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Programmability in Web server software for geophysical fluid sciences, Gfdnavi

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In recent years, increasing amounts of scientific data on geophysical and environmental fluids, e.g., in the atmosphere and oceans, are being available. Further, there is increasing demand for web-based data services. Several browser-based data servers, on which geophysical-fluid data can be analyzed and visualized, have been developed. However, they are suitable only for initial "quick-looks" and not for subsequent research processes. As a solution, we developed data server software named Gfdnavi. One of its important features is that it provides extensive support for programming (scripting). With Gfdnavi, users can easily switch between operations using a web browser and operations using scripts or command lines. This paper describes its network features: web services, which is an important part of Gfdnavi's programmability, and the functionality to search across multiple Gfdnavi servers. To develop the web services, we adopted the REST architecture. We also developed a client library to ensure access to web services in the programming language Ruby. Using this library, data can be analyzed and visualized on either the server side or client side. It also enables data handling on multiple servers. Search across multiple web servers is made possible by a simple peer-to-peer network with a central server, with the peer-to-peer communication based on web services.