

# Operation Request Gatekeeper – A Software System for Remote Access Control of Diagnostic Instruments in Fusion Experiments

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Tokamaks are equipped with a large number of diagnostic and control instruments. During fusion experiments, many of those instruments are repeatedly re-configured to meet the changing needs of each experiment. The number and complexity of these instruments often require that the configuration be done by multiple members of the scientific team and possibly from a remote location. Enabling remote access for diagnostic control has significant challenges due to the security and efficiency requirements. The Operation Request Gatekeeper (ORG) is a software system that addresses the challenges of securely submitting parameter configuration requests. It provides a framework for screening all the parameter change requests before they enter the secure machine zone and are executed. The ORG's decision on whether to pass on a configuration request is based on security verification (user authentication and authorization), grammar validation (is the request well formed), and validity checks (is a request within a specified range of values). The ORG design utilizes a multi-tier software architecture and provides a well-defined mechanism to plug-in verification and execution components for a new diagnostic. The ORG was designed and developed as a prototype component of the ITER CODAC. It satisfies the initial ITER CODAC requirements for remote request submission and has been tested with remote control of the KSTAR Plasma Control System. This paper describes the design principles of the ORG, its software implementation details, and reports on numerous tests that were performed both locally and worldwide. This work was supported in part by the US DOE under DE-FC02-01ER25455 and DE-AC05-00OR22725.