



# INVITATION TO TENDER

## ECMWF/ITT/2023/348

### Establishment of a Framework Contract for Storage Equipment and Support Services

### Volume II: Specification of Requirements

ISSUED BY: ECMWF Administration Department Procurement Section
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## Table of Contents

1. Background.....	3
1.1. Introduction.....	3
1.2. ECMWF Data Centre.....	3
2. Scope of the ITT.....	3
2.1. Objective.....	3
2.2. Important aspects of this ITT.....	4
2.3. Future purchases process.....	4
2.4. Evaluation Method and Selection Criteria.....	5
3. Specification of Requirements.....	5
3.1. Framework Contract.....	5
3.1.1. Manufacturers and Pre-sales technical support.....	5
3.1.2. Technical specifications for the sample equipment.....	6
3.1.3. Logistics arrangements.....	6
3.1.4. Support, maintenance and other professional services.....	7
3.1.5. Resources allocated to the contract.....	8
3.1.6. Pricing mechanism.....	8
3.1.7. Terms and conditions of the framework contract.....	8
3.2. Initial Purchase.....	9
4. Format of the Tender response.....	9
4.1. Presentation and Order of the Tender.....	9
4.2. Volume IIIA.....	9
4.3. Volume IIIB.....	10
Annex 1 – Sample Equipment.....	11
Annex 2 – Initial Purchase (Lot 1).....	17

# 1. Background

## 1.1. Introduction

This Invitation to Tender (ITT) has been prepared by the European Centre for Medium-Range Weather Forecasts, (governed by its Convention and associated Protocol on Privileges and Immunities which came into force on 1 November 1975, and was amended on 6 June 2010) ("ECMWF") for the purposes of obtaining proposals from Tenderers for the procurement of IT data storage equipment and related support services.

## 1.2. ECMWF Data Centre

ECMWF has one of the largest IT data storage facilities in the world comprising its main Data Handling System, which primarily stores observational data and data generated by its High Performance Computer system, and various ancillary storage systems including network attached storage. The equipment is currently from diverse manufacturers, including but not limited to Brocade, Dell, HPE, IBM, NetApp, Spectra Logic and Western Digital.

### ECMWF's HPC Facility

ECMWF's High Performance Computing Facility is based on an Atos Sequana XH2000 based service. These are used to run large mathematical models allowing the Centre to predict the weather worldwide over periods of several weeks. Note that this ITT does not cover the provision of any equipment related to ECMWF's supercomputers.

### ECMWF's Storage Systems

ECMWF maintains a large database of weather-related information. The Data Handling System (DHS) currently holds 550 petabytes of data, the bulk of it being pre-compressed and scientific in nature. This data is stored in a tiered environment controlled by the High Performance Storage System (HPSS). Most data are stored on tape media, with only 3% of the data residing on disk. HPSS is highly distributed software, making use of many servers to transfer data between disks or tape drives and users archiving or accessing the archives, via a high performance network.

Two ECMWF-written applications (MARS and ECFS) provide easy-to-use interfaces to DHS users. MARS data represents about 80% of the volume of data stored in the DHS, with ECFS represents the remaining 20%. In a typical day the archive grows by about 380 TB (this figure is expected to increase to 1PB per day).

Disk storage is connected to the servers through four Storage Area Networks (SAN) directors. ECMWF currently uses HPE DL and Dell R families of servers.

### NAS-based Storage

Hybrid flash/disk based online storage is provided for users' home spaces, dedicated meteorological caches and large project areas. These services use a mix of NetApp clusters and TrueNAS based systems. The TrueNAS systems are constructed from general purpose HPE/Dell servers with JBOD SAS connected disk enclosures. NAS-based storage is also utilised by a considerable number of virtualised infrastructures like vSphere, VDI and K8S clusters providing services including software development, job control, remote access, databases, object stores, web applications and charts visualisation.

# 2. Scope of the ITT

## 2.1. Objective

This ITT is expected to result in the setting up of a framework contract with 5 to 10 suppliers, with the ultimate purpose of securing the best value for money in the provision of IT data storage equipment and related support services. The suppliers admitted onto the framework will be invited to compete for future purchases

of similar types of equipment to those specified in Section 3. The initial framework will be for three years with the possibility of extension for a further two years. The framework awards (i.e. inclusion of suppliers onto the framework) are subject to approval by ECMWF's governing body, its Council, which meets in June 2023, so framework contracts with selected suppliers cannot be signed before mid-July 2023. ECMWF may reopen the competition at a later date to add additional suppliers to the framework on the same conditions.

In addition, this ITT intends to place an order for an Initial Purchase (Lot 1) comprising equipment from the supplier providing best value for money for this Lot 1, which has also been selected for the framework. The contract for this Lot 1 will be awarded in June 2023.

Suppliers may submit Tenders for inclusion onto the framework without bidding to supply Lot 1.

## 2.2. Important aspects of this ITT

- Tenders are welcomed from suppliers based in any country (subject to supply and support requirements).
- Whilst Section 3 contains a list of manufacturers, Tenderers representing other manufacturers are welcome to respond.
- Whilst the Initial Purchase under Lot 1 comprises equipment manufactured by Western Digital, subsequent orders may be for other specified or non-specified branded equipment and may be for brands that are not currently used by ECMWF.
- For future purchases all suppliers on the framework will generally be invited to tender via a further competition for the respective Lot.
- Suppliers on the framework which are invited to participate in a further competition for future purchases are not obliged to tender.
- Each future further competition will have its own evaluation criteria, although the main criterion is likely to be price. Prior performance on the previous Lots awarded under the framework (e.g. timely delivery/installation, successful acceptance etc.) will also be considered when awarding the contract resulting from a future mini competition.
- All equipment shall conform to EU specifications. While it is the intention of ECMWF to use this framework contract for purchases for its Data Centre in Bologna (Italy), there may be requirements for delivery to other locations, including non-EU ones, which will be notified in the documentation issued for a future purchase. In such case, equipment shall conform to standards and specifications, depending on the location of delivery.
- Due to the nature of some of the ECMWF projects, certain future purchases may be subject to specific administrative/legal conditions and/or restrictions (e.g. eligibility to receive funding). Such conditions shall be explicitly specified in the respective Lot documentation and the respective Lot competition shall be conducted among those suppliers which are not affected by such conditions.

## 2.3. Future purchases process

During the lifetime of the framework arrangement ECMWF will make further purchases of equipment. Each future purchase (called "Lot") will specify the IT data storage systems required, but could differ from the initial one in type, quantities, brands, technical specifications and support requirements of requested equipment. Systems described in each future purchase may be specified to a varying degree of detail depending on the particular requirement to be met. Installation details and acceptance criteria will be specified for future purchases.

Any future purchases through this framework, after the Initial Purchase, will be subject to further competitive quoting via further competitions between the suppliers who have been selected for the framework as a result of this ITT. ECMWF reserves the right to negotiate directly with one or more of those suppliers, depending on the particular requirements to be met (i.e. specific brand, urgent need etc.). The most appropriate method for any future purchase will be selected to meet deadlines whilst still adhering to ECMWF's tendering requirements.

It is anticipated that the expenditure over the first three years of the framework will be of the order of €7.5M, including purchase of Flash/disk systems (approx. 50%), TrueNAS disk enclosures (approx. 20%), hardware such as NAS, SAN, HBA cards etc. (approx. 15%) and hardware support and maintenance services (approx. 15%). Note that whilst it is envisaged that all suppliers who have been selected for the framework agreement as a result of this ITT will have the opportunity to quote for future purchases during the lifetime of this arrangement, there is no guarantee as to the volume of purchases to be offered.

## 2.4. Evaluation Method and Selection Criteria

For inclusion on the framework, Tenders will be evaluated based on the evaluation criteria and weights shown in the table below.

Evaluation criteria	Weight
<b>Tenderer's Credentials</b> <ul style="list-style-type: none"> <li>- Financial standing and Legal organization</li> <li>- Track record and references</li> <li>- Partner accreditations, quality assurance processes and management systems</li> </ul>	40%
<b>Quality of Proposal</b> <ul style="list-style-type: none"> <li>- Compliance with technical specifications for the sample equipment</li> <li>- Quality of resources proposed (dedicated account manager, other technical or professional staff)</li> <li>- Logistics arrangements (delivery, installation, acceptance)</li> <li>- Support/maintenance service and warranty conditions</li> </ul>	40%
<b>Pricing and Payment Mechanism</b> <ul style="list-style-type: none"> <li>- Prices quoted for the sample equipment</li> <li>- Appropriateness of pricing mechanism proposed</li> <li>- Acceptance of specific ECMWF requirements in terms of currency</li> </ul>	20%

*Table 1: Evaluation Criteria*

Tenderers must achieve a mark of at least satisfactory (i.e. 60%) for each high level criterion to be invited onto the framework.

Following notification of the result of your tender you may request feedback on the evaluation from ECMWF.

The contract for the Initial Purchase (Lot 1) will be awarded to the Tenderer which has passed the criteria for inclusion onto the framework and quoted the lowest overall price for this Lot 1.

## 3. Specification of Requirements

### 3.1. Framework Contract

#### 3.1.1. Manufacturers and Pre-sales technical support

A description of the equipment currently used by ECMWF is provided in section 1.2, as well as in Annex 1.

It is highly desirable that potential Tenderers can provide equipment from a range of manufacturers and are capable of providing ECMWF with technical expertise and guidance in the selection of the most suitable product for future acquisitions of equipment. Tenderers are asked to indicate how they can help ECMWF in identifying and providing data storage solutions to meet the organisation's scientific and business needs.

Tenderers are requested to complete the corresponding table in Volume IIIB to specify with what manufacturers they enjoy a partnership and at what official level, e.g. Dell EMC Premier Partner, Hewlett Packard Enterprise Gold Partner or IBM Premier Business Partner. Tenderers are not required to specify partnership with all listed manufacturers. Equipment manufacturers are not limited to those listed and

hence, Tenderers may add others to the list. The proposed manufacturers equipment must however be able to meet the levels of capacity and performance of the sample equipment specified in Annex 1.

To enable ECMWF to take advantage of future technology developments it is desirable that Tenderers can provide access for ECMWF staff to equipment of different types and from different manufacturers for evaluation, testing and benchmark purposes prior to purchase. Tenderers should confirm whether they can provide this facility, the likely location of test equipment (e.g. Tenderers premises, Supplier's premises or at ECMWF) and the terms and duration of access.

### 3.1.2. Technical specifications for the sample equipment

For each item specified in Annex 1 of Volume IIIB, which a Tenderer would be interested in supplying, a detailed breakdown of components and costs for delivery, installation and/or support in the indicated place of supply should be provided. For each item, Tenderers may propose alternative equipment of an equivalent capacity and performance to the requested item. Tenderers do not have to quote for all equipment, only those where they believe to be competitively priced.

Unless differently specified, all the required equipment shall conform to all relevant EU specifications.

### 3.1.3. Logistics arrangements

#### 3.1.3.1. General Requirements

Each future further competition will set an acceptance date by which ECMWF expects that the equipment will be accepted. This can either be by simply delivering the equipment to the specified location, in the case that no installation is required, or if it is, installation, initial setup and testing have been completed. If this has been done to the satisfaction of ECMWF, acceptance will be granted, and the goods can be invoiced.

Where installation is specified this includes:

- installation into a rack;
- connection to the provided power;
- configuration of management IP addresses;
- running manufacturer's standard validation tests to demonstrate that the equipment operates in accordance with the manufacturer's specification; and
- all other requirements as specified in the Lot documentation.

The acceptance date will be based on the date of issuance of a Purchase Order for a specific Lot following a further competition. This will normally be 6 weeks from the issuance of a Purchase Order, and allows time to deliver and install the equipment at the specified location (e.g. ECMWF's Data Centre in Bologna, Italy). For goods not needing installation this may be shorter, but in all cases a date will be set in the description of the Lot competition.

Tenderers shall explain their approach to ordering and delivery of equipment and how they foresee installation and acceptance being completed.

#### 3.1.3.2. VAT Exemption

ECMWF is an international intergovernmental organisation exempted from VAT on substantial purchases within the scope of its official activities in its host countries (United Kingdom, Italy, Germany), its other Member States and certain Co-operating States. Consequently, ECMWF in such circumstances is not liable for VAT. Further information may be found in the "VAT Guidance Note for Suppliers" document published at the ECMWF Suppliers webpage<sup>1</sup>.

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<sup>1</sup> [https://www.ecmwf.int/sites/default/files/medialibrary/2022-06/ECMWF\\_VAT\\_guidance\\_note\\_for\\_suppliers.pdf](https://www.ecmwf.int/sites/default/files/medialibrary/2022-06/ECMWF_VAT_guidance_note_for_suppliers.pdf)

### 3.1.3.3. Deliveries to ECMWF's Data Centre in Bologna, Italy

Tenderers should note that in case of shipments to ECMWF's Data Centre in Bologna (Italy), which originate from non-EU countries, a dedicated mandatory process must be followed for imports into Italy. This process is handled by ECMWF, however it takes time and depends on the promptness of the supplier in providing the required information and on the accuracy of the information provided. While ECMWF will provide the required assistance in terms of documentation and liaison with the Italian authorities for obtaining the customs clearance, it cannot guarantee any timeframes.

Three weeks prior to the actual shipment of the equipment, the supplier must provide the following documents to ECMWF:

- Waybill from the shipping company
- Commercial invoice with itemisation of goods and total value of goods being shipped (no VAT included)

In addition, the supplier must provide the following details in order to enable ECMWF to fill out and submit an application to the Italian Ministry of Foreign Affairs via the so-called "182 form", requesting the import of the equipment free of any customs duties:

- Total value of goods being sent
- Total weight of goods being sent
- Description of good being sent
- Number of pallets and / or boxes in the shipment
- Courier name
- How the goods are travelling (by air, by road)
- Customs entry point / city the goods are entering Italy

IMPORTANT NOTE: this information must match exactly the information provided in the commercial invoice.

The Italian Ministry of Foreign Affairs may need up to two weeks to authorise the paperwork; this period may increase during public holidays. ECMWF will promptly notify the supplier once approval is granted.

Tenderers are requested to describe the arrangements they have in place in terms of delivery of the various equipment they would be interested in supplying. Among others Tenderers should explain where shipments would originate from, i.e. from within or outside the EU. If it is the latter, Tenderers should describe their previous experience in handling imports to Italy with the application of special exemptions, such as those described above, as well as how they can guarantee their ability to comply with the delivery deadlines mentioned above.

### 3.1.4. Support, maintenance and other professional services

Tenderers are requested to specify what technical support services they can provide and what services they would expect to supply via the OEM vendor. Explain the levels of support available from both.

Most equipment will be placed under support following acceptance and the period of support is expected to start from this acceptance date. Tenderers shall explain the level of cover needed from the OEM vendor or supplier. If warranty only cover is required, this should be clearly described in the Tender response.

Where required, it is planned to purchase support for equipment for seven years with the initial purchase. This is the expected service life of the hardware. Understanding that this is not always possible, there will be a requirement to bid for five years support, but a request to additionally bid for two more years, up to seven years, if this is available from the vendor.

A requirement of the Framework is that a Lot could be used to specify only support services for equipment. Full details of the equipment would be provided to those Framework members expressing an interest in bidding for the Lot, including equipment types, serial numbers, duration and level of support and current

support status of the equipment. This will allow ECMWF to acquire support on equipment which has reached the end of its initial support period, purchased either through this Framework or any other contract.

Equipment originally delivered to one of the ECMWF sites may be moved to any other site at a future date and it is desirable that warranty / maintenance commitments would remain the responsibility of the selected supplier following the move (the actual movement of the equipment is outside the scope). Any such requirements shall be explicitly notified in the Lot documentation issued at that time. Tenderers are requested to confirm their ability to take on such a desirable commitment and to describe their approach in successfully handling it.

#### 3.1.5. Resources allocated to the contract

ECMWF will require the Tenderer to offer a dedicated account manager responsible for the contract and for any other matters related to the service. They will be the conduit to access pre-sales support, both internally and potentially with the vendor. Tenderers are requested to explain their approach to managing the overall framework contract, if selected, as well as individual orders awarded as result of Lot competitions and how this would be implemented.

#### 3.1.6. Pricing mechanism

Tenderers must explain the mechanism that will be used to derive the prices for equipment, e.g. which discount levels the Tenderer enjoys from a manufacturer, open book pricing etc. This should be demonstrated by providing, as far as possible, prices for the sample equipment specified in Annex 1. Where offered, separate prices for delivery, installation and support for the indicated location should be provided. Tenderers must also provide the price for Warranty & Support as specified in Annex 1. All prices shall be quoted in Euro (€) and shall remain valid and fixed for the period of time indicated in the ITT documentation.

Whilst the default currency for this ITT and any future purchases (i.e. Lots) is the Euro (€), in some of the Lots ECMWF may require suppliers to provide quotes in Pound Sterling (£). Respectively, for those Lots the Contractor's invoices shall be submitted in Pound Sterling (£) and payments by ECMWF to the Contractor shall be made in Pound Sterling (£). Such a requirement shall be explicitly notified in the Lot documentation issued at that time. Tenderers are requested to confirm their willingness to be paid in Pound Sterling (£) when this is requested in a Lot, as well as explain the currency conversion mechanism they will apply to ensure that ECMWF is still obtaining good value for money.

#### 3.1.7. Terms and conditions of the framework contract

The terms and conditions for this contract are provided in Volume IV of the ITT documentation. As these are for a framework, all selected suppliers will be engaged on the same terms and conditions. Tenderers are requested to confirm their acceptance of the terms and conditions by checking the corresponding box in Volume IIIA.

ECMWF may require additional or alternative terms in writing in relation to specific goods and/or services, which will be notified in the documentation issued for a future purchase (Lot).

Please note that as a result of ECMWF's immunity from jurisdiction, any contract, including any sub-contract and any ensuing contract between ECMWF and a third party (e.g. maintenance/support agreements), resulting from this ITT must contain an arbitration clause which is offered by ECMWF to all contracting parties. Tenderers are requested to explicitly confirm their willingness and ability to comply with this requirement and describe their approach in ensuring that such contracts comply with the above requirement. Further information may be found at <https://www.ecmwf.int/en/about/suppliers> in the documents under "ECMWF's status: Arbitration and VAT".

Where extending existing systems previously purchased under a Lot from this Framework, it will be the option of ECMWF to offer the equipment needed for such an extension to the winner of the original Lot. This is to avoid complications of support within a single system. If the original Tenderer is judged to be unable to



provide a competitive price for the extension, the equipment needed will be offered onto the Framework instead as a separate Lot. This will not prevent the winner of the original Lot from bidding for the said extension.

### 3.2. Initial Purchase

The items specified in Annex 2 comprise the Initial Purchase (Lot 1). Tenderers responding to this ITT are encouraged to bid for this Lot but do not need to. Using Annex 2 of Volume IIIB, Tenderers are requested to provide a detailed quote including breakdown of components and services. Prices given will be considered as firm, fixed and valid for a period of not less than three (3) months after the Closing Date of the ITT. Delivery and installation will be to ECMWF's Data Centre in Bologna, located at Tecnopolo di Bologna, Bologna, Italy.

## 4. Format of the Tender response

### 4.1. Presentation and Order of the Tender

The Tender response shall be presented as separate documents, which are to be uploaded to the respective question on the eProcurement Portal, as follows:

- Completed Volume IIIA (Template for Tenderers – Administrative Information);
- Completed Volume IIIB (Template for Tenderers – Response to Specification of Requirements);
- Attachments and Annexes, as requested in the Volume III documents.

Note that for any information that has been provided as part of the Tender, but not specifically requested by ECMWF, then ECMWF shall, at its sole discretion, decide whether to utilise that further information within its evaluation process.

### 4.2. Volume IIIA

Volume IIIA (Template for Tenderers – Administrative Information), which can be found under the ITT Online Questionnaire should be completed for the following information:

- Details about your organisation:  
*Information on the legal, commercial or professional status of the Tenderer, as well as contact details of the person who can be contacted by ECMWF in relation to the Tender. The Tenderer should also attach a copy of the official Company Registration Document and provide complete and accurate information on the Tenderer's shareholding structure and, if applicable, full details of its parent organisations up to and including the ultimate parent organisation.*
- Economic and financial capacity:  
Financial information on your organisation to enable us to evaluate your financial status.
- Staff resources
- Experience and references
- Additional questions:  
*This section contains a set of questions which seek either information or confirmation from the Tenderer.*
- Confirmation of agreement to Volume IV of the ITT (Terms and Conditions of Contract):  
*Tenderers must note that Volume IV of the ITT (Draft Contract) sets out the conditions of contract. As these are for a framework, all selected suppliers will be engaged on the same terms and conditions. It is mandatory that the Tenderer shall provide a response to the respective question on the form stating their acceptance of the conditions contained in the Draft Contract. Tenderers are reminded that their responses to Volume IV are part of the criteria that ECMWF will use to evaluate Tenders.*

### 4.3. Volume IIIB

Volume IIIB (Template for Tenderers – Response to Specification of Requirements) shall contain the Tenderer’s response to the requirements specified in Volume II. The document lists the requirements and provides a structure for the Tenderer’s response. This is the minimum information requested; Tenderers can provide any additional information or documents as necessary. Some of the requirements make reference to various sections in Volume II and do not provide the full description of the requirement; Tenderers are advised to formulate their response based on the description of the requirement provided in the respective section of Volume II and touch upon all the elements described or requested therein.

ECMWF seeks focused responses, rather than responses which include a significant amount of standard marketing material. If you wish to include marketing material in your proposal documentation set, it should be provided as discrete documents and limited to only marketing material which is directly relevant to the response and marked as “Marketing Material”, however ECMWF may, at its sole discretion, not evaluate any such marketing material.

## Annex 1 – Sample Equipment

For each item specified in this Annex, which you would be able and interested in supplying, using the format in Annex 1 of Volume IIIB, please provide a **detailed breakdown of components and costs for delivery and support in Bologna**. Prices shall be quoted in Euro (€) for the quantities indicated in Annex 1 of Volume IIIB.

For each item, Tenderers may propose alternative equipment of an equivalent capacity and performance to the requested item. Tenderers do not have to quote for all equipment, only those where they believe to be competitively priced.

Item	Description (Required technical specification / configuration)		
1	<b>Western Digital Ultrastar Data102 Hybrid Storage Platform</b>		
	<b>Component</b>	<b>no.</b>	<b>Description</b>
	<b>Model</b>	1	Ultrastar Data102 Hybrid Storage Platform
	<b>Host connections</b>	4	Dual port SAS @ 12Gb/s
	<b>Disks</b>	102	<b>22TB SAS @ 7.2k rpm, 12Gb/s (DC HC570)</b>
	<b>Rack Mounting</b>	1	Rack mounting kit
	<b>Licensing</b>	1	Base
	<b>Support</b>	1	Warranty Only
	<b>Installation required</b>		No
1 bis	<b>Disk enclosure with at least 84 slots</b>		
	<b>Component</b>	<b>no.</b>	<b>Description</b>
	<b>Manufacturer</b>		Any
	<b>Model</b>		Disk enclosure with at least capacity for 84 3.5" HDDs
	<b>Host connections</b>	4	12Gb/s SAS
	<b>Disks</b>	84	18TB (CMR) drives
	<b>Rack Mounting</b>	1	Rack mounting kit
	<b>Licensing</b>	1	Base
	<b>Support</b>	1	Warranty Only
<b>Installation required</b>		No	
2	<b>IBM FlashSystem 5035</b>		
	<b>Component</b>	<b>no</b>	<b>Description</b>
	<b>Model IBM FlashSystem 5035H</b>	1	Built with IBM Spectrum Virtualize software for Storwise FS5035 LFF Control Enclosure (2072-3N2)
	<b>Cache</b>	1	64GB (ALGA)
	<b>Host connections per cntl</b>	1 pair	16Gb/s Fibre Channel (ALBB)
	<b>Flash Indicator</b>	10	Hybrid Flash Indicator (AHZE)
	<b>Disk Enclosures</b>	9	FlashSystem 5000 LFF Expansion Enclosure (2072-12G)
	<b>Disks</b>	120	8TB @7.2k rpm (AL3B)
	<b>Licensing</b>	1	Base
	<b>Support (FS5035H)</b>	1	5 year hardware and software 24/7 6hr response (BOMT), if 7 years please quote separately for this.
	<b>Support (Disk Enclosure)</b>	9	5 year hardware and software 24/7 4hr response (BOMT) , if 7 years available please quote separately.
	<b>Power cords</b>	10	AC Power Supply HE (AHPA) + Power Cord - PDU Connection (9730)
	<b>Internal cables</b>	18	0.6m 12Gb/s SAS Cables mSAS HD (ACUA)
<b>Installation required</b>		Acceptance will be: <ul style="list-style-type: none"> <li>- System powers up with all fault lights off or green</li> </ul>	

			<ul style="list-style-type: none"> <li>- Basic ip addresses will be configured with supplied values.</li> <li>- The system can be logged into, password can be left as default.</li> <li>- Power cables labelled at PSU and tray connection ends</li> <li>- All host FC and management IP connections will be made by site personnel.</li> </ul>
2 bis	<b>Alternative block storage disk system</b>		
<b>Component</b>	<b>no.</b>	<b>Description</b>	
<b>Manufacturer</b>		Any	
<b>Model</b>	1	Any (must be capable of managing disks in pools using a distributed RAID algorithm)	
<b>Host connections per controller</b>	4	16 or 32 Gb/s Fibre Channel (8 in total)	
<b>Disks</b>	120	8TB @7.2k rpm	
<b>Licensing</b>	1	Base	
<b>Support</b>	1	Hardware and software, 5 year 24/7 6 hour initial response, if 7 year support available, please quote separately.	
<b>Installation required</b>		Acceptance will be: <ul style="list-style-type: none"> <li>- System powers up with all fault lights off or green</li> <li>- Basic ip addresses will be configured with supplied values.</li> <li>- The system can be logged into, password can be left as default.</li> <li>- Power cables labelled at PSU and tray connection ends</li> <li>- All host FC and management IP connections will be made by site personnel.</li> </ul>	
3	<b>NetApp E-Series E5760</b>		
<b>Component</b>	<b>no.</b>	<b>Description</b>	
<b>Model</b>	1	E-Series E5760	
<b>Host connections per controller</b>	4	32Gb/s Fibre Channel (8 in total)	
<b>Cache Memory</b>	1	128 GB	
<b>Enclosures</b>	2	DE460C	
<b>Disks</b>	90	18TB NL-SAS (E-X4146A)	
<b>Disks</b>	90	8TB NL-SAS (E-X4128A/B)	
<b>Rack Mounting</b>	1	Rack mounting kit	
<b>Licensing</b>	1	Base	
<b>Support</b>	1	Hardware and software, 5 year 24/7 4 hour initial response, if 7 year support available, please quote separately.	
<b>Installation required</b>		Acceptance will be: <ul style="list-style-type: none"> <li>- System powers up with all fault lights off or green</li> <li>- Basic ip addresses will be configured with supplied values.</li> <li>- The system can be logged into, password can be left as default.</li> <li>- Power cables labelled at PSU and tray connection ends</li> <li>- All host FC and management IP connections will be made by site personnel.</li> </ul>	

4	<b>HPE MSA 2062</b>		
	<b>Component</b>	<b>no.</b>	<b>Description</b>
	Model	1	HPE MSA 2062 16Gb Fibre Channel LFF Storage (R0Q79A)
	Host connections per controller	4	16Gb/s Fibre Channel (8 in total)
	SFPs	2	HPE MSA 16Gb Short Wave Fibre Channel SFP+ 4-pack Transceiver (C8R24B)
	Disks	20	HPE MSA 108TB SAS 12G Midline 7.2K LFF M2 1-year Warranty 6-pack HDD Bundle (R7L71A)
	Enclosures	9	MSA 2060 LFF Drive enclosure (R0Q39B)
	Rack Mounting	1	Rack mounting kit
	SAS Cables	18	HPE External 1.0m (3ft) Mini-SAS HD 4x to Mini-SAS HD 4x Cable (716195-B21)
	Licensing	1	Base
	Support	1	Hardware and software, 5 year 24/7 6 hour initial response, if 7 year support available, please quote separately.
Installation required		<p>Acceptance will be:</p> <ul style="list-style-type: none"> <li>- System powers up with all fault lights off or green</li> <li>- Basic ip addresses will be configured with supplied values.</li> <li>- The system can be logged into, password can be left as default.</li> <li>- Power cables labelled at PSU and tray connection ends</li> <li>- All host FC and management IP connections will be made by site personnel.</li> </ul>	
5	<b>IBM FlashSystem 7300</b>		
	<b>Component</b>	<b>no.</b>	<b>Description</b>
	Model	1	FlashSystem 7300 (4657-924)
	Cache	1	768GB
	Host connections	4	32Gb/s Fibre Channel (8 in total)
	Modules	24	9.6TB NVMe (FCM)
	Rack Mounting	1	Rack mounting kit
	Licensing	1	Base
	Support	1	Hardware and software, 5 year 24/7 4 hour initial response, if 7 year support available, please quote separately.
	Installation required		<p>Acceptance will be:</p> <ul style="list-style-type: none"> <li>- System powers up with all fault lights off or green</li> <li>- Basic ip addresses will be configured with supplied values.</li> <li>- The system can be logged into, password can be left as default.</li> <li>- Power cables labelled at PSU and tray connection ends</li> <li>- All host FC and management IP connections will be made by site personnel.</li> </ul>
6	<b>Hybrid Network Attached Storage Cluster Infrastructure</b>		
	<b>Component</b>	<b>no.</b>	<b>Description</b>
	NAS Cluster	1	Switched 100GbE storage cluster which must run ONTAP 9
	Nodes per cluster	4	Netapp FAS8700 controller or equivalent
	Network connections per node	2	25 Gb/s Ethernet
Storage: SSDs per cluster	24	960GB SSD	

	<table border="1"> <tr> <td><b>Storage: SAS disks per cluster</b></td> <td>144</td> <td>1.8 TB, 10K rpm, SAS</td> </tr> <tr> <td><b>Storage: NL-SAS disks per cluster</b></td> <td>48</td> <td>8TB, 7.2K rpm, NL-SAS</td> </tr> <tr> <td><b>Rack Mounting</b></td> <td>1</td> <td>Rack mounting kit</td> </tr> <tr> <td><b>Licensing</b></td> <td>1</td> <td>Premium Bundle and storage licenses</td> </tr> <tr> <td><b>Support</b></td> <td>1</td> <td>Hardware and software, 5 year 24/7 4 hour initial response, if 7 year support available, please quote separately.</td> </tr> <tr> <td><b>Installation required</b></td> <td></td> <td> <p>Installation is required; however, racking will be provided. All other components necessary for the installation are required (i.e. rails, cables, sundries, etc)</p> <p>Acceptance will be:</p> <ul style="list-style-type: none"> <li>- System powers up with all fault lights off or green</li> <li>- Basic ip addresses will be configured with supplied values.</li> <li>- The system can be logged into, password can be left as default.</li> <li>- Power cables labelled at PSU and tray connection ends</li> </ul> </td> </tr> <tr> <td><b>Shipping and Handling</b></td> <td></td> <td>Delivery to Tecnopolo, Via Stalingrado, Bologna, Italy</td> </tr> </table>	<b>Storage: SAS disks per cluster</b>	144	1.8 TB, 10K rpm, SAS	<b>Storage: NL-SAS disks per cluster</b>	48	8TB, 7.2K rpm, NL-SAS	<b>Rack Mounting</b>	1	Rack mounting kit	<b>Licensing</b>	1	Premium Bundle and storage licenses	<b>Support</b>	1	Hardware and software, 5 year 24/7 4 hour initial response, if 7 year support available, please quote separately.	<b>Installation required</b>		<p>Installation is required; however, racking will be provided. All other components necessary for the installation are required (i.e. rails, cables, sundries, etc)</p> <p>Acceptance will be:</p> <ul style="list-style-type: none"> <li>- System powers up with all fault lights off or green</li> <li>- Basic ip addresses will be configured with supplied values.</li> <li>- The system can be logged into, password can be left as default.</li> <li>- Power cables labelled at PSU and tray connection ends</li> </ul>	<b>Shipping and Handling</b>		Delivery to Tecnopolo, Via Stalingrado, Bologna, Italy															
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12	<b>32Gb/s Fibre Channel Host Bus Adapter</b>		
	<b>Component</b>	<b>no.</b>	<b>Description</b>
	<b>Manufacturer</b>		Marvell Qlogic
	<b>Model</b>	1	QLE2772-SR-SP
	<b>SFPs</b>	2	32Gb/s SR Optics
	<b>Warranty &amp; Support</b>		5 years NBD
	<b>Installation required</b>		No
13	<b>Brocade Fibre Channel G720 Switch</b>		
	<b>Component</b>	<b>no.</b>	<b>Description</b>
	<b>Model G720</b>	1	64 port switch
	<b>SFPs</b>	48	SFP+, LC connector; 32 Gb/s SWL
	<b>Licenses</b>		48 ports licensed and an ISL trucking license
	<b>Support</b>		Hardware and software, 5 year 24/7 6 hour initial response, if 7 year support available, please quote separately.
	<b>Power cords</b>	2	
	<b>Installation required</b>		No
14	<b>Brocade SANnav 3 year license</b>		
	<b>Component</b>	<b>no.</b>	<b>Description</b>
	<b>Model SANNav Software</b>	1	License to run SANnav for 3 (three) years



## Annex 2 – Initial Purchase (Lot 1)

For each item specified in this Annex, which you would be able and interested in supplying, using the format in Annex 2 of Volume IIIB, please provide a **detailed breakdown of components and costs for delivery and support in Bologna**. Prices shall be quoted in Euro (€) for the quantities indicated in Annex 2 of Volume IIIB.

For each item, Tenderers may propose alternative equipment of an equivalent capacity and performance to the requested item. Tenderers do not have to quote for all equipment, only those where they believe to be competitively priced.

Item	Description (Required technical specification / configuration)		
1	<b>Western Digital Ultrastar Data102 Hybrid Storage Platform</b>		
	<b>Component</b>	<b>no.</b>	<b>Description</b>
	<b>Model</b>	1	Ultrastar Data102 Hybrid Storage Platform
	<b>Host connections</b>	4	Dual port SAS @ 12Gb/s
	<b>Disks</b>	103(*)	<b>22TB SAS @ 7.2k rpm, 12Gb/s (DC HC570)</b>
	<b>Rack Mounting</b>	1	Rack mounting kit
	<b>Licensing</b>	1	Base
	<b>Support</b>	1	Warranty Only
	<b>Installation required</b>		No
(*) fully populated system + 1 spare disk per system.			