



भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
विद्युत संचार विकास प्रभाग
Power Communication Development Division

Subject: - To explore the possibilities of indigenous development of SCADA software for power system management – Minutes of Meeting.

The minutes of e-meeting of the team constituted by MoP “to explore the possibilities of indigenous development of SCADA software for power system management” conducted by the Central Electricity Authority via Webex online platform on 17th June, 2021 is enclosed herewith for kind information and necessary action by all concerned.

Encls.: As above.

Signature Not Verified
Digitally signed by UPENDRA
KUMAR
Date: 2021.06.24 15:46:57 IST

Chief Engineer
& Convener

To,

1. All Members of the Team
2. Chief Engineer (R&D), CEA
3. Shri Renji V Chacko, Senior Director, Head, Power Electronics Group, C-DAC, Thiruvananthapuram

Copy for kind information to: -

1. The Chairman of the Team & Member (Power System), CEA
2. Principal Chief Engineer, CEA

Team constituted by MoP**“To explore the possibilities of indigenous development of SCADA software for power system management”****Minutes of Meeting**

Meeting Number:	1 st Meeting
Meeting date & time:	17 th June, 2021 at 11:00 Hrs
Mode:	Online through Webex
Team Chair:	Shri Goutam Roy, Member (Power System), CEA
Convener:	Shri Upendra Kumar, Chief Engineer, PCD Division, CEA
Members of the Committee:	Enclosed at Annexure – I
List of participants:	Enclosed at Annexure – II

The Convener of the team extended a cordial welcome to all the participants/members and expressed his privilege to introduce Shri Goutam Roy, Member (Power System) & Chairman of the team to the participants. He then invited participants in the meeting for introduction. Chief Engineer, R&D Division, CEA and Officials from C-DAC were the special invitees in the meeting.

After introduction of the participants, he then invited the Chairman of the team for his opening remark and for sharing his aspiration from the team based on his vast experience in the power sector.

Shri Goutam Roy greeted the participants and shared his experience of power sector and how it has evolved over the time in terms of technology and advancements. He spoke about the SCADA systems in general and their role in power sector. He elaborated the increasing importance of SCADA systems in real time control and monitoring of integrated grid operations in vast and complex Indian power sector. Further, he added that impetus on SCADA systems to manage real time grid operations has gained even more importance with the increased penetration of RE, increased demand and introduction of smart grid. He also drew attention towards the need for timely availability of product, inter-operability, customization, standardization and cyber security issues arising due to advent of IoT and IEDs. He emphasized on the vision of Atmanirbhar Bharat and Make in India programme of Government of India to do away with the security threat and exploring the possibilities towards making available the SCADA system under Make in India programme. He said that in order to reduce dependence on foreign OEMs and to explore the possibilities for indigenous SCADA development is the need of the hour towards Atmanirbhar Bharat. He then requested Chief Engineer, PCD Division, CEA to initiate the discussion.

Chief Engineer, PCD Division, CEA informed the participants that this committee has been constituted by Ministry of Power upon request received from Energy Department, Govt. of Andhra Pradesh, which has a plan to automate all the EHT and distribution substations in

the first phase, the distribution (feeder) network in the second phase and the consumer management in the third phase. This involves setting up of Master Control Centers for groups of substations, purchase of large number of SCADA licenses, installation of IEDs for the substation equipment and RTUs/SAS at the substation level. He further explained that Energy Department, Govt. of Andhra Pradesh has cited certain challenges like abnormal cost of SCADA software, interoperability issues, dependence on OEMs for customization, non-standard data models and security issues and has requested Ministry of Power to initiate development of a homegrown SCADA and Historian software for power utilities by 2023 since license tenure of SCADA software in APSLDC will expire by this time. Taking cognizance of the matter, Ministry of Power has constituted this team to **“explore the possibilities of indigenous development of SCADA software for power system management”**. He informed the participants that although the team was constituted in October 2020, complete nomination of members was received in March 2021. The team meeting could not be called earlier due to second wave of Covid19 pandemic.

He informed that, CEA has collected inputs from various stakeholders on pointers like technical, contractual and otherwise issues/challenges being faced with current SCADA system, a list of local vendors from whom SCADA software and hardware are being procured, products for which power utilities rely on external agencies and suggestion on indigenous development of SCADA system for power sector. Inputs have been received from 34 stakeholders including Load Dispatch Centers, State Transmission Utilities, Discoms and Private Power Utilities. Talking about the currently deployed SCADA systems, he told the committee that most of the features and applications are developed by foreign OEMs considering developed nations conditions/requirements and their customization for Indian condition requires money and time. He urged the members to identify features and specifications of the SCADA software modules which are suitable for Indian Power Sector environment. He also suggested that competent Indian software companies may be identified that can develop SCADA software modules with the identified features and specifications and finally a roadmap may be decided for this task. He informed that currently deployed SCADA systems across LDCs are completing their life cycle in 2023-2024 and therefore preparing- a timeline for indigenous SCADA development is very important.

Hon'ble Chairman then invited participants to share their views on the matter.

DELIBERATIONS

DP&T Division, CEA

CE(DP&T), CEA stated that the development of SCADA software by any Indian company is not restricted and it is always open but the matter regarding indigenization of SCADA software seems to be more financial rather than technical. He further stated that the customization of the SCADA software is always done by the vendors as per the system requirement of the utilities. Further, it may also be an issue that in case the SCADA is developed by any Indian agency, then, whether the utilities may place order directly to this firm without any tendering. He suggested that the indigenization of the SCADA would largely depend on the above issues, however, there is no hindrance for any Indian company to develop their software and compete in the market.

Chief Engineer, DP&T Division proposed that in order to promote Indian companies,

clause for more than 50 % Indian component could be added in bidding specification.

APSLDC

The officer from APSLDC participating in the meeting in place of the nominated member did not offer any views on the matter.

GUVNL

GM, GUVNL stated that the existing system can be integrated with new system/RTUs and FRTUs and communicate on IEC61850 with each other. In case the IO count increases, one needs to have more investment for the additional licenses and compatible hardware. The DMS application can also be made operational, provided the data for integration is made available to the new system in the required format. In order to integrate existing RTU with new control centre, new vendor provide Interoperability table for IEC61850 serial protocol of existing RTUs.

One of the main considerations when choosing a SCADA system is its compatibility with existing controls hardware or PLCs that does not support modern communication protocols, such as OPC UA (Open Platform Communications Unified Architecture). He suggested that instead of purchasing new and expensive controls hardware, it is better to select a SCADA system having wide range of native drivers to ensure compatibility with all manufacturer's hardware.

Instead of going into all modules, in first phase we may select only less modules which are useful for Discoms. On successful running of 1st phase, then we may go for others modules.

MSETCL

Chief Engineer, MSETCL stated that issues regarding current SCADA systems could be resolved if proper functional training is provided to workforce on SCADA systems and various protocols like IEC-61850. He also stated that if IEC61850 protocol is strictly adhered to, then interoperability issues can be resolved. Further, he suggested that there is a need for common standard or specifications or approach to be followed across LDCs and power utilities in terms of SCADA product specifications. However, MSETCL being a transmission utility, it only can define issues faced and needs but defining total software requirement specification may not be possible for utilities.

PGCIL

CGM, POWERGRID proposed that the work may be taken up on a pilot basis, in parallel with the existing control centers. As control centers are critical to grid operation, it should not be disturbed and the new control center with indigenous SCADA can be setup in stand-alone mode. He also proposed that 3-4 different indigenous vendors must be chosen for this work to facilitate proper competition and ensure cost effective solution.

He stated that it is very important to explore the capability of indigenous suppliers in SCADA field. He suggested that in addition to SCADA software, Energy Management Software (EMS) is also needed to ensure grid security. The indigenous development of EMS may be taken up in next phase. In addition to software development, the indigenous hardware is also needed as presently the hardware such as servers, workstations, routers, switches used for control centers are not manufactured in India.

POSOCO

ED, NLDC stated that in addition to detailed input provided earlier to CEA following points may also be considered:

The requirement of SCADA system is different for different Utilities. Asset Management is the core requirement for Transmission Utilities (TransCos), Network security, Generation Control are the core areas for a Load Despatch Centre (LDCs), forecasting and scheduling is the core area for Renewable Energy Management Centre (REMCs) and distribution automation, demand management etc are the core requirement of the distribution System Operators (DSOs). Accordingly, a decision may be taken to select one area for development through Indigenous system integrators (SIs) and a roadmap may be created to gradually develop SIs for all other areas based on the success in selected area.

The SCADA applications include major modules like Data Acquisition & Control, Energy Management (EMS) system which includes State Estimators and other optimisation program, Automatic generation Control (AGC), Dynamic State Analysis (DSA) and these applications have been developed by the experts with decades of experience, and it may be difficult to attempt developing all these modules indigenously in one go.

Once these applications are delivered, there is a requirement of continuous upgrade of these applications based on the requirement of system operators. Continuous R&D efforts are to be done which involves major expenditure and Govt. funding may be thought off to start with and to support Indian System integrator (SIs). Replacement of SCADA system are planned for 7 – 9 years as per CERC Regulation and sustainability needs to be ensured if the Indian SIs are confined within Indian market only. Hence, Indian SIs must compete with the SIs over the world and develop applications considering their requirements also.

Multiple SIs are required to be developed to have enough competition to reduce the cost. Compatibility across system developed by these SIs needs to be ensured as well as compatibility with the existing system.

C-DAC

C-DAC mentioned about experience and expertise in similar Pan India technology implementations like Emergency Response System (112), and State-wide implementation like PMU and WAM in KSEB network, Vehicle Tracking System in Kerala State, SCADA in KSEB distribution network, SCADA in other Industrial environments etc. C-DAC also explained their SCADA hardware and Software environments and briefed about SCADA protocols, Standards and Security aspects.

Regarding the SCADA for Power system, C-DAC indicated that it is an integrated system with subsystems like Sensors, Communication, Data acquisition and SCADA software and application environments. A turnkey system solution by MNCs especially with proprietary protocols will have the limitations and problems as indicated by the Power system users.

These subsystems need to be considered based on Standards and defined protocols for achieving practical interoperability and upgradations in the long run. When subsystems are developed against Standards, multiple vendors can come up with solutions having interoperability. Wherever standards are not available, they need to be formulated.

C-DAC suggested that, a step by step approach of indigenization will be more practical and it will be a good idea to start with distribution side SCADA systems initially. Domain experts in multiple area need to handshake together in a Mission mode to realize the required system in short period.

Chairman

Chairman of the committee stated that it is great to know that C-DAC has been developing SCADA systems for various services and also for power sector in distribution area. Certainly, there's need for standardization. Also, capability wise there may be certain limitations with Indian developers but we will have to identify their strengths and align it with the things that can be developed within a time frame of 1 or 2 years. Gradually, we will shift into total indigenization of SCADA system. It may not be right to go for an abrupt shift, which may cause disruption in the existing system. Therefore, gradual switchover should be planned so that the current system does not hamper. Also, there is need to ensure integration and interoperability with the existing system. To start with, we may select one application which may be taken up for indigenization. Gradually, after development testing and stabilization of the application we may gain adequate experience to take up the development of other applications and integrate them. With all this, we will be in a position to gradually develop Indian OEMs in SCADA field. He then invited Chief Engineer, R&D Division to share his views.

R&D Division, CEA

Chief Engineer, R&D Division CEA stated that at present the SCADA is in advance stage of development and has been evolving over a period of time, incorporating the changes/modifications as per the need of the system and functional requirements specified by the users, operational difficulties posed and feedback given by users. The SCADA system consists of several sub systems supported by the requisite hardware/software. The system has been built so that cyber- attacks are minimum and ideally none.

In order to seamlessly integrate the new system with the existing system or with the system of a different make, the SCADA solutions have to pass the conformance requirements of interoperability- meaning thereby that the systems are to be developed and integrated based on the applicable international standards and protocols.

Established companies have put in lot of efforts in giving a shape to present day solutions. The system may have many layers - properly integrated to work as an interrelated solution. The SCADA solutions also require the matching hardware for properly porting the software tools. A dedicated communication system and its interaction with the related hardware and software solutions is also a prime requirement. Safety features are necessary adjuncts.

For building a system from scratch, a completely new team of experts would be required and supporting testing platform also need to be made available. Further, whether the solution evolved will be acceptable to the utilities and industries is the question.

If we work on the philosophy of developing the new SCADA system from the scratch, it might outweigh its benefits. If we start developing today, we will be lagging behind the race. It would be better that we identify our functional requirements and be part of standardization activities, which are at quite an advance stage of development.

We may enter into agreement with the established companies in this field and become

a part of the development team. Once we develop the expertise by knowledge transfer, we would be in a better position to deal with indigenous SCADA development.

PCD Division, CEA

CE, PCD Division, CEA stated that detailed list of issues and requirements are already available. What we need is a roadmap for indigenous development of SCADA software. On this aspect, POSOCO has given its submission that we can identify two or three utilities which can go for single tender basis and to start with, we can have a pilot project to see its performance and gradually, we can shift for wider adoption. But one important thing that is lacking is identification of Indian developers who can take responsibility of developing the modules/applications. As already submitted by C-DAC that they are involved in development of SCADA for distribution sector. He requested members to identify other such vendors and their capabilities. Following this, we will have enough inputs to finalize the roadmap for indigenous development of SCADA. As we know that SCADA systems deployed at LDCs are due for upgradation in 2023-24, we are up against a very strict timeline and it may be difficult to meet the same. Nonetheless, we have to start from somewhere and gradually move forward.

POSOCO

ED, POSOCO pointed out that since AP has requested for indigenous development and has submitted that they are having some expertise, hence input from AP is important.

ED, POSOCO mentioned that as the Distribution System Operators (DSOs) have started operating at distribution level, automation at distribution level is also required. Hence, to begin with, the development of distribution SCADA may be taken as a preliminary step towards development of Indian SIs in SCADA space and a number of pilots could be selected. Since M/s C-DAC is already working at the distribution level, they may be a prospective SIs at the distribution level. Award could be placed to separate Indian SIs on single tender basis and may be through separate Govt initiatives and assistance to these SIs from the Govts. The successful commissioning of these pilots shall establish the credentials of the Indian SIs. Subsequently, other areas could be selected for development again through a pilot. Accordingly, simultaneous pilot at all these sectors may be planned based on the availability of sufficient major SIs with relevant expertise who can take up these pilots.

Chairman

Chairman stated that firstly, we need to identify modules that can be selected at initial stage and given to Indian vendors to develop. We may take help of POSOCO, PGCIL and APSLDC for this. Second is identification of standards and specifications so that interoperability can be ensured among the developed products. For this a small team can be formed under CE, PCD, CEA with POWERGRID, POSOCO and other state utilities as well as C-DAC as the members for identification of standards and protocols.

In the meanwhile, we can identify the possible Indian vendors and have meetings with them to identify challenges. Roadmap for developing homegrown SCADA software modules will be decided after completion of these exercises.

Chairman suggested that task for indigenous development of SCADA system may be taken up in phased manner to ensure smooth integration and interoperability with existing systems.

Regarding timeline set by MoP for the report submission, it was suggested that as we could not operate normally during the month of April-May due to Covid19, extension of time line may be sought from the MoP.

CONCLUSIONS

Concluding the deliberations of the meeting, following was decided:

- POSOCO, POWERGRID and APSLDC will identify and suggest the modules to be indigenously developed in initial stage and share with the committee within a week's time.
- A subcommittee will be formed under CE, PCD, CEA with POWERGRID, POSOCO, other state utilities as well as C-DAC as the members for identification of standards and protocols- The convener of the committee shall issue notification.
- POSOCO, POWERGRID, Gujarat, Maharashtra and Andhra Pradesh, in coordination with CEA, will identify possible Indian developers within two weeks' time and have meetings with them to discuss feasibility and identification of challenges in development of modules from their perspective.
- CEA will share the gathered inputs/draft report on "possibilities of indigenous development of SCADA software for power system management" with the members for enrichment.
- Members are requested to initiate the activities as per the timelines given above for timely submission of the final report.

Members List

S. No.	Committee Composition	
1	Shri Goutam Roy, Member (PS),CEA	Chairman
2	Shri Vivek Goel, Chief Engineer (DP&T), CEA	Member
3	Shri Upendra Kumar, Chief Engineer (PCD)	Convener
4	Shri Debashis Bose, Deputy Secretary, MoP	Member
5	Shri A K V Bhaskar, Chief Engineer,APSLDC	Member
6	Shri H M Patel, I/c General Manager (IT),GUVNL	Member
7	Shri Shrikant Sadashiv Rajurkar, ED (Trans),MSETCL	Member
8	Shri. Sunil Agrawal, ED, PGCIL	Member
9	Shri Debasis De, ED,POSOCO	Member
	Shri Devendra Kumar, Chief General Manager ,POSOCO (Alternate Member)	

List of Participants

S. No.	Organization	Name	Designation	Email
1	CEA	Shri Goutam Roy	Member (Power System)	goutamroy.cea@nic.in
2		Shri Ashok Kumar Rajput	Chief Engineer (R&D)	akrajput@nic.in
		Shri Vivek Goel	Chief Engineer (DP&T)	cedpt-cea@gov.in
4		Shri Upendra Kumar	Chief Engineer (PCD)	upendra.cea@nic.in
5		Shri R P Singh	Director (PCD)	rp_cea@nic.in
6		Shri Praveen Kamal	Director (DP&T)	pankaj.cea@nic.in
7		Shri Prateek Srivastava	Assistant Director (PCD)	prateek.sri@gov.in
8		Shri Tanuj	Assistant Director (PCD)	tanuj.cea@gmail.com
9	MoP	Shri Debashis Bose	Deputy Secretary	d.bose80@nic.in
10	POSOCO	Shri Debasis De	Executive Director	debasis.de@posoco.in
11		Shri Devendra Kumar	Chief General Manager	dkumar@posoco.in
12		Shri Harish Rathour	Senior Deputy General Manager	harishrathour@posoco.in
13	Powergrid	Shri A P Gangadharan	Chief General Manager	apganga@powergrid.in
14	APSLDC		Deputy Executive Engineer	ade.tc.scada@gmail.com
15	GUVNL	Shri H M Patel	General Manager (IT)	gmit.guvnl@gebmil.com
16	MSETCL	Shri Shashank Jewalikar	Chief Engineer	cestu@mahatransco.in
17	C-DAC	Shri Renji V Chacko	Senior Director	renji@cdac.in
18		Shri Vinukumar AR	Senior Director	vinu@cdac.in
19		Shri Titus Chazhoor	Group Head, Control & Instrumentation Group	titus@cdac.in