ECMWF Copernicus Procurement

Invitation to Tender



Copernicus Climate Change Service Volume II

Evaluation and Quality Control Framework for the Sectoral Information Systems

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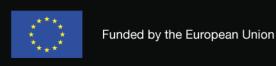




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1 Introduction

ECMWF as the Entrusted Entity for the Copernicus Climate Change Service (C3S) invites tenders for implementation of the Evaluation and Quality Control (EQC) framework for the Sectoral Information Systems (SISs). The successful Tenderer shall be responsible for:

- Designing a mechanism to provide quality assurance information to the users of the SISs;
- Defining and implementing a process for accepting workflows and applications (e.g. demonstrators) into the Climate Data Store (CDS) catalogue;
- Implementing such a system and maintaining it operationally;
- Keeping a database of user requirements updated;
- Providing an analysis of user requirements related to SIS workflows, applications and products.

The work to be done will rely on outputs from several existing C3S contracts, as indicated in Section 2. The scope of activities and detailed requirements for this tender are described in Section 3 of this document.

The purpose of the EQC function in C3S is to independently assess the quality of all C3S products and services, and to ensure that users have the information they need in order to use the products and services for their own purposes. The EQC function also keeps track of user requirements, and informs ECMWF, its providers, and the European Commission about gaps, limitations and shortcomings in products and service delivery. C3S users include scientists, consultants, planners and policy makers, the media and the general public.

The successful Tenderer will identify the methodologies to assess the quality of both technical and delivery components of the services developed by the SIS contracts including their ability to engage with the target users and provide value to them.

The successful Tenderer will design the routines and the reporting procedures that each SIS team will have to follow to inform ECMWF, the European Commission, and the users themselves about the quality, the usefulness, usability and uptake of their proof of concept products.

Specific objectives and technical requirements are described in Section 3 of this document. General performance requirements are presented in Section 4. Information about the tender format and content is in Section 5, and Section 6 contains a list of acronyms and definitions.

A separate invitation to tender has been issued for implementation of the EQC function for the C3S Climate Data Store (CDS).

2 Background information for this tender and definitions

2.1 The C3S Climate Data Store

The backbone of the C3S is a distributed cloud-based Climate Data Store (CDS) that provides users with a single point of access to quality-assured climate data and information. The datasets may be physically located at various data centres around the world, or they may be distributed in the cloud, but this is transparent to users of the CDS. All data are open and free to access, and can be used by anyone for any purpose. To facilitate the transformation of data into tailored information products, the CDS features a toolbox for creating workflows and applications on-line. All CDS data and tools are accessible from the C3S website as well as via open Application Programming Interfaces (APIs). The first public release of the CDS will be launched shortly.

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Figure 1 shows a conceptual representation of the CDS. This <u>link</u>¹ provides a description of the main elements of the CDS infrastructure and details on its functionality and design.

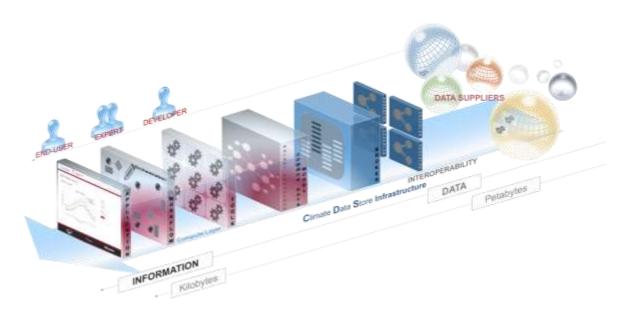


Figure 1: The Climate Data Store infrastructure and toolbox

CDS CATALOGUE. The CDS provides access to climate datasets via a searchable catalogue. Categories of data include: Climate Data Records (CDRs) and Interim Climate Data Records (ICDRs), quality-controlled archives of in-situ climate observations, reprocessed satellite data records, data from climate reanalyses, seasonal forecast data, output from climate model simulations, and a variety of derived climate impact indicators. Alongside the datasets, the CDS catalogue also contains tools and services designed to address the needs of specific users.

CDS TOOLBOX. The CDS Toolbox provides users with the ability to create interactive web applications tailored to their needs using CDS datasets. The Toolbox contains a variety of software tools for combining CDS datasets and performing basic operations on the data, including functions for interpolation and re-gridding, simple statistical calculations, visualisation, text manipulation, etc. The Toolbox is designed to be extendable. The Toolbox uses a Common Data Model to represent different types of datasets available in the CDS catalogue. This allows data and tools to be combined into workflows that can be executed on-line. A Toolbox Editor is available to parametrise workflows using widgets to create interactive web applications on the CDS.

SECTORAL INFORMATION SYSTEM (SIS)

The development of a set of interactive web applications built using the CDS tools and datasets to meet the requirement of the target users is one of the main purposes of the SIS contracts.

One of the main requirements for this contract is to define and implement the criteria for the inclusion of a specific workflow and associated tools into the CDS catalogue.

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¹ https://www.ecmwf.int/sites/default/files/elibrary/2017/17181-newsletter-no-151-spring-2017.pdf

2.2 Current EQC activities

Three contracts have been issued in Q3 of 2016 to prepare some elements of the EQC function for the CDS. Key deliverables and timelines for these contracts are summarised in Table 1. Each contract addresses a specific category of data products, and explores for each category the user requirements and possible solutions for addressing them. A fourth contract was issued in Q4 of 2017 to deliver quality assessments for ECV products during the operational phase of C3S starting in 2018. Relevant deliverables will be shared with the successful Tenderer at the start of the contract.

	Title	Start	End	Key deliverables
C3S_51 Lot 2	Quality Assurance for ECV Products Derived from Observations	01/10/16	31/12/18	 User requirements for climate data Inventories of existing climate datasets Scientific assessments and gap analysis for a selection of datasets Recommendations for further development of the CDS Recommendations for further development of the EQC function
C3S_51 Lot 3	Quality Assurance for Multi-Model Seasonal Forecast Products	01/07/16	30/09/18	
C3S_51 Lot 4	Quality Assurance for Multi-Model Climate Projections	01/08/16	31/10/18	
C3S_511	Quality Assessment of ECV Products	01/11/17	30/06/21	 Quality assessments for individual ECV products (appr. 100 datasets) Multi-product assessments for each ECV (appr. 39 ECVs) Thematic assessments for sets of related ECVs (appr. 6 themes)

Table 1: Relevant C3S contracts for EQC implementation and their key deliverables

CONTENT MANAGEMENT SYSTEM FOR QUALITY ASSURANCE TEMPLATES. Gathering, checking and updating the information needed to populate the quality assurance templates with accurate and useful content is a complex process that involves multiple parties, including data providers, CDS data managers, and other EQC actors who carry out data quality checks on behalf of C3S.

In order to support such a process, a dedicated Content Management System for quality assurance templates is being developed under the C3S_51 Lot 2 contract. The system will support content generation by multiple parties and will feature the tools needed to publish quality assurance templates on the CDS. The system will be designed to accommodate multiple types of quality assurance templates (see Figure 2 for an example) for different categories of data products. A first version, capable of handling quality assurance for ECV products derived from observations, is to be delivered in the first half of 2018 and will be shared with the successful Tenderer.

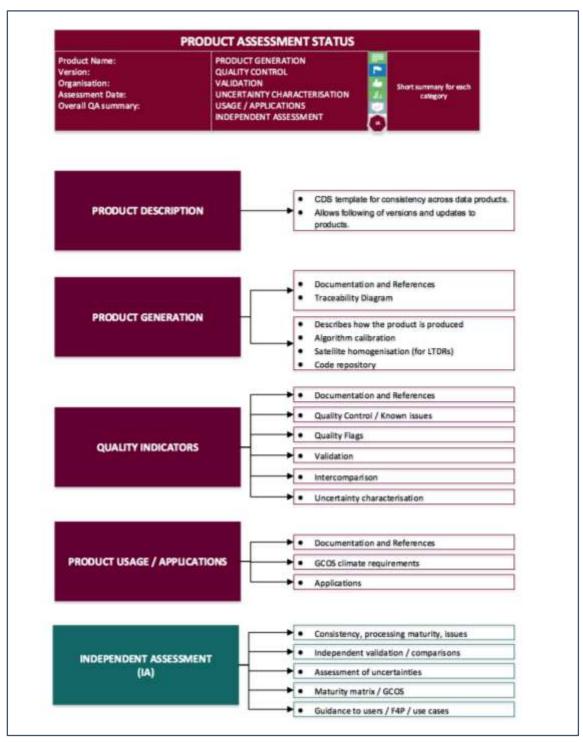


Figure 2: A quality assurance template for ECV products derived from satellite observations

Alongside the abovementioned contracts C3S also contracted a dedicated activity to learn about users requirements within specific sectoral context. This work, led by University of Reading, collected such requirements and organised them into a User Requirement Data Base, addressing a number of economic sectors. This is a document designed to collect user requirements in a structured and traceable way. The document will be shared with the successful Tenderer at the start of the contract.

3 Technical requirements

3.1 Evaluation and quality control for SIS and workflows

3.1.1 Scope of service

There are three primary objectives of the SIS services:

- 1) To provide practical examples on how the Climate Data Store infrastructure could be used for sectoral applications. This among other things means:
 - a. developing and maintaining workflows-based applications to address user-specific requirements;
 - b. generate, maintain and keep up to date, a user-relevant set of climate impact indicators;
 - c. providing services which respond to the operational requirements of the users (timeliness, accuracy, documentation, etc.).
- 2) To engage with sectoral users to understand their requirements, document them and whenever possible address them.
- 3) To build using state-of-the-art approaches so that the services being developed could act as benchmarks as well as examples that other developers could follow.

The EQC function for the SIS will thus ensure that all the services available through the CDS will be compliant with these three top level objectives. One of the primary goals of the EQC function will be to define the quality criteria and establish the associated operational procedure to decide whether a specific workflow - irrespectively of who produces it - could or not be included into the public list of workflows that will appear on the CDS catalogues. The user-interfaces developed within the SIS contracts should be seen as a special category of a broader set of applications. During the operational phase it is expected in fact that a large number of applications will be developed by external users on the CDS. The developers of some of these applications could, in some cases, be interested in publishing them on the CDS. One of the objectives of this contract is to define the standard for this "publication" process and implement it so that it can be run operationally by ECMWF and their contractors.

In defining the exact details of the standard, the successful Tenderer is required to build upon the results of other EQC contracts as well as other good practice such as, for example, the maturity matrix developed within ESA-CCI and Core-Climax initiatives (http://cci.esa.int/sites/default/files/content/docs/Holzer-Popp maturity matrix 022014.pdf).

The operational SIS contracts will effectively bridge the gap that exists between the climate data available on the Climate Data Store and its use by downstream users within sector-specific applications. In that sense an important quality measure must be linked to the correct identification of sectoral-specific requirements and the ability to document them effectively.

The second function of the SIS contracts is to demonstrate how the data contained on the CDS can be transformed to address users' needs using the CDS technology (e.g. toolbox functions, workflow, map engines). In that sense it is important the EQC function considers the technical implementation of the services and assess how traceable, well documented and reproducible the procedures used really are.

Finally, given that the SIS contracts need to represent a set of examples of good practice, it is essential for the EQC to monitor and guarantee the solutions proposed represent the state of the art in the respective fields. This could - for example - include checks to control how well the proposed services link to the most recent literature or practice in the field.

The successful Tenderer shall develop a common Evaluation and Quality Control framework able to operate seamlessly across sectors, time-scales, data-supplies and standards. The approach shall be

sufficiently generic so that it can be applied almost irrespectively of the sector or the data-stream under consideration.

Such a framework shall include both the identification of a common set of minimum requirements as well as a definition of a series of procedures aimed at safeguarding the quality and the user-relevance of the services C3S will deliver during the operational phase.

3.1.2 Specification of work

Workpackage 1: Review of the methods and standards currently in use to guarantee the fitness-forpurpose, user relevance and, more generally, the quality of services (including the software and datasets that underpin them).

Whilst ECMWF does expect this review to be mainly focused around climate data and services, we would expect the Tenderer to look further afield to see whether the procedures in use in other communities can be ported to Copernicus. As a minimum the successful Tenderer should consider mechanisms for ensuring quality in relation to the following aspects:

- Consistency between the expected and the actual outputs of a workflow (and associated service).
- Technical quality of the workflow and review mechanism.
- Alignment between the methodologies adopted in the workflow (and associated service) and the good practice in the field. This could include - but should not be limited to - links to peer reviewed publications.
- Traceability of user requirements.
- Easy access to high quality documentation.
- Use of robust methodology for independent validation/verification of the results.
- Comparison with other datasets for verification/validation purposes.
- Adherence to ECMWF/C3S/Copernicus or EC specific quality standards or review procedure.

It is expected that this WP will largely be based on what the successful Tenderer has written in the bid. For this reason, the main deliverables for this workpackage are expected within a maximum of 2 months from the signature of the contract.

Deliverables expected:

- A concise report summarising the main characteristics (including pros and cons) of the different approaches analysed.
- A short document detailing the main principles and the implementation strategy the contractors are expected to follow.

Workpackage 2: Development of the framework

As part of this WP, the successful Tenderer will develop all the components detailed in the strategy document described in the document delivered in WP 1. Given the speed at which the whole programme is being implemented the framework should be developed in a hierarchical way establishing first the main guiding principles - so that they can be used even in the absence of detailed implementation plans - and then detailing how the principles should be implemented in practice.

Deliverables expected:

A framework to be applied to both the existing and the future SIS services as well as to those
workflows developed by external users which would want to become visible into the CDS. Such a
framework should include information about all mains goals of SIS (i.e. build upon CDS
infrastructure, be a reference of good practice, engage with user and document their
requirements) as well as establishing criteria for the acceptance of new datasets and services.

Workpackage 3: Implementation of the framework

In order to maintain an operational EQC function for the SIS - and more generally for all the CDS workflows that will be made available through the CDS - the successful Tenderer shall implement a series of functions and ensure their smooth running during the operational phase. Such functions shall be designed to ensure that any publicly available workflow - as for example the SIS demonstrators (e.g. ecem.climate.copernicus.eu, swicca.eu, or edge.climate.copernicus.eu) - is compliant with the top-level objective of the SIS function (i.e. developing dataset and tools linked to well-documented user-requirement, following good practice & state-of-the art approaches and building upon the CDS infrastructure).

In developing such functions, the tenderer shall consider the long-term sustainability of the service. In that sense, expensive review processes should be discounted unless absolutely necessary. Irrespective of the specific approach, the Tenderer shall identify suitable procedures to ensure the workflow code is written to a high standard, is well documented and generates the outputs it is supposed to deliver.

In order to appropriately cost the bid, the Tenderer could assume that:

- The SIS function expects to make upwards of 100 workflows available on the CDS between now and the end of 2020.
- The complexity of these workflows (both in terms of post-processing procedures and user-interactions) is expected to be non-dissimilar from those developed in the Sectoral Information System Proof of Concept contracts.
- Alongside the workflows funded by C3S it is anticipated there will be a similar number of workflows developed as part of H2020 or Era4CS (http://www.jpi-climate.eu/ERA4CS) projects as well.

As for the previous WP, given the speed at which the service is being implemented the contractor should design an implementation able to rapidly deliver basic EQC functions whilst at the same time allowing for a more gradual increase in the functionalities.

Deliverables expected:

- A set of operational procedures designed to ensure the quality of any publicly available workflow
 and its outputs. This shall be designed and documented so that they can be run operationally by
 third parties without the need for the contractor to be involved. This should also include guidelines
 on the availability of documentation and training material.
- A set of procedures to monitor the operational delivery of the user-critical dataset and an associated set of thresholds that can be used for KPI (e.g. seasonal predictions of impact variable available to users before the 12th of the month).
- A short document targeted at CDS developers and experts (including the SIS contractors) summarising the main quality principles that underpin the functions the contractor will deliver.
- A series of workshops or engagement activities to ensure the basic quality principles (in a first phase) and the operational procedures (at a later stage) are properly understood by the CDS developers and experts (including the SIS contractors).

Workpackage 4: User requirements database

A user requirement contract ECMWF had with University of Reading developed in MS Excel a draft version of the User Requirements Database (URDB) which contains some 1000 requirements collected during user-interaction by C3S contracts, for a number of economic sectors. URDB content is expected to evolve and grow rapidly as a result of an increasing number of user interactions during the

operational phase of C3S. Such interactions will include staged events by C3S (ECMWF and contractors) such as dedicated user workshops and other types of outreach events. User requirement gathering will also take place as part of the C3S user support function, since the interaction between a user support agent and a user offers a unique opportunity for in-depth discussion of a user's needs and requirements within a specific product area.

The successful Tenderer shall:

- take responsibility for managing the URDB;
- implement software tools required for its operational implementation;
- support the collection of user requirements for the whole C3S programme (either directly by the successful Tenderer as part of its work or by other C3S contractors);
- input user requirements into the database, and facilitate input by other actors authorized by ECMWF;
- maintain the URDB as a living database with continuous access by ECMWF;
- issue a consolidated version of the database on an annual basis.

Deliverables expected:

- An operational URDB and associated tools to enable effective interaction with other functions of the programme such as the User Support, the SIS and the Climate Data Store Teams.
- Operational management of the URDB and associated tools, including collection, merging and filtering of requirements.
- Quarterly reports containing URDB summary statistics.
- Annual releases of the URDB and associated software and documentation.

Workpackage 5: User requirement analysis document (SIS component)

Starting from the URDB developed in WP 4, the successful Tenderer shall perform an annual analysis of user requirements, filter, cluster and merge them as appropriate before assessing the feasibility and cost of implementing a suitable measure for responding to such requirements.

All of this will become part of a document (the User Requirement Analysis Document) that will be shared with ECMWF on a regular basis for allowing a prioritisation of the responses.

Deliverables expected:

A yearly issue of the URAD analysis elements for the SIS/workflow function.

Workpackage 6: User engagement activity

In order to ensure the user relevance of all the products and services made available by C3S (including the demonstrators and the workflow editor environment) and their fitness for purpose, the successful Tenderer shall organise a series of user consultations and workshops. This will be at the same time an opportunity to present what has been done so far and gather new requirements and feedback. In the organisation of such events, the contractor is expected to work in close coordination with the ECMWF Copernicus Communication team and contractors covering outreach and dissemination activities organised by C3S. The tenderer shall plan at least one user consultation for each of the sectors mentioned in the delegation agreement (i.e. energy, water, agriculture & forestry, health, transport, costal-areas, tourism, insurance, infrastructure and disaster risk reduction) and shall, as much as possible, extend the user base beyond those organisations the SIS contracts have already engaged with (cf. climate.copernicus.eu/sectoral-information-system). Also for this reason, it is expected that these events will take place in different locations all over Europe. An initial proposal of potential

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locations shall be specified in the bid as a base for further discussions during negotiations with the successful Tenderer.

Deliverables expected:

- At least 10 user consultation events (one per sector in the delegation agreement) over the term of the contract.
- A summary report for each event.

Workpackage 0: Management and Coordination

WPO covers the contractual management and overall technical coordination. It shall include planning and tracking of tasks and resources, communication and reporting towards ECMWF, subcontractor management (if relevant), quality assurance of contractual outputs, development and tracking of KPIs and targets, risk management and mitigation actions, etc.

Specifications on the contract schedule, meetings and KPIs are explained in Section 4.

As part of the general contract management description, the Tenderer shall include the following elements in line with the reporting and planning requirements as laid down in the Terms and Conditions of the Framework Agreement. The table below provides the template to be used by the successful Tenderer to describe the complete list of deliverables, milestones and schedules for WPO (cf. template in Volume IIIB Section 5.5). All milestones and deliverables shall be numbered as indicated and document deliverables shall be periodically updated and versioned as described in the table.

Deliverables for this work package shall include the following reports:

WP0 Contractual	WPO Contractual Obligations Template				
#	Responsible	Nature	Title	Due	
D0.y.z-YYYYQQ	Tenderer	Report	Quarterly Implementation Report QQ YYYY QQ YYYY being the previous quarter	Quarterly on 15/01, 15/04, 15/07 and 15/10	
D0.y.z-YYYY	Tenderer	Report	Annual Implementation Report YYYY YYYY being the Year n-1	Annually on 28/02	
D0.y.z	Tenderer	Report	Final report	60 days after end of contract	
D0.y.z-YYYY	Tenderer	Other	Preliminary financial information YYYY YYYY being the Year n-1	Annually on 15/01	
D0.y.z-YYYY	Tenderer	Report	Draft Implementation plan YYYY YYYY being the Year n+1	60 days after signing of contract for Year N+1	
				Annually on 28/02	
D0.y.z-YYYY	Tenderer	Report	Finalised Implementation plan YYYY YYYY being the Year n+1	Annually on 31/10	
D0.y.z-YYYY	Tenderer	Other	Copy of prime contractor's general financial statements and audit report YYYY YYYY being the Year n-1	Annually	
D0.y.z-YYYY	Tenderer	Other	Letter from auditor specific to contract YYYY YYYY being the Year n-1	Annually	

Tenderers shall provide preliminary versions of the completed tables as part of their bid.

3.1.3 Schedule

Activities shall be performed in the context of a multi-annual Framework Agreement (maximum 34 months and with an end date not later than 30 June 2021). The kick-off (KO) of the first service contract is expected to take place in September 2018.

Tenderers shall provide a schedule for milestones and deliverables consistent with the use of 12-month service contracts.

4 General Requirements

4.1 Schedule

The Tenderer is expected to provide a detailed time plan and schedule as part of the tender response. The proposed time plan and schedule shall address the main tasks, inputs, outputs, intermediate review steps, milestones, deliverables and dates.

4.2 Meetings

ECMWF will organise General Assembly meetings every 18 months to bring together all C3S service providers. Two GA meetings are expected to be planned during the course of the Framework Agreement and the successful Tenderer is expected to attend these meetings. The successful Tenderer is also expected to attend monthly teleconference meetings to discuss C3S service provision, service evolution and other topics that cut across different aspects of C3S, and six-monthly review meetings to assess the contract performance, risks and further actions linked to payment milestones.

The cost of attending meetings shall be covered by each successful Tenderer and shall be included in the tendered price. The cost of organising and attending any additional meetings shall also be covered by each successful Tenderer and shall be included in the tendered price.

4.3 Deliverables

Expected top level deliverables are outlined in Section 3. These can be in the form of documents or reports, data sets or databases, services and user support. Requirements for each type are described in the following subsections.

4.3.1 Documents and reports

All project reports shall be produced in English. The quality of reports and deliverables shall be equivalent to the standard of peer-reviewed publications and practice. Unless otherwise specified in the specific contract, deliverables shall be made available to ECMWF in electronic format (PDF/Microsoft Word/Microsoft Excel or compatible).

4.3.2 Data sets

It is expected that data sets (including databases) generated or acquired by the successful Tenderer will be delivered via the Climate Data Store. The section below indicates generic requirements for these datasets in terms of standards and conformity.

Provision of data and products: Suppliers will make the output of their work available to C3S users via the CDS, by one of two methods:

- (a) uploading their data and products to a designated server,
- (b) providing them via web services.

In the case of (a), suppliers will have to agree with ECMWF on the data formats to be used. ECMWF will only accept data in formats that follow internationally recognised standards. Such standards must be open (i.e. non-proprietary), managed by a recognised international standardisation body (e.g. ISO, WMO, OGC, etc.), or any de-facto standard. Open source software should also exist that can read and write files of these standards. Serialisation formats (e.g. NetCDF, XML, JSON) should be supported by standard schemas and conventions. All text-based formats should be encoded in UTF-8. ECMWF will implement tools to check the compliance of the provided data and products to the agreed standards before they are added to the CDS.

Examples of case (a) are data uploaded to the CDS in WMO GRIB edition 1 and 2, NetCDF files conforming to CF-1.6, or greater.

In the case of (b), suppliers will have to agree with ECMWF on the protocols to be used to invoke the web services. ECMWF will only accept protocols that follow internationally recognised standards. Such standards must be open (i.e. non-proprietary), managed by a recognised international standardisation process (e.g. ISO, WMO, OGC, etc), or be a de-facto standard such as OpenDAP. ECMWF will consider using bespoke web-based APIs to access the data and products if they implement very simple protocols (e.g. REST), as long as the results returned by these APIs are compatible with (a). It should be noted that requests for these web services will mostly originate from the Climate Data Store itself, as part of a workflow run on behalf of an end-user; ECMWF will therefore need to have the necessary credentials to invoke these services. ECMWF will not provide information on the end user's identity when invoking the web services. ECMWF will nevertheless collect usage statistics for all aspects of C3S.

Examples of case (b) are OGC standards (WMS, WCF, WFS, etc), OpenDAP, etc. Other protocols could be considered as the system evolves.

Every dataset and/or service provided shall be documented using the appropriate metadata standards (e.g. ISO 19115).

Provision of processing capabilities: Suppliers will (when appropriate) implement specific web-service-based data manipulation facilities. These will make it possible to run some agreed reduction and/or analysis algorithms directly on the data and products located on the suppliers' systems, and to return the results of said algorithms.

As for data retrievals, invocation of these web services will originate from the Climate Data Store itself as part of a workflow run on behalf of an end user, and ECMWF will need to have the necessary enduser credentials to invoke these services. ECMWF will not provide information on the end user's identity when invoking the web services. ECMWF will nevertheless collect usage statistics.

ECMWF will ensure that these services are invoked in a controlled fashion, to prevent any misuse of the system. This web services will be implemented with OGC's WPS standards or will be based on simple web-based REST API or equivalent. The results returned by these services will have to be in formats compatible with options (a) or (b) described above.

Data and IPR: It is a condition of EU funding for C3S that ownership of any datasets developed with C3S funding passes from the suppliers to the EC, via ECMWF. Ownership will pass on delivery of the datasets. In return, the suppliers will be granted a non-exclusive licence to use the datasets which they have provided to C3S for any purpose except one which conflicts with the aims of C3S.

All software and products used by the successful Tenderer to produce the C3S datasets will remain the property of the successful Tenderer, except for those components which are acquired or created specifically for C3S purposes, with C3S funding, and which are separable and useable in isolation from the rest of the successful Tenderers' production system. The identity and ownership of such exceptional components will be passed to the EC via ECMWF annually, but in return the successful Tenderer will be granted a non-exclusive licence to use them for any purpose except one which conflicts with the aims of C3S.

Deliverables acquired by the supplier and distributed to ECMWF will have to come under a license that allows permanent and unrestricted re-distribution of such Deliverables (particularly datasets) through the CDS by ECMWF on behalf of the EU. In particular, the current Copernicus License permits access to all products contained in the CDS 'for the purpose of the following use in so far as it is lawful: reproduction; distribution; communication to the public; adaptation, modification and combination with other data and information; or any combination of the foregoing.' This may involve any form of commercial use. The supplier will also be required to provide a license that meets such criteria and can be published in the CDS alongside each dataset to which it applies.

Detailed contractual terms, including terms to give effect to the arrangements described above, are set out in the terms and conditions for this ITT (Volume V of the ITT documents).

4.3.3 Web services

Web services and/or portals developed under contract with C3S shall be fully integrated in the C3S web portal following the guidance provided in the table below.

Activity	Guidance
Design	The existing templates and styles for the main service website
Design	· · · · · · · · · · · · · · · · · · ·
	(http://climate.copernicus.eu) must be used. The ECMWF Copernicus web officer
	will provide these on request.
Domain	Off-platform sites must be registered as a sub sub-domain of the main C3S sites
	(http://project.climate.copernicus.eu).
	The name will be agreed with the Copernicus web officer and registered by the
	European Commission once approved.
User journey	The user journey must start on the main C3S website for via a dedicated landing
	page for the project. The sub sub-domain URL should point to this page.
Content	All corporate and 'About us' project content will be published on the main service
	website and not duplicated on the microsite.
Navigation	A home button should take users to the main websites' homepage.
Logos	Supplier logos should not appear on the microsites. There will be a page on the
	service main website that reflects the contribution of suppliers.
Reporting	We require monthly Google Analytics reports for the microsites. These should
	include at minimum:
	• Visits
	Unique visits
	Bounce rate
	Traffic source
	Document downloads
	There should be an accompanying short explanation of the trends shown by the
	data.

4.3.4 User support

ECMWF has established a centralised Service Desk to provide multi-tiered technical support to all users of C3S data, products, tools and services. The C3S Service Desk is used for ticketing user requests and distributing these requests to specialists as needed. Dedicated staff at ECMWF provide basic support in the form of self-help facilities (FAQs, knowledge bases, tutorials etc.) as well as individualised support on technical queries related to the CDS, data formats, data access etc. In

addition, ECMWF staff will provide specialised scientific support to address questions related to its industrial contributions to C3S, e.g. in the areas of global reanalysis and seasonal forecasting.

All C3S contractors are expected to contribute to the delivery of multi-tiered technical support for the data and/or services they provide. Such specialised user support shall take the form of direct response to individual user queries via the C3S Service Desk facility, as well as contributions to FAQs, user guides and knowledge bases.

As part of the bid, Tenderers shall describe the level of user support service on C3S Service Desk tickets (for example, 90% of Tier-2 requests answered within 5 working days), with sufficient flexibility to be improved depending on user requirements. Tenderers shall also address development of user guides and any other form of user support, such as video tutorials, user workshops, etc.

4.4 Key Performance Indicators

The service shall be delivered in iterative cycles on an annual basis. At the end of each year, a service readiness review shall take place that will include assessment of a set of Key Performance Indicators (KPIs). The KPIs shall be designed to quantify different aspects of quality of service against the requirements described in this document.

As part of the bid, the Tenderer shall specify a proposed set of KPIs appropriate for the service, e.g. relating to data access, user support, user satisfaction, etc. These initial specifications shall be refined together with ECMWF during the first 6 months of the contract.

5 Tender Format and Content

General guidelines for the tender are described in Volume IIIB. Specific requirements to prepare the proposal for this particular tender are described in the next sub-sections.

5.1 Page Limits

As a guideline, it is expected that individual sections of the Tenderer's response do not exceed the page limits listed below. These are advisory limits and should be followed wherever possible, to avoid excessive or wordy responses.

Section	Page Limit
Executive Summary	2
Track Record	2 (for general) and 2 (per entity)
Quality of resources to be	2 (excluding Table 1 in Volume IIIB and CVs with a maximum
Deployed	length of 2 pages each)
Technical Solution Proposed	30 (Table 2 in Volume IIIB, the section on references, publications,
	patents and any pre-existing IPR is excluded from the page limit
	and has no page limit)
Management and	10 (excluding Table 3, Table 5 and Table 6 in Volume IIIB) + 2 per
Implementation	each Work package description (Table 4 in Volume IIIB)
Pricing Table	No limitation

Table 2: Page limits

5.2 Specific additional instructions for the tenderer's response

The following is a guide to the minimum content expected to be included in each section, additional to the content described in the general guidelines of Volume IIIB. This is not an exhaustive description and additional information may be necessary depending on the Tenderer's response.

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5.2.1 Executive Summary

The Tenderer shall provide an executive summary of the proposal, describing the objectives, team and service level.

5.2.2 Track Record

The Tenderer shall demonstrate for itself and for any proposed subcontractors that they have experience with relevant projects in the public or private sector at national or international level. ECMWF may ask for evidence of performance in the form of certificates issued or countersigned by the competent authority.

5.2.3 Quality of Resources to be Deployed

The Tenderer shall propose a team providing the skills required for providing operational services that meet the technical requirements set out in Section 3. The team shall include a Service Manager with at least 5 years of experience in management of large-scale projects. The Tenderer shall describe the experience of the Service Manager and of the technical project team in performing activities related to the various aspects of this tender.

5.2.4 Technical Solution Proposed

The Tenderer shall give a short background to the proposed solution to demonstrate understanding of that solution and of the C3S context. This section shall also include information on any other third-party suppliers that are used as part of the technical solution, and a statement of compliance for each requirement formulated throughout this document, describing how the proposed solution maps to the requirements.

5.2.5 Management and Implementation

The Tenderer shall provide a detailed implementation plan of proposed activities for the duration of the Framework Agreement. Deliverables should be consistent with the technical requirements specified in Section 3. The number of milestones is not restricted, but they should be designed as markers of demonstrable progress in service development and/or quality of service delivery. Adjustments to the proposed implementation plan can be made on an annual basis depending on needs for service evolution, changed user requirements, or other requirements as agreed between the European Commission and ECMWF.

As part of the general project management description the Tenderer shall provide a list of sub-contractors describing their contribution and key personnel, legal name and address. The Tenderer shall describe how the Framework Agreement, in particular Clause 2.9 has been flowed down to all their sub-contractors.

6 Additional information

6.1 Definitions

Service Level: measure of the performance of the delivery of a C3S data or value-added product. Certain goals are defined and the Service Level gives the percentage to which those goals should be achieved.

User Requirements Database (URDB): database to collect user requirements in a structured and traceable way.

User Requirement Analysis Document (URAD): document to capture the stratification of user requirements per domain, importance and feasibility.

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Service Evolution Strategy (SES): proposed longer term (typically 4 years) perspective for forthcoming service upgrades and extensions, the expected benefits and costs, together with recommendations for potential research needs outside Copernicus operations.

6.2 Acronyms

API Application Programming Interface
C3S Copernicus Climate Change Service

ECMWF European Centre for Medium-Range Weather Forecasts

ECV Essential Climate Variable

EU European Union

FAQ Frequently Asked Questions

GRIB General Regularly-distributed Information in Binary form

ISO International Organization for Standardization

ITT Invitation to Tender

JSON JavaScript Object Notation
KPI Key Performance Indicator
NetCDF Network Common Data Form
OGC Open Geospatial Consortium

OpenDAP Open Source Project for a Network Data Access Protocol

PDF Portable Document Format

UTF-8 Unicode Transformation Format using 8-bit blocks

WCF Windows Communication Foundation
WMO World Meteorological Organisation
REST Representational State Transfer
XML Extensible Markup Language