Data Concentrator's Technical Specification		
1	**General Information**	
1.1	**Country**	
1.2	**Manufacturer**	
1.3	**Vendor**	
1.4	**Name & type of the DC**	
1.5	**List of clients referring to name, country, date of sale and number of sale**	
1.6	**Company's background on DC technology & capacity of production per year**	
1.7	**Company's background on DC production**	
2	**General Specification**	
2.1	The concentrator should serve as an interface between the central system and the electronic meters. DC should support at least 1200 meter.	
2.2	The concentrator shall interface with connected meters and the master station system using bi-directional communication	
2.3	The concentrator should have the capability to retrieve and retain the required data from/to the meter at cyclic time intervals. The meter reading cycle in concentrator should be programmed by central system	
2.4	The concentrator should be able to receive requests and to send answers to central system. The central system should remote read and configure the concentrator's data and parameters.	
2.5	If communication between concentrator and master station is failure, several attempts should be done.	
2.6	Concentrator should determine the interval and periodicity of command sending to master station through combing requests and optimizing communication.	
2.7	The concentrator should be able to send command to the meters and to take delivery of the answers.	
2.8	The concentrator should be able to detect the presence of a new meter. The concentrator should detect the new meter. The concentrator should detect the new meter every day and the detection time is configurable by the central system.	
2.9	The concentrator should regularly check communication of the meters that it communicates with them.	
2.10	The concentrator should collect its own events/alarms and meters which are connected to it. These events should be able to sent to the central system according to two modes: - Push: the events are sent by the concentrator to the central system, - Pull: the events are gathered by central system. The events for concentrator include: Parameters initialization, parameters loss, parameters update, meters parameters update, meter reading failure etc. The events for the meter include: standard meter events, tamper events, relay control events, power network events, gas and water meter events, long voltage outage events, M_bus events, magnetic events, meter cover open and meter terminal cover open events, current reverse events etc. This two mode should be configurable locally and remotely.	
2.11	Concentrator should classify events as important and normal events to record according to event property. Events include meter reading failure, power on/off of concentrator, clock deviation of energy meter and etc. Concentrator should push warning message to master station. Concentrator should response commands from master station and send corresponding event.	
2.12	The concentrator should be able to identify the feeding phase of each meter (for single-phase meters). (it is mandatory for PLC)	
2.13	The concentrator should be able to detect changing of feeding phase of meter (for single-phase meters). (it is mandatory for PLC)	
2.14	- The concentrator should have the following interfaces: - Wi1: interface for connection to WAN modem WAN modem should be PSTN, GSM/GPRS/UMTS, Wi-Max, XDSL, Wi-Fi ... default interface is GPRS. - Wi2: backup interface for connection of a WAN modem interface is Ethernet RJ45 port.	

	- CI1: for communication with the meters this interface is base on DLMS/COSEM protocol, this port can be RS485 (this port should be two wired, active and screw terminal type and should be easily installed, and also wires should not be contacted directly to this port by screw), PLC or …. - CI4: for connection to Utility automation devices for Smart Grid purposes (this interface is base on IEC61850 protocol) interface is Ethernet RJ45 port. - CI3: for connection to operation and maintenance. - RS485: for connection to local meter in distribution substations this port should be two wired, active and screw terminal type and should be easily installed, and also wires should not be contacted directly to this port by screw). This interface is base on DLMS/COSEM protocol. - Network: for the connection of the equipment to power supply,	
2.15	The concentrator should be able to restart locally (via CI3 interface) and remotely (starting from the central system). Details of hardware and software, as well as the mechanisms allowing covering this functionality should be prepared. The concentrator must also be able to restart "automatically" in the event of problem. The contractor must specify the scenarios in which such a restarting is occurred.	
2.16	The lifespan of the concentrator should be 20 years with a maximum failure rate annual of 0.5%.	
2.17	Insulation protection class should be 2	
2.18	- Specified Operating Range ranges from -25 to +60ºC and tolerable humidity is 95% - Limit Range of Operation ranges from -40 to +70ºC. - Limit Range for Storage and Transport ranges that meter work by maintaining its accuracy class without any failure from -40 to +70ºC.	
2.19	The accuracy of DC's clock should be 0.5 second per day in 23ºc degree and 0.15 second change against 1ºc change per day. DC should have Persian calendar including Leap year, Day light saving time.	
2.20	DC should have Day Light Saving Time (DST) mode and it should be possible for operator not only set its time and date but also activate and inactivate it.	
3	**Operating System**	
3.1	Applicative software for all the concentrators should be provided. This software should be compatible with the concentrators of the various suppliers.	
3.2	DC software: the concentrating software should work on an identical operating system. The operating system should be recognized by the client and be tested.	
3.3	DC firmware, the operating system and DC software should be updated Locally and remotely.	
3.4	The software of the concentrator should apply priorities in the execution of its tasks. An urgent task (for example those which take part in the service of operation of the supply contactor) must be carried out in high priority. Also, if a level of service would be likely not to be held, the software of the concentrator should be able to suspend the execution of a low priority task to treat the urgent tasks. The suspended tasks must be automatically taken again later.	
3.5	The software of the concentrator should optimize using WAN and LAN). For example, if LAN or WAN is saturated, the concentrator should not issue non urgent request on the network. Mechanism should be explained by details.	
3.6	The software of the concentrator should take part to optimize the volume of Data exchanged on LAN with a meter, for example, by joining together in only one request all the orders relating to the same meter, instead of issuing a significant number of unit requests. Mechanism should be explained by details.	
3.7	The software of the concentrator should take part to optimize the volume of the Data exchanged on LAN with a bunch of meters, for example, by transmitting one message, of type broadcast or multicast, when several identical orders must be sent to a certain number of meters of its bunch. Mechanism should be explained by details.	

3.8	The software of the concentrator should take part to optimize the volume of Data exchanged on the WAN with central System by gathering in only one message for simultaneous transfer all the data from the meters of the same bunch. Mechanism should be explained by details.	
4	**Power Supply requirements**	
4.1	Contractor should propose a value of the maximum consumption of concentrator out of W. The real consumption of a concentrator depends on its activity (communication activates or not) the contractor should indicate the value of the consumption of the concentrator out of W for the following profiles of operation: - The concentrator does not communicate, should be less 5W and 10VA. - Communication LAN functions, should be less 10W, 15VA. - Communication WAN functions should be less 10W, 15VA.	
4.2	The concentrator should work with both single-phase and three-phase alternative power supply with 50Hz, to 230 V between phase and neutral. The normal work voltage range should be 80%~120%Un.	
4.3	The concentrator being protected, by fuses of gauge 2A.	
4.4	The concentrator should be insensitive to power supply cut-offs, lower duration or equalizes with 500ms. More than 500ms power cut-offs, concentrator should be switched on the emergency power supply.	
4.5	Emergency power supply should ensure the maintenance of the current date and time of DC. The emergency power supply should also guarantee the sending alarms to central system. Emergency power supply should supply DC for minimum one week (168 hours) for sending alarm. Emergency power supply should supply DC for minimum two years for RTC.	
4.6	The lifespan of the emergency power supply should be minimum 10 years under environment and nominal operating conditions.	
4.7	The emergency power supply should not require any maintenance during the lifespan of the concentrator. However, if a maintenance of the emergency power supply is necessary (pile, battery, etc), the contractor must specify it. In all the cases, the contractor should describe the adopted solution.	
5	**Mechanical requirement**	
5.1	Concentrator's case material should be polycarbonate and it should be fire, heat and ultra violet radiation resistant	
5.2	All parts of the Concentrator should be resisted against mechanical stroke and shake during the transportation	
5.3	Concentrator enclosure protection should be at least IP51	
5.4	Concentrator should have 4 connecting terminals to power supply, which are from left to right: NR, P1, P2, and P3 corresponding to the neutral and the three phases. The connecting terminals to the power supply are made by unlosable screws without insulator perforation.	
5.5	The concentrator should be marked by the following indications: - The single identification number, - The diagram of the connecting terminals to power supply and the interfaces. These indications can be replaced by the graphic symbols of standard - The reference voltage standard out of V, - The frequency of reference in Hz, - Mention “manufactured in [country of manufacture to be filled by the manufacturer]”, - The symbol of the class of protection II, - The temperature range for which the concentrator is operated - The month and the year of manufacture, with format MM/AAAA,	
6	**WAN requirements related to DC**	

6.1	DC should be able to support different communication modems (such as: PSTN, GSM/GPRS, UMTS, Wi-Max, XDSL, Wi-Fi ...) and all this modems should be added to DC.	
6.2	The modem should be “plug and play” and supplied with the concentrator. The modem is easily changeable without demounting of the concentrator. This change should not invalidate the guarantee of the concentrator	
6.3	Modem of the concentrator should be accessible and be isolated electrically from the other parts of the concentrator.	
6.4	Parameters of connection to WAN should be programmable and configurable in the concentrator remotely and locally	
6.5	DC should support static and dynamic IP address	
6.6	Interface between central system and DC should be upgradable and allow the later addition of other technologies.	
6.7	The volume of exchanged data on the WAN should be optimized. For this purpose the contractor should optimize the protocols on the level of each OSI layer and describe these optimizations.	
6.8	Contractor should give the detailed specifications of the protocol between the concentrator and central systems.	
6.9	For each telecommunication technology, the contractor should specify the mechanism of establishment of the connection and volume of data exchanged (negotiation of establishment, strategy of reconnection in the event of failure, authentication, sending of parameters IP). For each telecommunication technology, contractor should describe the sequence of connection process after installation of the concentrator, and in particular: - How it is started, - The volume of exchanged data, - Its minimal, average and maximum duration, - How it is enclosed.	
6.10	The whole of the system should support IPv4	
6.11	The system should be easily upgraded to IPv6 by simple software upgrade, without upgrade hardware	
6.12	A detailed analysis of WAN communication layers should be provided by contractor.	
6.13	For more scalability purpose in the future and more convenient for remote maintenance using web server technology is necessary. The software in the concentrator should be the web server.	
7	**Security Requirements**	
7.1	Concentrator should use method for encryption/decryption of data exchanged in all Concentrator interfaces. At least AES128 method should be used in all information exchanges in private network, between meter and data concentrator (LAN interface), and local interface. At least ECC192 method should be used in all information exchanges in public network as well as between concentrator and central system directly. Security method and hardware should be described in details by contractor. Contractor should prove following items: - Security of method. - Client ability to change security key remotely. - Confidentiality of remote key changing - If client change security key there is no way for meter manufactures to achieve new key (new key is not accessible for meter hardware, firmware, and external software). - All input and output information decrypted and encrypted.	