

## Introduction

The ICSU World Data System (WDS) was created by the 29th General Assembly of the International Council for Science (ICSU). It builds on the 50-year legacy of the ICSU World Data Centre system (WDC) and the ICSU Federation of Astronomical and Geophysical data-analysis Services (FAGS). The WDS aims at a transition from existing stand-alone centres and individual services to a common globally interoperable distributed data system that incorporates emerging technologies and new scientific data activities. The new system will build on the potential offered by advanced interconnections between data management components for disciplinary and multidisciplinary applications.

WDS will enjoy a broader disciplinary and geographic base and will strive to become a world wide 'community of excellence' for scientific data. To this end, WDS will work closely with ICSU's Committee on Data for Science and Technology (CODATA) as well as other stakeholders. Through membership of the WDS, members will contribute to ICSU programmes and initiatives.

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## WDS Regular Members Application Form

The purpose of this application is to supply a transparent, objective base for the evaluation of WDS candidates for membership into the WDS system as well as for periodic assessment of WDS facilities and the overall performance of the WDS. The procedures supplied ensure the trustworthiness of WDS facilities in terms of authenticity, integrity, confidentiality and availability of data and services.

The certification procedure is essentially based on a catalogue of evaluation criteria. The procedure as applied to candidates and used for monitoring WDS members consists of this application, a demonstration of capabilities, and – if necessary - an on-site review. All steps involved are carried out by the World Data System Scientific Committee (WDS-SC), which functions as a certification authority (CA) with the help of the WDS International programme Office.

In principle, the goal is to have objective controls (criteria) against which data repositories and services can be evaluated. In some cases, questions can simply be answered as yes or no. In many cases, however, evaluation will be based on non-standardized information supplied by applicants indicating the degree of trustworthiness. In general, the information supplied for a specific criterion can be attributed to different levels of maturity: (0) not addressed, (1) conception phase, (2) implementation phase, (3) operational. The decision about what is a valid concept or which service can be seen as fully operational is in the responsibility of the WDS-SC, with input from other relevant experts as appropriate.

The catalogue of criteria comprises policies, the organizational framework, the management of data, metadata, and services, and the technical infrastructure. Depending on the type and level of the service supplied specified criteria and procedures may be mandatory, recommended, or optional, that is, the trustworthiness of a data repository or a service is related to its aims and specifications and hence the role(s) aimed at within the WDS.

The criteria and procedures have been defined incorporating existing standards and best practices from other organizations and projects. However, as this is a rapidly developing field and the scope of WDS comprises a number of special services (former FAGS) as well as new services like data publishing, the catalogue and procedures described cannot be seen as final. Instead, certification should be seen as an iterative process leading to stepwise improvements and reflecting the overall development. Therefore, applicants are encouraged to comment on the different parts of the questionnaire. Please, use the comment fields also in case you have questions and need support for specific criteria.

The application is structured into 7 sections with in total 29 questions or criteria to be addressed. The 17 criteria for membership of WDS are in sections III to VI, supplementary information is provided in sections I and II and feedback can be provided in section VII. The sections are:

- I. Identification information
- II. Role(s) and scope within WDS
- III. WDS general requirements and policies
- IV. Organizational framework
- V. Management of data, products and services
- VI. Technical infrastructure
- VII. Feedback from applicant

The application can be revisited as often as necessary. On the last page you will be requested to indicate the status of your application. A pdf version of the application can be downloaded at:

[http://www.icsu-wds.org/images/files/WDS\\_Application\\_Regular.pdf](http://www.icsu-wds.org/images/files/WDS_Application_Regular.pdf)

## WDS Regular Members Application Form

Please, have in mind to use the web interface for final submission of your application.

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## I. Identification information

### 1. Name of facility

### 2. Organisation & contact information

Name of contact:

Address 1:

Address 2:

City/Town:

State/Province:

ZIP/Postal Code:

Country:

Email Address:

Phone Number:

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## II. Role(s) and scope within WDS

The WDS is a global federated system of long term data archives and data related services covering a wide spectrum of natural and social sciences and encouraging interdisciplinary science approaches. The system is integrating various facilities with different scope. Facilities within WDS may cover single disciplines or may be multidisciplinary. Their scope of work should be national, regional and global. Roles or functions within the federated system comprise the complete data management chain from data production to publication.

Facilities may apply for single or multiple of the following roles:

- A. Data collection and processing (incl. QA/QC)
- B. Long-term data repository (data library, incl. open access to all data)
- C. Data publisher (incl. citability, usage of persistent identifiers, and peer review like procedures for data & data products)
- D. Community related service (e.g. data related service)
- E. General service (e.g. mapping, cataloguing, bibliography & bibliometrics, data dissemination)

### 3. Which role(s) do you apply for within WDS?

- A. Data collection and processing
- B. Long-term data repository
- C. Data publisher
- D. Community related service
- E. General service

Comment

### 4. What is the geographical coverage of service(s) supplied?

- National
- Regional
- Global
- Space

### 5. What is your current national or regional role?

## WDS Regular Members Application Form

**6. What is your current global role?**

**7. If you have been a member of the former ICSU System of World Data Centers (WDC), please, specify the name of the WDC.**

**8. If you have been a member of the Federation of Astronomical and Geophysical data-analysis Service (FAGS), please, specify the name of the service.**

**9. If you belong to any other global cluster or organisation (e.g. IGS, IODE, or IVOA), please, specify the name.**

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## 10. What is the scientific background of your facility?

- Astronomy
- Space sciences
- Earth sciences
- Life sciences
- Chemistry
- Physics
- Cultural and ethnic studies
- Economics
- Gender and sexuality studies
- Geography
- Political science
- Psychology
- Sociology
- Computer sciences
- Mathematics
- Statistics
- Systems science
- Agriculture
- Architecture and design
- Business
- Engineering
- Environmental studies and Forestry
- Family and consumer science
- Health sciences
- Transportation
- History
- Languages and linguistics
- Anthropology
- Archaeology
- Area studies

Please, name your specific field(s).

## III. General requirements

### 11. CRITERION: Signed Letter of Agreement, Intent to Cooperate or similar with ICSU

- A Letter of Agreement, Intent to Cooperate, or comparable agreement will be signed with ICSU.

Guidance:

The ICSU WDS constitution states that the facility must agree to a model consortium agreement, Letter of Agreement, or Intent to Cooperate with ICSU, or other comparable agreement. This will describe the commitment of the facility to the goals of ICSU WDS.

A template is supplied at: <http://www.icsu-wds.org/membership/join-icsu-wds/template-agreement>

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## III. General requirements

### 12. CRITERION: Have relevant external experts to provide advice and guidance to WDS node

Guidance:

Evidence of the arrangements in place for provision of external expert advice or guidance should be provided. This can vary in the degree of formality. For example, advice/guidance could be provided by one or two relevant experts in the appropriate field, perhaps by means of reviews of the reports every two years, or occasional visits of the experts to the facility. These could be members of the Scientific Unions, but this is not essential. For facilities that belong to thematic groupings (e.g. IODE or IVOA), those bodies could act as the external experts. For the former FAGS, each analysis service works under the general supervision of an Advisory Board which has been approved by the Scientific Union or Unions concerned. This arrangement can continue for WDS.

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## III. General requirements

### 13. CRITERION: Should attend WDS meetings every two years

- Representatives of the facility will attend biennial meetings

If you will not be able to attend meetings, please explain briefly why.

#### Guidance:

To be fully a part of the WDS, the facility must engage with other members, exchange expertise, review developments, etc, and the forum every two years is one important mechanism for this. In addition, participation indicates that the WDS member must have resources and funds available to support this.

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## III. General requirements

### 14. CRITERION: Promote active communication with research community and other users



**Guidance:**

The WDS facility should provide an indication of outreach and communication activities, for example, regular report of activities (annual or every two years), participation in conferences and exhibitions, production of promotional leaflets, flyers and articles/papers.

WDS-SC will provide a template for a report. This will cover, for example, a short summary of the remit and status of the WDS node; an overview of activities and developments; new data, products and services; key targets for upcoming year, any changes relating to the WDS criteria, key performance indicators.

The type of information provided to the research community and other users by the WDS facility could cover:

- Data products and services available
- Linkages with other organisations who use the data for generation of products and services
- Current projects aiming to increase and promote use of data and services supplied
- Statistics/metrics indicating usage of data and services
- Availability of an Enquiries or Help Desk
- Details of surveys of customer satisfaction undertaken
- Training courses

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## III. General requirements

**15. CRITERION: Provide full, open, timely, non-discriminatory and unrestricted access to metadata, data, products, and services, no cost or at the Cost of Fulfilling User Request (COFUR)**

- Our facility and services supplied comply with the ICSU WDS data policy (see guidance)

Please, if you comply with this policy supply a reference to a corresponding document or web address. If you will not be able to comply to the ICSU WDS data policy, please explain briefly why.

Guidance:

The WDS facility must provide data in accordance with the WDS data policy:

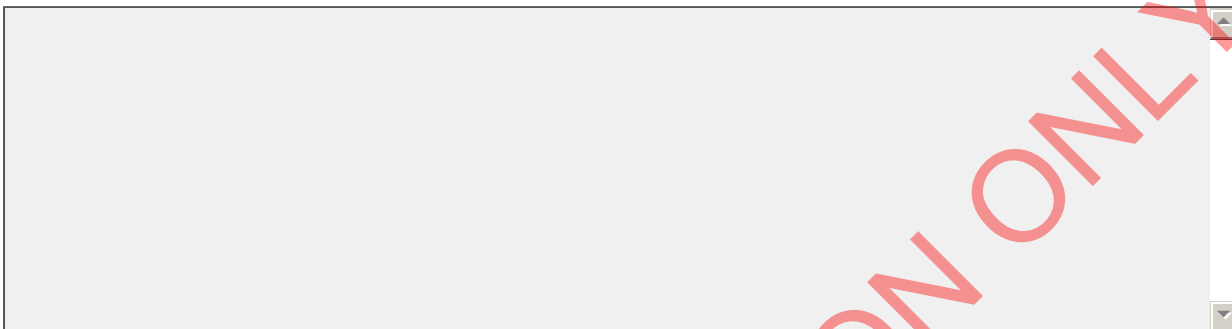
- There will be full and open exchange of data, metadata and products shared within WDS, recognizing relevant international instruments and national policies and legislation;
- All shared data, metadata and products will be made available with minimum time delay and at minimum cost;
- All shared data, metadata and products being free of charge or no more than cost of reproduction will be encouraged for research and education.

If a licensing scheme is in use, please provide details.

## IV. Organisational framework

### 16. CRITERION: The facility has defined:

- the scope of the data and/or product (services) it offers;
- its responsibility for the long-term preservation of its data, products and services;
- its target communities and their needs;
- the rights of its users to access and use data; and
- processes for responding to changing scientific requirements and to evolving technologies.



#### Guidance:

The WDS facility should provide evidence of its goals and objectives through a strategy document, mission statement, etc. and other supplementary documentation (for example, detailing data sets, products, services). These are often published in the form of a policy or contractual documents describing the commitments. This should also include a forward look.

It should also note if any of the goals are beyond the remit of this facility, and provide the reason for this (e.g. not appropriate for user community, real-time data service where the responsibility for the long term preservation of the original data lies elsewhere).

## IV. Organisational framework

**17. CRITERION: The organizational form is adequate for the facility in terms of:**

- **funding**
- **sufficient numbers of qualified staff**
- **organizational structure**
- **long-term planning**



Guidance:

In order to be certified, the WDS facility must provide evidence that it is hosted by a recognised institution (ensuring long-term stability and sustainability) appropriate to its user community. The facility must indicate that it has sufficient funding, including staff resources, IT resources and a budget for attending meetings. Ideally this should be for a 3 to 5 year period, and the information should be updated regularly. Evidence should also include a description of the range and length of expertise of both the organisation and its staff. Any appropriate affiliations (e.g. national or international bodies, etc.) should also be noted.

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## IV. Organisational framework

**18. CRITERION: Expertise of the host organization offers local oversight (scientists, data specialists) of international repute**

Guidance:

WDS facilities are hosted within other larger organisations, groups of organisations or consortia who can provide local oversight. WDS facilities should specify name(s) and expertise of host organization, describe its international reputation, affiliations, etc. This could be done by means of an existing document.

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**IV. Organisational framework**

**19. CRITERION: Maintenance of a continuity plan in the event of a host institution shift of interests or reaction to substantial changes**

Guidance:

The WDS facility should provide a long term stewardship plan indicating options for relocation or transition of the activity to another body in the event of a shift in interest of the host institution. These will be reviewed by the WDS-SC or other appropriate body to ensure an orderly transition.

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## IV. Organisational framework

**20. CRITERION: Facility is committed to formal, periodic review and assessment to ensure responsiveness to scientific and technological developments and evolving requirements**



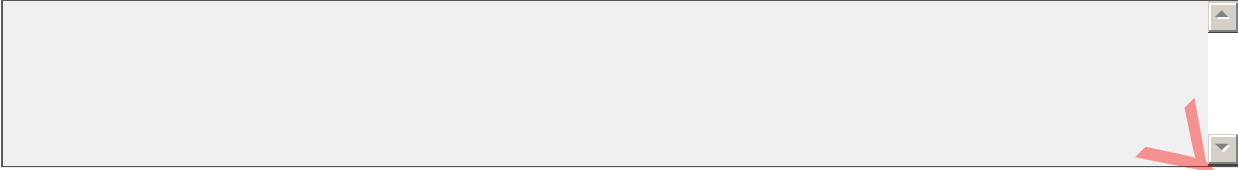
Guidance:

This will be met by the WDS facility providing a report every two years (question 13), including a forward look covering planned response to new scientific developments as well as new technological requirements. Certification through WDS-SC will be regularly reviewed (e.g. every 3-5 years) by the approved process.

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## V. Management of data, products, and services

**21. CRITERION: The facility ensures integrity and authenticity of data sets during ingest, archival storage, data quality assessment and analysis, product generation, access, and delivery**



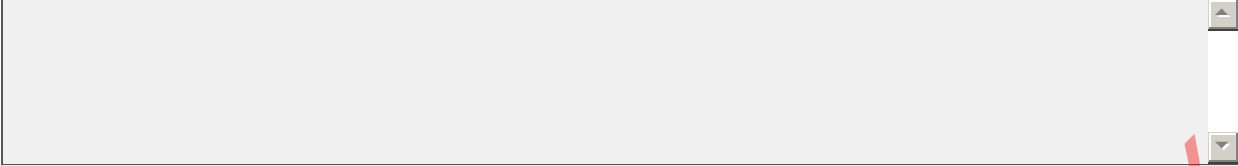
**Guidance:**

Evidence should be provided by the WDS facility to show that it operates a data management system suitable for preserving integrity and authenticity in the processes of ingest, archival storage, data quality assessment and data access. This is provided in particular by documentation of all changes to the objects, including metadata and usage of appropriate international standards and conventions which should be specified. Adequate metadata is necessary to ensure that there is no information loss (e.g. register of acquired data, contents, structure and technical description of data, version control, usage rights and conditions). Additionally and where appropriate, algorithms and model states must also be preserved.

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## V. Management of data, products, and services

### 22. CRITERION: The facility accepts data sets from its producers based on defined criteria for collection, selection, and evaluation



#### Guidance:

The WDS facility should provide evidence of its procedures for verification of completeness and correctness of data and metadata. This will include reference to quality control, standards and reporting mechanisms accepted by the relevant community of practice.

The WDS facility could provide summaries of any quality assurance processes and algorithms that are in place. This should not be a detailed description of how the algorithms work but a broad summary of the checks that are run and, for example, whether data are visually inspected. The summary should include details of how any issues are resolved (e.g. are they returned to the data provider for rectification, fixed by the data center, noted by quality flags in the data file and/or included in the accompanying metadata).

Details of any Quality Management System (QMS) or accreditation schemes implemented by the data center should be provided. Where data have been collected in line with nationally or internationally agreed standards this should be indicated.

Evidence should be provided, where appropriate, of procedures to maintain and validate provenance, quality and authenticity of data products. Where appropriate examples of data publication should be provided.

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## V. Management of data, products, and services

### 23. CRITERION: Archival storage of the data sets is undertaken to defined specifications

**Guidance:**

The WDS facility should provide its operating plan/procedure for the archival process including definition of the data sets (granularity, information type and structure), storage of the data sets, usage of unique persistent identifiers (e.g. DOI, URN, LSID) and implementation of long-term stewardship and preservation measures.

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## V. Management of data, products, and services

**24. CRITERION: The facility permits efficient usage of archived data sets, products and services based on defined criteria and preferably open standards (searchable, accessible, and usable objects and services)**



Guidance:

The WDS facility should provide evidence that it maintains a searchable metadata catalogue to appropriate (internationally agreed) standards, to ensure access to data, products and services. Because standards are evolving, this may require negotiation with WDS applicants.

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**VI. Technical infrastructure**

**25. CRITERION: Facility functions on well-supported operating systems and other core infrastructural software**


Guidance:

This covers the general system infrastructure requirements and evidence to be provided should cover the following: software inventory; system documentation; support contracts; use of strongly community supported software (e.g., Apache).

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## VI. Technical infrastructure

**26. CRITERION: Facility is using hardware and software technologies appropriate to the services it provides to its designated community(ies)**

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Guidance:

The WDS facility should provide evidence of:

- The procedures and arrangements in place to provide swift recovery or backup of their essential services in the event of an outage;
- For real-time to near-real-time data streams: the provision of around-the-clock connectivity to the public and private networks at a bandwidth that is sufficient to meet its global and/or regional responsibilities (24/7 & bandwidth);
- Interoperability according to international and/or community standards (e.g. Spatial Data Infrastructure (SDI) standards, OGC, W3C, ISO 19115, WMO Core Metadata Profile, ISO 23950 or OAI-PMH search, geospatial services, IVOA standards). This will need regular review because standards evolve and change.

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## VI. Technical infrastructure

### 27. CRITERION: Security: Technical infrastructure for protection of the facility and its data, products, services, and users



#### Guidance:

WDS facilities should have a security policy describing how the data, products and services are protected from both malicious and accidental loss. System-based hazards could arise for example due to hardware problems or the failure of individual storage media. Externally the facility's first priority must be to protect against natural threats (e.g. fire, water, seismic activity) and also against risks caused by humans. The objects can be harmed directly by employees or through harmful programs smuggled into the system (e.g. viruses). Note that the security policy should exist but should not be made public as it potentially exposes vulnerabilities.

Ideally, a policy should include the following:

- How the holdings are physically protected (e.g. how access to the building is controlled, how secure the building is, who has access)
- Access to the network (if the holdings are accessible from the network) – what is the access policy, how is user access limited and by whom, whether there is an internet link and details of how the firewall is configured and altered, how machines are patched, which users can log on to particular machines, policy on passwords (e.g. how often they are changed and how secure they need to be)
- Policy when staff leave organisation
- Database policy – how users are established, what rights they have, how often administrator passwords are changed, what control is there over allowable passwords
- How the data holdings are backed up – how often, where are the backups stored and how long for, how protected are the backups (e.g. fire proof safe, stored securely off site, who has access).



## VII. Feedback from applicant

**28. Please, indicate the status of your application.**

- Draft version
- Draft version - feedback needed
- Final version

**29. The WDS certification procedure is not seen as final. We need your input for further improvements. Therefore, let us know your opinion about the quality of this questionnaire and the relevance for your facility. In addition to the scale you are encouraged to leave corresponding comments.**

	*	**	***	****	*****
Ranking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments

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