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IRIS efforts to open access to a global network of seismological data centers

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The IRIS Data Management Center (DMC) manages $\frac{1}{2}$ a petabyte of seismological and other observable time series data recorded at stations around the globe. Roughly another $\frac{1}{2}$ petabyte are available in a set of federated centers internationally. Working within the International Federation of Digital Seismograph Networks domain standards group, web service interface standards were developed. The initial specification was finalized in 2012, with our data center supporting the standard services shortly thereafter. In the meantime, the DMC has been a strong advocate for adoption of these services at other data centers through consultations, offering reusable software components and funding the development of service implementations in common systems. Currently, nearly 2 dozen seismological data centers offer access to their data via these services. Leveraging these uniform data access interfaces, a federated system that allows users to search for and access seismological data across all of the centers was developed. The catalog of federated data availability is offered openly via a web service interface designed to be easily integrated into data access tools. Cross-data center discovery and access has now been integrated into a number of data access tools, including command-line downloaders, web-based station browsers and data selection interfaces, MATLAB client and in Python (via the community-developed ObsPy framework). Users of these updated systems now see and have access to data at the DMC and other peer data centers without needing to learn new tools and without spending effort to search across multiple centers. This federated framework is well positioned to supply data directly to researchers in other domains and the public through brokering systems or other middleware. To this end, the DMC is participating in the National Science Foundation's EarthCube initiative to promote FAIR principles.

The IRIS DMC has been certified as a trusted repository by the ICSU World Data System (WDS).