

W7-X Logbook REST API for processing metadata and experiment data enrichment at the Wendelstein 7-X stellarator

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Wendelstein 7-X (W7-X) is a stellarator experiment located in Greifswald, Germany. In the first operational phases (OPs), the W7-X team has been already working on a variety of research topics with about 40 diagnostic systems in operation. In these OPs, many plasma discharges (50 per day/1000 per OP) with durations of up to 100 s were conducted, producing about 500 terabyte of experiment data. For demonstrating steady-state operation, longer experiment durations of up to 30 min are planned for upcoming OPs. Therefore, a large flexibility is needed to satisfy the different use cases and requirements of such an experimental environment, esp. for data processing and analysis.

For this reason, several essential functions for W7-X research are available as web services. The services can easily be combined and integrated into other software due to the usage of standard protocols and common web techniques, such as representational state transfer application programming interfaces (REST APIs). A new central logbook was implemented for working with W7-X experiment metadata via web browser and REST API. Since its introduction, many enhancements have been implemented according to user feedback. For effective research and processing of experiment data, the bulk data of W7-X experiments can be enriched with additional information, such as comments and tags for categorizing. For W7-X experiments, a majority of metadata is extracted automatically from the planned program by the central control software, while the team members complete these logs manually or via software. The logbook also provides search functionality with a powerful search syntax and millisecond response times. By using the REST API, users can integrate logbook searches into their own software and programmatically add new comments or tags. In combination with other W7-X web services, such as a magnetic coil database or the experiment data archive, additional W7-X resources can be utilized for the creation of new tags and further metadata. In this way, all team members were able to contribute to the creation of comprehensive experiment overviews. The logbook quickly became a crucial tool for W7-X operation and is now considered a central hub for experiment related information.

This contribution shows the principles and usage of the W7-X logbook REST API for data enrichment in combination with other W7-X web services and applications.

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