

Met Office Early Market Engagement: Request for Information for replacement Weather Station Data Services provided by the Weather Observations Website

Who we are

The Met Office is a world leader in providing weather and climate services. We are the UK's National Meteorological Service and a Trading Fund within the Department for Science, Innovation and Technology (DSIT), operating under set targets and returning a dividend.

Recognised as one of the world's most accurate forecasters, we use more than 10 million weather observations, an advanced atmospheric model and a high-performance supercomputer to create 3,000 tailored forecasts and briefings every day. These are delivered to a wide range of customers from the Government to businesses, the general public, armed forces, and other organisations.

We play a key role on the international stage by providing vital services, advancing global understanding through research and being an important participant in projects and organisations.

We are at the forefront of climate change research, playing a key role in helping determine the worldwide response to climate change. Our involvement in global collaborative projects includes advising the Intergovernmental Panel on Climate Change (IPCC) and our tailored advice and services help decision-makers and businesses across public and private sectors to manage risks and opportunities associated with a changing climate.

Further information about the Met Office is available on the following website:
<http://www.metoffice.gov.uk>

Background information about our requirements

The Met Office has been operating the Weather Observations Website (WOW; <https://www.wow.metoffice.gov.uk/>) since 2012, enabling members of the public to submit their weather station observations and exploiting them as an increasingly important source of third party data for use in forecast applications.

This data has been demonstrated to have a positive impact, especially when incorporated into our high resolution mesoanalyses (smaller scale representation of the atmosphere in the form of an analysis) and nowcasting (forecasting in the very short term next few hours) applications, measurably improving our ability to predict the weather over the UK. Going forward, there are plans to evaluate the impact of assimilating data in regional numerical weather prediction models, currently covering a "UKV" modelling domain equivalent to the British Isles and its surrounds.

WOW is reaching end of life and is no longer cost efficient, so the WOW Next project is exploring options to replace this capability with a new data-focused service. We are not looking to replace the service in a like-for-like way as the business need has changed, so we welcome alternative suggestions for provision of our requirements,

Our indicative requirements and objectives

Our requirements are threefold:

1. We are initially looking to replace the WOW dataset with an alternative but equivalent automatic weather station (AWS) dataset. This needs to have similar characteristics to the WOW data (including measured variables, quality, spatial and temporal resolution, reporting frequency and timeliness). WOW currently provides us with approximately 1700 sites across the UK and Ireland, and we are looking to source data from a similar, or greater, number of low cost AWSs, such as those operated by members of the public, or organisations with an interest in the weather, with a good distribution across the UK.

This data will supplement the data that we receive from the ~300 official Met Office automatic weather stations in the UK. We are especially keen to acquire data from the UK and Ireland, but also the full UKV domain (Figure 1 below) encompassing the area from approximately 20°W to 16°E and 63°N to 45°S, including other countries such as France, Belgium and the Netherlands, as well as maritime areas if available (e.g. marine-based data):

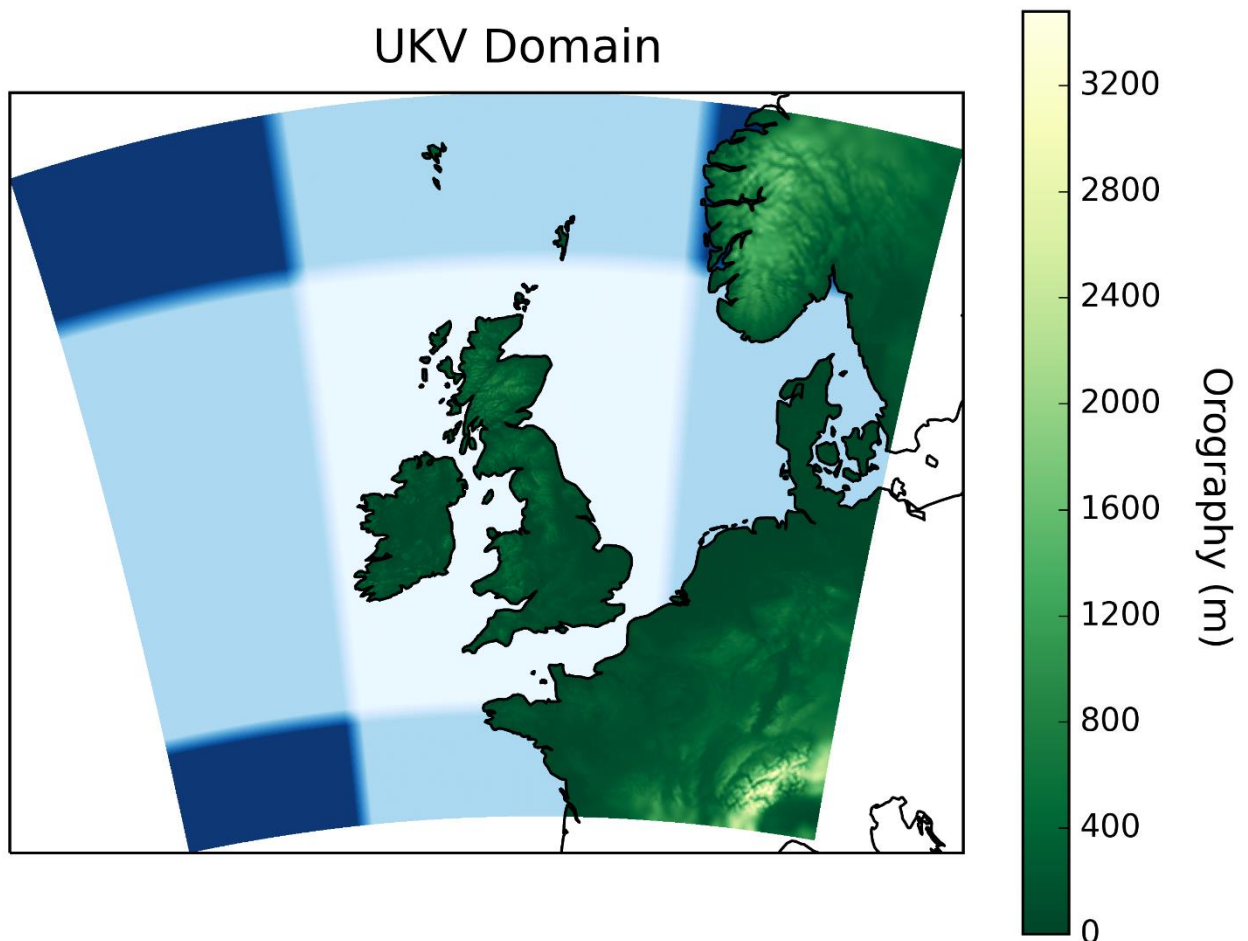


Figure 1: UKV model domain. This has a hybrid resolution grid which is 1.5 km over the inner domain covering the UK and Ireland and 4.5 km resolution towards the domain edges (20°W to 16°E and 63°N to 45°S)

The primary measurements of interest are air temperature, relative humidity, atmospheric pressure, wind speed and direction and rainfall. However, additional measurements of visibility, snow depth, solar radiation and air quality are also of interest.

- To explore the potential of procuring 'data as a service' from a third-party provider, who possesses the capability to ingest and expose various Automatic Weather Station (AWS) data sources. These sources of data could be quite varied and will include public and/or private sector weather networks. Initially, we plan to use data sourced in requirement 1, but we envisage that it will, over time, expand to encompass other sources.

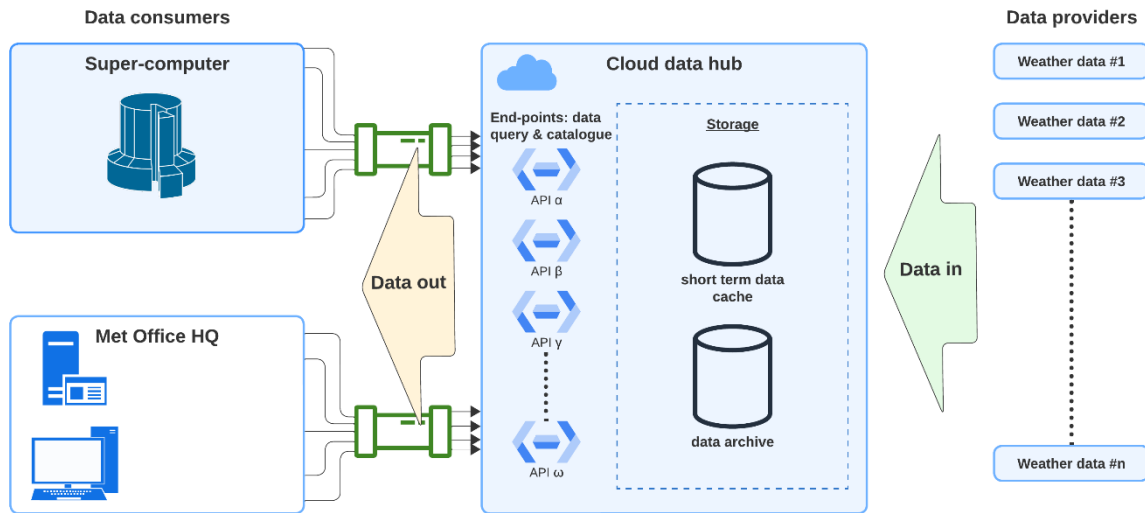


Figure 2: Schematic to show how the 'data as a service' capability would operate. Taking in data from providers, storing and making available the weather station data via an API for use in the Met Office

- To develop a webform or interface webpage that could be used to allow our Voluntary Climate Network (VCN) of observers to report manual weather readings on a daily basis, as is currently the practice via WOW.

Information we are seeking from the market

We are looking for information from organisations that may be able to support us by supplying some or all aspects of the three requirements listed above.

We are specifically looking for organisations to detail their capabilities in this market, to help us to understand what options may be available to us in determining the optimal solution(s) in terms of cost, quality, and sustainability.

Previous Early Market Engagement

An early market engagement focused on item 1 above only was previously published on the UK government Find a Tender service in March 2023 under the following reference- <https://www.findtender.service.gov.uk/Notice/007359-2023>

A copy of the previous early market engagement is attached for reference.

As this scope remains largely unchanged, previous respondents to item 1 need only confirm they are still interested in taking part in any future procurement around item 1 and do not need to return the information previously supplied, unless there have been changes to the content of their offering. If you have responded to the previously published engagement but are also able to offer something with regards to items 2 and 3, please complete the relevant sections as part of the submission.

How to respond to us

If you'd like to submit a response to us, please do so by emailing your documentation to aled-evans@metoffice.gov.uk. We're looking to receive submissions by the **28th June 2024**.

If you require any further information to help you to submit a more meaningful response, please contact aled.evans@metoffice.gov.uk.

Along with your response to the questions listed below, please feel free to include any suggestions on further information that you would like to see as part of any future procurement which would aid you in providing a quality submission.

What we will do with this information

We will review what we have received from vendors to establish whether there is common ground, themes, trends. We will look at the IT security and data protection & licensing information which will guide how we set our requirements. Specifically, we are trying to unearth any areas that could be a problem or limiting factors on being able to achieve what we want to, so we can put measures in place to address those before issuing a tender, rather than being surprised at the tender return stage and wasting supplier's time.

Supplier capabilities and market interest will also guide decisions around whether the future contracting opportunity needs to be structured into discrete lots with potentially multiple suppliers, or whether more than one/all three capabilities can be sourced from one supplier.

We also need information about the size and appetite of the market, together with indicative cost information, for our business case to take this forward. **Please note that without indicative cost information we will be unable to compile a business case needed to take this formally to market, so this is a key outcome for this exercise.**

What the next steps might be

The Met Office may follow up your response by asking further questions or having a brief MS Teams meeting with you in order to understand your stated provisions and get the best understanding of the marketplace before any formal tender is issued. We may also ask for a sample of the data that can be provided, for information only, at this stage.

We may run further market engagement activities with different specific sets of queries or share some suggested approaches to invite comment from potential suppliers on attractiveness and feasibility.

Once we are sure that we have all the information we need and we have budgetary approval to proceed, we will advertise our requirement formally for suppliers to submit tenders. Suppliers will be notified if and when this happens, so they can choose to respond.

PLEASE NOTE –

this notice is an information gathering exercise rather than a call for competition, and therefore publication or response does not commit the Met Office or any respondents to a future procurement, nor provide any process exemptions or preferential treatment to any parties expressing an interest. The Met Office will not be liable for costs incurred by any interested party in participating in this exercise.

Information to Return

Please provide information on the following when you respond to this Early Market Engagement:

Requirement 1 – Provision of primary observed near-surface measurements.

The goal with this requirement is to replace and enhance the current data that the Met Office currently receives from over 1700 WOW AWS sites across the UK and Ireland via WOW. This is data from low-cost AWSs which is submitted to WOW by members of the public on a voluntary basis. Data from WOW currently complements our own network of approx. 300 Automatic Weather Station sites and are used in real time weather analysis and forecasting activities.

Please note that the requirement is to replace WOW data with an equivalent dataset. It is not a requirement to maintain the current model of engagement with the members of the public who at present submit their data to WOW.

Network coverage and density	<p>Please clearly state the number of sites from which you currently receive data in the UK and Ireland.</p> <p>Please also outline and describe your data coverage for the UKV domain (see Figure 1) – coordinates broadly cover 20°W to 16°E and 63°N to 45°S. Alternatively, please specify in terms of a list of countries or regions from which weather station data are received.</p> <p>Please also provide an indication of your network coverage at a broader European and global scale as this could also be of interest.</p>
Meteorological measurements required	<p>Please outline your data offering against the following observed parameters:</p> <ul style="list-style-type: none">• The primary measurements of interest are: temperature, relative humidity, pressure, wind speed and direction and rainfall intensity & accumulation.• Additional secondary measurements of interest include: visibility, snow depth, solar radiation and air quality.• Metadata about the station location and local environment is also required. As a minimum this must include location (latitude and longitude) and the precision of the location must be stated (e.g. - 100 m or less). Sensor height (above the ground) and site exposure information would also be useful (e.g. proximity to buildings, fences, and trees). <p>Please also specify whether the readings are taken from equipment obtained from a single manufacturer or are from a variety.</p>

<p>Data formats and methods for receiving data and reporting frequency; Data Protection</p>	<ul style="list-style-type: none"> • What methods can be used to provide the Met Office with the required data? e.g. API, FTP etc. • What file formats can you provide data in? e.g. BUFR, ASCII, csv, JSON, other raw data formats? • What is the expected latency of data provisioning in relation to the time that observations are made? To what extent is there variability in data latency? • Reporting frequency is also of interest. Observations at 5-, 10- or 15-minutes frequency are ideal, but observations made every hour or as frequently as every minute could also be beneficial. Please indicate the typical range of reporting frequencies within the network. If there is variation, please present this information as a table or graph illustrating the number or percentage of sites associated with each reporting frequency. • In view of the above reporting frequency, could you tell us what a typical data volume would be that we might expect to access/receive across your data provisioning on an hourly or daily total volume basis. • Data Protection: Please articulate any data protection policies and measure you have in place around the data you provide and how your organisation complies with the UK Data Protection Act 2018
<p>Pricing</p>	<p>How would you expect your pricing model to work for our requirement? E.g.</p> <ul style="list-style-type: none"> • Would you recommend a tiered approach, depending on the number of observations / volume of data provided? • What duration options / discount structures may be available? <p>We would also like to understand the feasibility of expanding the data service to cover European partners in EUMETNET. This would be from two perspectives;</p> <ul style="list-style-type: none"> • Sharing the UK data for research purposes, • Potentially scaling up the solution to include data from other European Met Services. <p>Can you please explain what your approach would be to these two possible future requirements from a terms of use and cost perspective</p>
<p>IT Security</p>	<p>The Met Office requires assurance that our data (and that of our partners and customers) is processed, held and stored securely in order to assure us of our obligations to the Data Protection Act 2018, relevant legislation, accreditations, best practice and</p>

	<p>compliance regimes within UK government.</p> <p>Any services Met Office may ultimately procure should be capable of demonstrating the principles of 'Security by design' and 'Security by default'. They will be handling information deemed as 'Official' under the Government Security Classification Scheme and require appropriate protection and assurance.</p> <ul style="list-style-type: none"> • At this stage, Met Office would like to understand what steps have you taken to make your solution robust from an IT security perspective in the context outline above? <p>For further information on this topic please see the following links: Government Functional Standard GovS 007: Security - GOV.UK (www.gov.uk) 10 Steps to Cyber Security - NCSC.GOV.UK Minimum Cyber Security Standard - GOV.UK (www.gov.uk) Security policy framework, May 2018 - GOV.UK (www.gov.uk) Government Security Classifications - GOV.UK (www.gov.uk) The cloud security principles - NCSC.GOV.UK NCSC CAF guidance - NCSC.GOV.UK Cybersecurity Framework NIST National Cyber Security Centre - NCSC.GOV.UK'</p>
<p>Network resilience and continuity of data provision</p>	<p>What resilience do you aim for in your service provision?</p> <p>What resilience do you have in your collection and processing chain? For example, if you use a cloud supplier do you have parallel processing of all data across two different regions or cloud suppliers?</p>

Requirement 2 - 'Data as a service' from a third-party provider.

The goal with this requirement is to identify a capability that allows for the ingestion of real time data from environmental networks. e.g. AWS, the transformation and then the provision of this data to the Met Office, in a timely manner to be used in our operational weather forecasting and analysis systems.

Please note: The networks outlined will include data from requirement 1, but also for additional networks to be identified by the Met Office.

Experience ingesting real time data.	Please outline your experience of ingesting real time data from environmental sensor networks. Please include information such as how you operated the network, its purpose, variables measure and the number of sites.
Data transformation and standardising	<p>What is your experience of transforming and standardising data from often disparate data sets obtained from across several sources?</p> <p>What experience do you have in transforming real time data and metadata to a common standard?</p> <p>What standard quality checks are you able to provide on data e.g. basic climatological/physically plausibility range or format checks, flagging data that may look wrong? How do you resolve issues which arise from these checks prior to data entering the service?</p>
Data storage details	<p>What is your default storage time for data within your solution? Is there any flexibility with this?</p> <p>How do you back up data in both the short and long term in case data is deleted in error or corrupted? How long would it take to recover data in such cases?</p>
Service Level Standard	Describe the service level standard provided by your solution- are there options to increase or flex this and if so, what would these be?
Make data available in a secure and appropriate manner	<p>What ways can you make the data available?</p> <p>Are there any standardised principles that you adhere to for data availability?</p> <p>How do you ensure that you maintain security when making data available (see the IT Security section below)?</p> <p>Data latency – What is the end-to-end timeframe typically achieved for data from ingest to customer delivery? Note: We require a minimum possible latency value for all data, due to operational requirements.</p>
Adding new data sets	<p>How does your solution extend to bring in new data sets?</p> <p>What would the turnaround time be for adding new networks? Please give two examples of where this has been done, describing the data set added, any issues identified and how they were overcome.</p> <p>Note: Examples of data sets that we would wish to add would include standard AWS networks from other public and/or private sector organisations, and networks that may include non-Met related variables that would need filtering out.</p>

	<p>Can the solution also ingest non-AWS sourced data e.g. IOT, vehicle sensor data etc and potentially other non-weather variables</p>
<p>Data formats and methods for receiving data; Data Protection</p>	<p>What experience do you have in working with different data formats and converting between formats?</p> <p>What methods can be used to provide the Met Office with the required data? e.g. API, FTP etc.</p> <p>In what file formats can you provide the data? e.g. BUFR, ASCII, csv, JSON, other raw data formats?</p> <p>Data Protection: Could you articulate any data protection considerations you undertake around the data you provide and how your organisation complies with the UK Data Protection Act 2018?</p>
<p>Pricing</p>	<p>We estimate that we would need at least match, or ideally exceed, our current WOW generated capability across the UK and UKV model domain (approx. 1700 regularly active AWSs).</p> <p>How would you expect your pricing model to work for our requirement?</p> <ul style="list-style-type: none"> • Would you recommend a tiered approach, depending on the number of observations / volume of data provided? • What duration options / discount structures may be available? <p>Please provide estimates for the provision of such a service based on these volumes and outline how this would change as the scale up service expands.</p> <p>What would the approximate cost be for the addition of each new network?</p> <p>For the two examples that you provided in the section 'adding new data sets' above, please provide an indicative cost.</p> <p>We would also like to understand the feasibility of you providing the service to cover some of our European partners that we work with in EUMETNET. Can you please explain what your approach would be to this possible future requirement and what impact this would have on pricing our service.</p>
<p>IT Security</p>	<p>The Met Office requires assurance that our data (and that of our partners and customers) is processed, held and stored securely in order to assure us of our obligations to the Data Protection Act 2018, relevant legislation,</p>

	<p>accreditations, best practice and compliance regimes within UK government.</p> <p>Any services Met Office may ultimately procure should be capable of demonstrating the principles of 'Security by design' and 'Security by default'. They will be handling information deemed as 'Official' under the Government Security Classification Scheme and require appropriate protection and assurance.</p> <ul style="list-style-type: none"> • At this stage, Met Office would like to understand what steps have you taken to make your solution robust from an IT security perspective in the context outline above? <p>For further information on this topic please see the following links:</p> <p>Government Functional Standard GovS 007: Security - GOV.UK (www.gov.uk)</p> <p>10 Steps to Cyber Security - NCSC.GOV.UK</p> <p>Minimum Cyber Security Standard - GOV.UK (www.gov.uk)</p> <p>Security policy framework, May 2018 - GOV.UK (www.gov.uk)</p> <p>Government Security Classifications - GOV.UK (www.gov.uk)</p> <p>The cloud security principles - NCSC.GOV.UK</p> <p>NCSC CAF guidance - NCSC.GOV.UK</p> <p>Cybersecurity Framework NIST</p> <p>National Cyber Security Centre - NCSC.GOV.UK</p>
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Requirement 3 - Webform or interface webpage that could be used to allow our voluntary climate network of observers to report their weather readings.

The goal is to create a capability that allows our Voluntary Climate Network (VCN) of approximately 150 members, to submit a variety of weather observations elements via a webform rather than the current approach which is via WOW, spreadsheet or in some cases through a physical postcard that then requires keying-in before being processed, a costly and delayed process. The aim of this requirement is to have a simple unified process that will encourage most users to migrate to digital functionality.

Please note: whilst the goal initially is for the VCN, we are hoping to extend the offering to also cover rainfall data that could be provided by an environmental government organization in the future.

<p>Experience of developing digital functionality to allow data-entry.</p>	<p>Please provide evidence or detailed descriptions of previous projects where you have developed data entry applications:</p> <ul style="list-style-type: none"> • These examples should include projects involving meteorological or environmental data collection and entry. • Please highlight the data entry interfaces and validation processes. <p>Data captured in this form needs to go from the data capture in the cloud to an on-prem Oracle database, how would you approach this?</p> <ul style="list-style-type: none"> • Please give an example where you have successfully managed data flows from cloud-based applications to on-premises databases. • We encourage you to describe the technical approaches used in previous projects to ensure timely and accurate data transfer, including any middleware, APIs, or data integration tools used. • Please provide strategies for ensuring timely data delivery, such as scheduled data transfers, real-time streaming capabilities, or batch processing techniques. • Please describe any monitoring and alert systems in place to detect and address delays or failures in data transfer.
<p>Key requirements</p>	<p>The user requirements for this application are outlined below.</p> <ul style="list-style-type: none"> • A user needs to be able to log into a personal account which corresponds to their climate site, so that they can submit weather observations for a range of elements including temperature, sunshine, wind and rainfall data. • Each site must be associated with a numerical ID suitable to the data collected. Typically, these are between 4 and 6 digits. • A user needs to be able to select the date and time they wish to submit their observation. e.g. a calendar view. • A user needs to be able to retrospectively submit observations. • A user needs to be able to bulk upload data in one go if unable to enter daily observations for a time. • A user should be able to view and compare historical data from their climate site and other climate sites. • The solution needs to include to a login/ authentication for users to submit an observation • Progressive Web App technology should be strongly considered for this service

	<ul style="list-style-type: none"> • In addition to the stand-alone service for our current volunteers, (around 150) there may be a requirement for this to be scalable to accommodate additional third parties' data (between 1500 and 2000 regular users) • Cross field entry validation must be employed to detect entry errors/ inconsistencies and provide feedback to the user of the interface. • Some limited conversion of text entry data to alpha numerical equivalent must be undertaken • The user should be able to access help for each field, which is either hosted pdfs or text/imagery. • The user entry screen should default/be selectable between Rainfall Observation and Climate observation.
<p>Pricing</p>	<p>How would you expect your pricing model to work for our requirement? Would pricing be done on a one-off basis for the creation of the form, or based on form usage (number of hits)? How would subsequent alterations or expansions be dealt with in terms of pricing?</p> <p>Please provide indicative pricing for the creation of this service (Rough Order of Magnitude) or if unable to do so please outline the steps required and the related technical resource inputs. Also, please outline any ongoing support aspects you believe will be required to the form to maintain the service from your perspective.</p>
<p>Data formats and methods for receiving data and reporting frequency; Data Protection</p>	<p>What methods can be used to provide the Met Office with the required data? e.g. API, FTP etc.</p> <p>What file formats can you provide data in? e.g. BUFR, ASCII, CSV, JSON, other raw data formats?</p> <ul style="list-style-type: none"> • How will the system allow users to submit data at varying frequencies (e.g., hourly, daily, weekly), depending on their reporting schedules <p>Data Encryption:</p> <ul style="list-style-type: none"> • How will the system use encryption (e.g., SSL/TLS) for data transmission to protect data in transit? • How will the system encrypt sensitive data stored in the database to protect data at rest?
<p>IT Security</p>	<p>The Met Office requires assurance that our data (and that of our partners and customers) is processed, held and stored securely in order to assure us of our obligations to the UK Data Protection Act 2018, relevant legislation, accreditations, best practice and compliance regimes within UK government.</p>

	<p>Any services Met Office may ultimately procure should be capable of demonstrating the principles of ‘Security by design’ and ‘Security by default’. They will be handling information deemed as ‘Official’ under the Government Security Classification Scheme and require appropriate protection and assurance.</p> <ul style="list-style-type: none"> • At this stage, Met Office would like to understand what steps have you taken to make your solution robust from an IT security perspective in the context outline above? <p>For further information on this topic please see the following links: Government Functional Standard GovS 007: Security - GOV.UK (www.gov.uk) 10 Steps to Cyber Security - NCSC.GOV.UK Minimum Cyber Security Standard - GOV.UK (www.gov.uk) Security policy framework, May 2018 - GOV.UK (www.gov.uk) Government Security Classifications - GOV.UK (www.gov.uk) The cloud security principles - NCSC.GOV.UK NCSC CAF guidance - NCSC.GOV.UK Cybersecurity Framework NIST National Cyber Security Centre - NCSC.GOV.UK</p>
<p>Resilience and continuity of data provision</p>	<p>What resilience do you aim for in your service provision?</p> <p>What resilience do you have in your collection and processing chain? For example, if you use a cloud supplier do you have parallel processing of all data across two different regions or cloud suppliers?</p>