

Design study of REC-XPOZ network for ITER Remote Experimentation Centre (REC)

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As a sub-project of the Broader-Approach activity between Japan and EU, preparation of ITER Remote Experimentation Centre (REC) is ongoing in Rokkasho Fusion Institute of QST, Japan toward remote participation in the ITER plasma experiments. In this study, current proposals of REC system, including a segment to be connected with ITER via VPN for remote participation, are reported.

Collaboration between REC and the ITER CODAC as a part of cooperation arrangement between BA activity and ITER project is starting in terms of remote participation. Our REC is expected to connect to XPOZ-RP segment in IO by a secure channel. A dedicated layer-2 VPN (L2VPN) with broad bandwidth between IO and REC was established in 2020. In the REC side of the L2VPN, a special isolated network segment, hereafter referred as REC-XPOZ, will be prepared in order to secure the communication between IO and REC.

A host running CODAC client applications on the CODAC Core System will be securely connected in the REC-XPOZ and CODAC server applications hosted in the XPOZ segment in ITER will be tested remotely. A server for live monitoring of the ITER experiment and of plant status has been also prepared and will be connected to the REC-XPOZ as well. Live streaming data without time-consuming disk I/O will be received and visualized on REC video-wall as well as the other operator interface terminals, to be looked up by remote participants at the REC.

In the REC, it is planned that all data generated in ITER will be replicated and stored into Rokkasho. A server with SSD for this fast data transfer by using MMCFTP has been prepared in the REC-XPOZ as the data receiver. Fast data transfer with 8 Gbps throughput between ITER and REC was already demonstrated in 2016. Further demonstration will be planned as the physical network between IO and REC is upgraded.

In order to promote research activities based on the ITER remote experiment, access to the replicated ITER DB in REC will be provided for domestic researchers in secure and efficient way with sufficient analysis computing resources. These data access from researchers to the replicated ITER DB has to be strictly separated from the REC-XPOZ for the security of the IO-REC L2VPN. Design study of the REC-SAN (storage area network) is ongoing considering this security point of view. A possible network structure including REC-XPOZ, REC-SAN and data analysis resources for domestic researchers of the REC based on data replication via L2VPN connection will be discussed.

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