<p>Two-Way Micro duct Future Path</p> <ul style="list-style-type: none"> •Material: HDPE (High Density Polyethylene). •Configurations: 2-way. •Installation/ Application: Direct Installation in Micro Duct. •Pressure resistance minimum 16 bars. •Sizes for pipe: according to (optical fiber Micro duct Cable size) and accepted ratio. •Anti-static inner layer reduces friction caused by static electricity build-up during fiber installation •For Install and running optical fiber Micro duct Cable. •High-quality material. •Operating temperatures: (-30 to +70c). •With Micro duct connectors and all required installation accessories. <p>***(Brand: Dura-line)</p>	300m

21.	<p>Installation of Cables and Dura-Line In the Micro Trench Install and running ((Two-Way Micro duct Dura-line) and optical fiber Micro duct Cable) in the Micro trench with the following:</p> <p>1. Road cutting:</p> <ul style="list-style-type: none"> • Micro trench should be performed using Wet cut by dedicated equipment. • The Micro Trench shall be applied on routes that involve surfaces such as roads (asphalt), and other concrete-based surfaces. • The Micro-Trench shall be Width (3cm-5cm), Depth (15cm-20cm) according to dura dimensions. • Micro Duct should be cleaning and drying. <p>2. Installation of Micro duct Dura-line The Micro Trench: The installation will be as the following: 20mm of sand, Micro duct laying, 60mm of sand, Infilling 90mm (asphalt or concrete according to road type) and adjustment.</p> <p>3. Reinstatement - Infilling and repairing the road or footway surface to its original level and condition.</p> <p>4. Micro duct Manhole</p> <ul style="list-style-type: none"> • Manhole vault for (optical fiber Micro duct Cable and Two-Way Dura-Line) • Concrete Materials • Internal dimensions: 60cm*60cm*60cm (W*L*D). • **Main manhole should be (100cm*100cm*100cm) • With cover and cable inlets. • Underground installations. • For joints of optical fiber cable • The distance between 2 Manholes should not exceed 200m. • The Design Should be submitting to SRC for approval before starting works. <p>5. Use fiber cable blowing machine to blow cables into the micro duct.</p>	300m
22.	<p>12-Fiber Optic Patch Panel</p> <ul style="list-style-type: none"> • 12-fiber optical adapter (Single-mode, SC Duplex) and fiber pigtails. • 12 -Fiber Optical Splice Cassette. • 2 x Cables inlet. • Rack-Mounted. <p>***(Brand: Corning Or AFL)</p>	8

23.	<p>24-Fiber Optic Patch Panel</p> <p>24-fiber optical adapter (Single-mode, SC Duplex) and fiber pigtails.</p> <p>24 -Fiber Optical Splice Cassette.</p> <ul style="list-style-type: none"> • 2 x Cables inlet. • Rack-Mounted. <p>*** (Brand: Corning Or AFL)</p>	2
24.	<p>Cat6a Ethernet Cable, U/FTP</p> <ul style="list-style-type: none"> • 23-AWG Solid Bare Copper conductors. • Individual Shielded Pair: Bi-Laminate tape. • Outer shield: 26-AWG solid tinned copper. • LSZH jacket. • drain wire. • Cables quantity: all cable quantity from the patch panel in Rack cabinet to the keystones in the rooms. • All cables should be running through PVC conduits. <p>*** (Brand: Belden)</p>	LOT
25.	<p>Ethernet Wall Socket</p> <p>Including:</p> <ul style="list-style-type: none"> • CAT6A Keystone Jack. • For U/FTP Cable • Keystone Jack Faceplate (White). • junction box. • The locations of Socket will be allocated by SRC during execution. <p>*** (Brand: Corning Or Belden)</p>	50
26.	<p>24-Port Cat6A Patch Panel</p> <ul style="list-style-type: none"> • Rack mounted. • For CAT6A U/FTP Cable. <p>*** (Brand: Corning Or Belden)</p>	7
27.	<p>Documentation for installation, maintenance, programming, operation, and troubleshooting (hard copy (4 copies) & software (cd original)).</p>	1
28.	<p>bag Tools for installation and maintenance for all system.</p>	2
29.	<p>modern Laptop (14", core i9 10th GEN Processor, DDR4 16GB RAM, 1TB SSD Hard, WIN10) with their for programming & maintenance interface and software.</p>	2

4 - Spare part :-

NO.	Item	QTY
1	32 analog channels (Analogue Users Interface)	2
2	Operator Console	1

5-General requirement :-

- 1- The contractor is responsible for supplying, installing, programming, operating, testing and commissioning the complete system and must add any required hardware and software to complete the system.
- 2- Guaranty: the system is subject to guarantee for 365 days starting after complete installation and commissioning.
- 3- Support: The contractor must be able to provide the needed support for the system at site or remotely depending on the fault nature for 365 days starting after complete installation and commissioning.
- 4- PABX main parts (Servers, interface boards, power supplies, phone set (IP Phones) must be from Brands from the list mentioned below with certified certificate issued by the Iraqi Embassy in the country of origin :-
 - ALCATEL
 - MITEL
 - AVAYA

5- Training :-

- (7) days training for (10) persons for installation, operation, programming and maintenance at SRC office.
- 6- Documentation: all documents of installation, maintenance, programming, operation and troubleshooting must be supplied hard copy (4 copies).
- 7- Software: All software must be original. All required software for installation, programming, troubleshooting and maintenance should supplied.

- 8- The contractor must submit the following documents with his offer:-
- Bill of quantities.
 - Technical documentation for the offered Materials and Equipment's, details, design, network drawings.
 - The overall block diagram for all design system.
- 9- The contractor should submit to us when supplying the Materials and Equipment, the following documents:-
- Certificate of Origin for Equipment's and Materials ordered.
 - Factory Test Certificates for Equipment's and Materials ordered.
 - Third party inspection.
- 10- A site survey must be made before submitting the bid.
- 11-The contractor MUST be licensed from CMC (Commission of Media and Communications) for all the related systems and works included in the bill of quantity.