INVITATION TO TENDER

ECMWF/ITT/2019/BOND19

PROCUREMENT OF
SERVERS AND HYPERCONVERGED SYSTEMS

at ECMWF, Tecnopolo di Bologna, Bologna, Italy

Volume II:

Specification of Requirements

Tables

Figures (Appendix 4)

Definitions

Definitions used in this Invitation to Tender (ITT) are listed here:

Acceptance	the process of performing tests on the Works to ensure that it reaches an acceptable condition to ECMWF
Acceptance Date	the date or dates set out in Schedule 1 of the Contract being the date or dates by which the Initial Procurement must successfully complete the User Acceptance Tests in accordance with Schedule 4 of the Contract
Agreement	volume III of this ITT including all Schedules thereto
Centre	ECMWF
Contract	the documents defining the Parties' rights and obligations comprising the Agreement, ECMWF's Letter of Acceptance of Tender, the ITT Documentation and the Contractor's Tender in accordance with Clause 2.1 of the Agreement
Contractor	successful Tenderer
Data Hall	a space within the data centre that is used to host IT infrastructures and the high-performance computers and related services
Data Handling System (DHS)	large-scale Data Handling System is used to store and retrieve data that is needed to perform weather modelling, research in weather modelling and mining of weather data
Data Storage	a space within the data centre that is used to host tape library infrastructure and related services
Delivery Date	the date or dates by which the Contractor is required to deliver the Works to the Site as specified in Schedule 1 to the Contract or in a Purchase Order
Disk	A rewritable storage device where data are recorded persistently by various electronic, magnetic, optical, or mechanical changes to a surface layer of one or more rotating disks, or by the use of integrated circuit assemblies as memory to store data persistently
ECMWF	means European Centre for Medium-Range Weather Forecasts
First Response Time	the number of minutes, hours, or days between when a customer submits a support ticket and when a customer support representative provides an initial response
High Performance Computer Facility (HPCF)	the super-computing facility used to produce weather forecasts and scientific research
Hypercare	the stabilisation period after installation is completed
Initial Installation	the first delivery of Hardware and Software for each Lot of under a Purchase Order issued by ECMWF
ITT	this Invitation To Tender
Lot	one of a number of categories of goods or services which a single procurement process has been divided into. Specifically, for this Tender there are two (2) Lots: • Lot 1 – Servers and Software • Lot 2 – Hyperconverged Systems

Manufacturer	original equipment manufacturer of the supplied hardware and software components
OEM	original equipment manufacturer
Preferred Bidder	the Tenderer selected by ECMWF for the award of this Contract
Reliability Test	the test that will be performed on the Works outlined in Clause 3.3 of Schedule 4 of Volume III
Requirement	a singular documented physical or functional need that a design, product or process aims to meet
Services	all the services listed in Schedule 1 or on a Purchase Order, to be provided by the Contractor to ECMWF under this Contract
Server	A computer in a network, capable of running a multiprocessing operating system and used to provide services to other computers in the network
Hardware	physical devices (including Servers, Hyperconverged Nodes and Disk Systems) supplied by the Contractor under this Contract as specified in Schedule 1 to the Contract or on a Purchase Order
Tender	a response to this ITT
Tenderer	an organisation bidding for this ITT
Tests	the tests that will be performed on the Works outlined in Schedule 4 of Volume III
Usable Capacity	For Servers, Usable Capacity is defined as the amount of storage space that can be presented to attached hosts, not counting any space required for redundancy, mirroring, or tiering. For example, if a Disk System was composed of 64 1TB disks, configured as 6 8+2 RAID6 arrays and four hot spare disks, the Usable Capacity provided by that Disk System would consist of 48TB. For Hyperconverged Systems, Usable Capacity is defined as the amount of storage space that can be presented to a cluster, counting any space required for redundancy, mirroring, or tiering
User Acceptance Tests	the acceptance tests of the Initial Installation to be undertaken as defined in Clause 5 of Schedule 4 of the Contract
Works	all, hardware & software furnished and all Services to be performed by the Contractor under this Contract
You	the recipient of this ITT, a prospective “Tenderer”

The definitions incliuded in Clause 1 of the Contract are also applicable to this Volume II of the ITT Documentation.

Storage and bandwidth units used in this document.

Storage Units	
MB	1000x1000 Bytes.
MiB	1024x1024 Bytes.
GB	1000x1000x1000 Bytes.
GiB	1024x1024x1024 Bytes.
TB	1000x1000x1000x1000 Bytes.

TiB	1024x1024x1024x1024 Bytes.
Bandwidth and throughput units	
MiB/s	1024x1024 Bytes/sec.
GiB/s	1024*1024*1024 Bytes/sec.
Gib/s	1024*1024*1024 bits/sec.
Power units	
kWh	1,000 watt-hours

Background

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 Servers and Hyperconverged Systems. ECMWF is an independent intergovernmental organisation supported by 34 States. Information on ECMWF's activities can be found at:

https://www.ecmwf.int/en/about

The installation will be at ECMWF's new data centre at Tecnopolo di Bologna, Via Stalingrado, Bologna, Italy from Q4 2019 onwards. Additional information on ECMWF's current Computer Environment and LAN can be found at:

https://www.ecmwf.int/en/computing/our-facilities

https://www.ecmwf.int/en/computing/our-facilities/networks

ECMWF's New Data Centre

In June 2017 ECMWF Member States approved the proposal by the Italian Government and the Emilia Romagna Region to host ECMWF's new data centre in Bologna. The new data centre is currently being built on the site of the new Tecnopolo di Bologna campus that is redeveloping the unused buildings and grounds of a former tobacco factory. ECMWF's headquarters are to remain in the UK. Details about the new data centre can be found here:

https://www.ecmwf.int/en/about/media-centre/press-kit-bologna-host-ECMWFs-new-data-centre

ECMWF expects the Bologna data centre will be run with a small staff complement, that includes a 24 hour a day, 7 days a week, 365 days a year (24x7x365) operations team responsible for the monitoring of the infrastructure.

ECMWF's supercomputers

ECMWF's High Performance Computing Facility is based on a Cray XC40 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. A separate ITT was issued in November 2018 in order to procure a new supercomputer for the Bologna data centre.

ECMWF's Data Handling System

ECMWF maintains a large database of weather-related information. The Data Handling System (DHS) currently holds 250 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 is stored on tape media, with only 3% of the data residing on disk. HPSS is highly distributed software, making use of many x86 servers to transfer data between disks or tape drives and users archiving or accessing the DHS data, 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, but only about 6% of the number of files. ECFS data represents the remaining 20% of the data, corresponding to 94% of the files.

Tape drives and disk storage are connected to the servers through several Storage Area Networks (SAN) switches. In a typical day the archive grows by about 233 TB.

For the Data Handling System, only the servers and not the storage are covered by this ITT.

vSphere clusters

Several vSphere clusters are used to provide virtual machines and automation to many areas in ECMWF, ranging from Active Directory infrastructure, content management Systems, monitoring, to software development, job control, web applications, charts visualisation, and remote access.

The new data centre in Bologna will hold these virtual servers and desktops and the physical servers required will be procured within this ITT, and as some of these clusters run currently on VSAN systems (VDI included), VSAN ready nodes will be required for some servers within this Tender.

ECMWF are therefore not looking for different virtualisation solutions in the market due to the great experience and knowledge the Centre's staff have gained along many years using VMware technologies, and also the time constraints when it comes to procure and deliver systems in time for the new data centre.

Desktops

An x86 Linux and Windows virtual desktop service is used to provide remote access and working facilities to staff and constultancts in the UK and other regions. This will run within the vSphere system described above.

Network

The Local Area Network (LAN) will connect all our computing systems in Bologna. The network will be a state-of-the-art implementation with a spine-leaf layout using generally 25Gbit/s interfaces but providing up to 100Gbit/s if required. A few servers for Network management will be also provided by this ITT.

Scope of the ITT

This ITT covers the procurement of two Lots as defined in:

- Lot 1 – Specific Requirements – Servers and Software
- Lot 2 – Specific Requirements – Hyperconverged Systems

Tenderers may elect to tender for Lot 1, Lot 2 or for both Lots. Where a Tender covers both Lots, the Tenderer must submit separate prices for each Lot, but may also indicate a discounted price or percentage reduction for each Lot which will apply if ECMWF awards the Tenderer a contract for both Lots. For the avoidance of doubt, ECMWF shall be permitted to award a contract for one or for both Lots on the basis of the Tender/s submitted.

All Tenders (whether for one Lot or for both Lots) shall cover:

- installation,
- training of up to five (5) ECMWF staff, and
- support & maintenance of the hardware and software/firmware (if applicable).

Tenderers are asked to note that the Contract included in Volume III assumes that a single Contract will be awarded for both Lots and that appropriate changes will be made If separate contracts are awarded for the two Lots.

This ITT covers an initial purchase of Servers and Hyperconverged Systems and thereafter allows ECMWF to make additional purchases for a period of three (3) years from the date of contract signature. This period may be extended annually by ECMWF for up to a further two (2) years. Tenderers are required to submit prices for the initial purchase and to quote discounts against list prices for subsequent purchases.

The maintenance period for each system will be defined on the relevant Purchase Order issued by ECMWF and will commence on the date of acceptance by ECMWF. These maintenance periods may therefore extend beyond the expiry date of the Contract(s) for Servers and Hyperconverged Systems.

All pricing and discounts shall be submitted by completing:

- ITT019 – Servers and Hyperconverged Systems – Pricing Spreadsheet

ITT Timetable

ECMWF envisages the below timetable for this ITT. ECMWF reserves the right to amend these dates at any point. If ECMWF decides to amend any of the dates or milestones portrayed below then it shall notify the Suppliers who have expressed an interest or Tenderers via the eProcurement portal

Date	**Description**
27TH JUNE 2019	DATE FOR RELEASE OF TENDER BY ECMWF
17TH JULY 2019	CLARIFICATIONS CLOSE
31SD JULY 2019	14:00 LOCAL UK TIME - CLOSING DATE FOR RECEIPT OF TENDER RESPONSE
LATE SEPTEMBER 2019	INITIAL EVALUATION COMPLETE
EARLY OCTOBER 2019	PRESENTATION BY SHORTLISTED TENDERERS (DATES/TIME TO BE ANNOUNCED BY ECMWF)

EARLY OCTOBER 2019	EVALUATION OF TENDERS AND CONTRACT NEGOTIATIONS
MID OCTOBER 2019	APPROVAL BY ECMWF
LATE OCTOBER 2019	CONTRACT SIGNATURE
JANUARY 2020	INSTALLATION AND ACCEPTANCE OF THE INITIAL INSTALLATION

Table 1: Envisaged Timeline of this ITT

Evaluation method and selection criteria

Tenderers will be evaluated, utilising the criteria detailed in Table 2 for Lot 1 Servers and Table 3 for Lot 2 Hyperconverged Systems below, based on both written proposals and any oral presentations to ECMWF. However, ECMWF reserves the right to use information other than that provided by the Tenderers in its evaluation.

The following are the key evaluation criteria and their associated weighting that will be used as part of the evaluation process. ECMWF will be looking for strong capability in all the following aspects:

Lot 1 - Servers - Evaluation criteria	**Weighting**
Price	*50%*
Tenderer's financial & corporate credentials and Track Record	*20%*
Management and Implementation -credibility of approach/plan and time to deliver, run and support, quality of process and team	*15%*
Service Level Approach & Relationship - service level commitments, guarantees and service credits regime, service level metrics collection and reporting	*15%*

Table 2: Lot 1 Servers - Evaluation Criteria & Weighting

Lot 2 - Hyperconverged Systems - Evaluation criteria	**Weighting**
Price	*40%*
Tenderer's financial & corporate credentials and Track Record	*20%*
Management and Implementation -credibility of approach/plan and time to deliver, run and support, quality of process and team	*25%*
Service Level Approach & Relationship - service level commitments, guarantees and service credits regime, service level metrics collection and reporting	*15%*

Table 3: Lot 2 Hyperconverged Systems - Evaluation Criteria & Weighting

The evaluation of the Tenderer's Financial and Corporate Credentials will be based on the Tenderer's responses to Volume IA and to Appendix 1 of this document.

The evaluation of the Tenderer's compliance with Technical and Operational Requirements will be based on the Tenderer's response to Appendix 2 of this document.

The evaluation of the Tenderer's response to the Price criteria will be based on the Tenderer's financial submission in response to Appendix 3 of this document.

Evaluation process for Lot 1 and Lot 2

The evaluation process for Lot 1 and Lot 2 is identical, will be conducted in parallel and separately, and is split into a maximum of three stages:

1. The first stage of each evaluation will be based on the information provided in Volume IA Tender Submission Form and the responses to section "**A1.1 Pre-Qualification Requirements**" of this volume II document and will determine a 'short list' of Tenderers for consideration for the second stage. Tenderers who are not selected to stage two will not be considered further for this ITT. The ECMWF evaluation team shall be permitted to review other parts of the Tender if the team considers this is necessary to determine which Tenders should be fully evaluated in the second stage.
2. The second stage of the evaluation will be based on a full evaluation of the Tenders, including the response to Volume 1A, and will determine a shortlist of Tenderers for invitation to the third stage. Tenderers who are not shortlisted to stage three will not be considered further for this ITT.
3. The third stage may involve either a presentation / Q&A session on ECMWF premises in Reading by the short-listed Tenderer(s) and/or a site visit(s) for ECMWF staff to the premises of the shortlisted Tenderers to meet the team(s) responsible for the ongoing solution support (for example service desk personnel and field engineers). Both options should involve the key bidder staff nominated for this ITT and are expected to take place in accordance with the dates indicated in "**Table 1: Envisaged Timeline of this ITT"** - ECMWF envisages giving at least one week's notice of such. At these events, the Tenderer will have the opportunity to showcase the aspects of their proposed solution or solutions and both parties shall have the opportunity to clarify any outstanding elements of the ITT response. Following the event(s) and any subsequent clarifications, the shortlisted Tenderer(s) may be invited to submit their 'best and final offer' Tender to ECMWF, for final evaluation[1]. It is at the end of this stage that a Preferred Bidder for the relevant Lot will be established.

Contract Awards for Lot 1 and Lot 2 will take place after the relevant Lot's stage 3, or in the case of a combined single Contract for both Lots, after stage 3 evaluation has completed for both Lots.

Negotiations, contract award and variations

As a result of the processes defined above, a Preferred Bidder(s) will be established with whom final contract negotiations will be opened. ECMWF reserves the right to negotiate with one or more Tenderers before taking a decision on awarding the Contract(s). Within one (1) month following the notification of award of the Contract, any unsuccessful Tenderer may request, in writing, feedback from ECMWF on the evaluation of the Tenderer's Tender.

Please note that ECMWF reserves the right to vary the structure and timing of the evaluation dependent upon the number and quality of Tenders received.

ECMWF Questions during Evaluation

During the evaluation of Tenders, ECMWF reserves the right to ask questions to clarify aspects of Tenderers' submissions. ECMWF will expect Tenderers to answer such questions promptly (normally with one business day of receipt). ECMWF will address questions by email to the contact you nominate in your Volume IA Tender Submission Form or via the procurement portal and you should therefore ensure that your contact monitors his/her emails and the procurement portal at all times during our evaluation.

[1] ECMWF will review the initial evaluation results for the shortlisted Tenderers and may adjust these results in line with their findings during the presentation / Q&A session and/or the site visit and any revisions made in the 'best and final offer' Tender.

Organisation of this document

In accordance with the evaluation method and selection criteria listed in the previous section, the remainder of this ITT is organised as follows:

- Tender Requirement Instructions;
- Appendix 1 Tenderer's Credentials;
- Appendix 2 Technical and Operational Requirements;
- Appendix 3 Pricing and Agreement;
- Appendix 4 (information only) Floor Space for the Server Deployments.

Tender Requirement Instructions

Tenderers should note that they need to ensure that Requirements are fully addressed, since a partial response may not be considered or evaluated. This includes the Requirements present in this section, in the appendices and in the embedded Excel spreadsheets.

In this document, Requirements are categorised by the bold notations **M**, **D** or **R** to the left of the pertinent section.

Requirement category	Definition
M	denotes a MANDATORY Requirement: a Requirement that must be adhered to, or a performance Requirement that must be met in order that the tendered solution can be accepted by ECMWF. ECMWF will not consider a tendered solution that fails to meet a mandatory specification Requirement (marked M) unless the tenderer offers valid reasons why the feature in question is either unnecessary for, or irrelevant to, the tendered solution or is deemed as an improvement over that specified.
D	denotes a DESIRABLE feature. The extent to which any Tender offers features listed as desirable (marked D) will be one of the factors taken into account in selecting the winning Tender. If offered, the feature must be included in the overall price for the Works.
R	denotes a REQUEST for information. A response must be given to all such requests. Requests for information (marked R) are intended to provide a description of the construction, philosophy, operation and the cost implications of the tendered solution in areas that are regarded as being of particular importance. A clear response to such requests will be of assistance to ECMWF in the Tender evaluation process.

Table 4: Categories of Requirements and their Definitions

With regard to the Tenderer's ability to accommodate the Requirements, the Tenderer must use the following schema for completing the **Detailed Description** and **Self-Score** columns:

1. When populating the **Detailed Description** columns, Tenderers should note that, where relevant, when addressing that a Requirement is met, Tenderers must give minimum sufficient detail to explain the way in which the Requirement is met - a simple expression, such as "compliant" or "agreed", will not normally suffice.
    - Unless stated otherwise, **the Detailed Description should be no longer than 250 words**. Where word counts above 250 words are allowed, the higher limit will be clearly stated. Any text above the maximum specified word count will not be evaluated.
    - Attachments/Annexes should not be submitted unless the Requirement expressly requests or authorises their submission.
    - Tenderers are reminded that referencing web sites or providing hyperlinks does not provide an acceptable means of informing their submission. Any references of these types will be ignored and will not be evaluated.
2. Any additional features not listed in the ITT as Requirements, but which the tenderer feels may be relevant, should be clearly identified and supported by descriptive material.

- Note that 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". ECMWF reserve the right not to evaluate Marketing Material if it deems it to be irrelevant.

3. When populating the **Self-Score** column, the Tenderer must self-score following the definitions in the table below to provide an indication of compliance with the Requirement

Self-Score Value	Definition
3	Tenderer fully meets or exceeds the ECMWF Requirement.
2	Tenderer partially meets the ECMWF Requirement. The Requirement will be met as part of a future commitment. In the Detailed Description column, describe how the Requirement will be fully met. Specify, where applicable, associated timescale and cost.
1	Tender does not meet the ECMWF Requirement at the time of response. The Requirement will be met as part of a future commitment. In the Detailed Description column, describe how the Requirement will be fully met. Specify, where applicable, associated timescale and cost.
0	Tenderer cannot meet the ECMWF Requirement, either at the time of Tender submission or as part of a future commitment.

Table 5: Self-scoring values and their Definitions

Self-Scores will be validated by ECMWF to ensure they have been completed accurately. Where ECMWF's assessment is different from the Tenderer's Self-Score, ECMWF may ask the Tenderer to review and justify its Self-Score.

As this ITT comprises two Lots, where the Tender is responing to both Lots, Requirement descriptions may be completed twice - once for each Lot - if that is appropriate, or else as a single description which is indicated as being relevant to both Lots.

Tenderers must address the Requirements listed in the table below together with the Requirements listed in Appendices 1 - 3.

Tender Requirement			
Requirement number	**Requirement**	**Detailed Description**	**Self-Score**
M(1)	Tenderers must ensure that all Requirements in this ITT are addressed and a response, in electronic format, is posted to ECMWF's eProcurement Portal prior to the deadline; partial responses will not be considered. N.B. efforts have been made to remove duplicate Requirements, where this may occur, please still address the Requirement and/or reference your first response.		
M(2)	Tender documentation must be written in English.		

Tenderers should note that responses to all Requirements specified in Volumes I and II of this ITT must be submitted by the Tender Closing Date. Tenderers invited to make presentations or give presentations to ECMWF may be required to address the Requirements set out in Appendix 1 A.2.

Appendix 1 Tenderer's Credentials

A1.1. Pre-Qualification Requirements

Pre-Qualification Requirements			
Requirement Number	**Requirement**	**Detailed Description**	**Self Score**
M(3)	Using section 6 of Volume IA (Tender Submission Form), the Tenderer must provide an executive summary to describe the key aspects and advantages of its Tender. The executive summary must: • Provide a top level description of the Tenderer's design • Describe how the Tenderer will satisfy the technical and other Requirements set out in the ITT; • Define the advantages to ECMWF of accepting the Tender • Demonstrate the ability of the Tenderer to supply and support its solution • Describe the commercial and pricing benefits offered the Tenderer's solution • Detail the Tenderer's relationship with the proposed suppliers of hardware • Where third parties are referenced in the Tender, describe the Tenderer's relationship with them and the way in which they will contract with them The executive summary is intended to give ECMWF an overview of the Tender so that it can understand the Tenderer's approach. Tenderers are not expected to repeat detailed technical, pricing or other responses in their executive summaries. (The response to this question must be no longer than 1000 words).		

M(4)	Tenderers must list the core technical competencies of their organisation. This must include the details of what is considered to be the key technology areas supported by the organisation. (Maximum 500 words).		
M(5)	Tenderers are invited to indicate the technical certifications/accreditations/awards relevant to this Tender that their organisation holds.		
M(6)	Tenderers are invited to indicate their proposed account management structure as follows: • describe your governance processes to manage an effective relationship and the successful delivery including roles and responsibilities of people involved from both sides, the frequency of the different meetings and the purpose of each meeting; • describe the key management dashboards and empirical information that you suggest are used to govern the relationship; propose how continuous improvements will be made to the governance process.		
M(7)	Tenderers are invited to provide a description of their territorial presence in Italy, with a focus on the Bologna area.		
M(8)	For all Hardware components, Tenderers must confirm that they have the capabilities to provide 24x7x365 support and break/fix maintenance of Hardware based on 3 -year parts, 3-year labor and (optional) 3-year onsite support in Bologna		
M(9)	For all Hardware components, Tenderers are invited to describe their capabilities to provide 24x7x365 support and break/fix maintenance of Hardware based on 3 -year parts, 3-year labor and (optional) 3-year onsite support in Bologna.		
M(10)	Tenderers must confirm that they have the capabilities to provide the support detailed in M(8) and M(9) in English.		
M(11)	Tenderers are invited to specify whether the support and maintenance of the manufacturer's hardware and software equipment can be done directly by the Manufacturer.		
M(12)	Tenderers shall state their ability to offer professional services for onsite engineer presence during any user acceptance and / or performance testing.		

M(13)	Tenderers are invited to describe their organisation's approach to working in a relevant multi-vendor environment, with evidence supporting their success of working in such an environment.		
M(14)	Tenderers are invited to describe their organisation's approach to problem-solving in a relevant environment, with evidence supporting their success at solving.		
M(15)	Tenderers are invited to Describe their organisation's standard Project Management process.		
M(16)	Tenderers are invited to provide detail/evidence of any Project Management certifications.		
M(17)	Tenderers are invited to describe their organisation's standard Quality Management process.		
M(18)	Tenderers are invited to provide detail/evidence of any Quality Management certifications.		
M(19)	Tenderers are invited to describe their organisation's standard Information Security management process.		
M(20)	Tenderers are invited to provide detail/evidence of any Information Security certifications.		
M(21)	For each Lot in the Tender, Tenderers are invited to specify the number of projects which they have undertaken in the last three (3) years using a solution of the kind proposed in the Lot and the same manufacturer.		
M(22)	Tenderers are invited to identify 3 comparable projects (together with references) by answering Question 4 in Volume IA of this ITT. Please note that no additional response is required against this Requirement R(22).		
M(23)	Tenderers must confirm that they are able to quote prices in Euros (€) and that, if selected by ECMWF, Tenderers will be prepared to contract in Euros (€).		
M(24)	Tenderers must confirm that the proposed Works fully comply with each of the Mandatory requirements listed in all Annexes of all ITT Volumes. Further evaluation will not be undertaken for any response which does not provide compliance with the Mandatory requirements.		

A1.2. Requirements for Presentations, Demonstrations and Visits

Requirement number	Requirement	Detailed Description	Self-Score
Presentations, Demonstrations and Visits Requirements			
M(25)	If requested by ECMWF, Tenderers must give a presentation of their Tender at ECMWF. The date of the presentation will be made known following receipt of Tenders.		
M(26)	If requested by ECMWF, Tenderers must provide demonstrations of the Initial Installation or, should this not be possible, of equipment that is as similar as possible to the equipment included in the Initial Installation. Arrangements for the time, location and exact content of the demonstrations will be made following receipt of Tenders.		

A1.3. Requirements for Training

Requirement number	Requirement	Detailed Description	Self-Score
Training Requirements			
M(28)	For each Lot in the Tender, Tenderers must offer an onsite training programme given at ECMWF's Bologna or Reading premises for 5 ECMWF operational staff with sufficient understanding of the working of the Works being tendered to enable them to provide effective day-to-day and emergency operational support including administrative tools, performance analysis, software upgrades and changes to configuration files.		
R(29)	Tenderers must provide details of a training programme which could provide future ECMWF analysts and operational staff with sufficient understanding of the working of the software and hardware being tendered to enable them to provide effective day-to-day and emergency operational support.		

A1.4. Installation and Acceptance Dates

Requirement number	Requirement	Detailed Description	Self-Score
Installation and Acceptance Dates Requirements			
R(30)	Based on the timeline in Table 1: Envisaged Timeline of this ITT above, it is highly desirable that the Installation Date of the Initial Installation be as early as possible. Tenderers are requested to highlight any issues they have with the dates in Table 1.		
M(31)	Tenderers must state an Installation Date of the Initial Installation that they can commit to.		

Appendix 2 Technical and Operational Requirements

1. Server & Hyperconverged Systems Technical Requirements

1.1. Information Provision to ECMWF and Product Availability

Requirement number	Requirement	Detailed Description	Self-Score
Functional Requirements			
M(32)	Tenderers must agree to provide to ECMWF on an annual basis or more frequently, under non-disclosure if required, product roadmap updates. Tenderers shall describe their policy regarding maintenance, spare parts and support for the hardware and software/firmware of the tendered Systems when reaching their end of life, after the period committed to above. Tenderers must also agree to inform ECMWF when a model of Server or Hyperconverged System purchased by ECMWF is about to reach its end of life in sufficient time to allow additional systems to be purchased if ECMWF so wishes.		
D(33)	In order to minimise the costs of supporting the Works, ECMWF wishes to minimise the number of differing types of systems that it purchases, but still spread purchases over the period of the call-off contract. It is highly desirable that Tenderers can normally offer, for a period of at least 12 months from the date of General Availability, models of Hardware that can use the same system image.		
M(34)	Tenderers must agree to deliver, if requested by ECMWF, a demonstration model of the offered Hardware on free loan, technically as close as possible in all aspects to the equipment tendered for the initial acquisition and installation. The demonstration equipment will be kept by ECMWF for a maximum of 90 calendar days from the delivery date, during which time ECMWF will be responsible for its safe keeping. The location of the test system will be the ECMWF Datacentre facilities in Reading, United Kingdom, unless otherwise specified.		

1.2. Initial Installation of Servers & Hyperconverged Systems

The Specific Requirements for Servers & Hyperconverged Systems are detailed in two (2) separate documents within the ITT pack:

- Lot 1 – Specifications General Purpose Servers and Software
- Lot 2 – Specifications Hyperconverged Systems

Requirement number	Requirement	Detailed Description	Self-Score
Functional Requirements			
M(35)	See separate documents: • Lot 1 – Specific Requirements – Servers and Software • Lot 2 – Specific Requirements – Hyperconverged Systems Tenderers must provide prices and technical specifications for an Initial Installation of the Hardware described in the above two (2) documents, which comply with the requirements specified within those documents.		
R(36)	Tenderers are asked to provide any details of Linux and VMware ESXi certification and support for the tendered Hardware, in particular which distributions of Linux and VMware ESXi have been certified.		
M(37)	(Only for servers fitted with HBA FC Cards). Each Server needs to provide enough internal bandwidth that it is possible to transfer data between storage devices connected to the FC card and a dual port 25Gib Intel Ethernet Server adapter PCI, at rates of 12Gib/s (devices to network), or 8Gib/s (network to devices), or 14Gib/s (bidirectional). It can be assumed that the devices and network are not bottlenecks.		

1.3. Additional Acquisitions of Servers & Hyperconverged Systems

The Specifications referenced in paragraph 1.2 above define Works comprising the Initial Installation to be priced by the Tenderers.

ECMWF may wish to place orders for additional deliveries of the same equipment and/or similar Hardware at any time during the contract lifetime.

<table>
<tr><th>Requirement number</th><th>Requirement</th><th>Detailed Description</th><th>Self-Score</th></tr>
<tr><td colspan="4">Future Acquisition Requirements</td></tr>
<tr><td>D(38)</td><td>In this context, ECMWF expects to purchase Hardware to meet very diverse needs over the life of the contract. Consequently, it needs the Tenderer to be able to supply a range of Server and Hyperconverged System products. For manageability and to enable hosts to function in a cluster environment all Hardware within a Lot should be from the same original equipment manufacturer.</td><td></td><td></td></tr>
<tr><td>M(39)</td><td>For purchases of Servers and Hyperconverged Systems in addition to the Initial Installation, Tenderers must agree to provide on request specimen Hardware on loan for up to 45 calendar days in order that ECMWF can establish whether the specifications of the models being considered for purchase are suitable for use in the ECMWF environment.</td><td></td><td></td></tr>
<tr><td>R(40)</td><td>Tenderers will describe the range of Servers and Hyperconverged Systems that it is currently possible to supply:
<table>
<tr><th>Feature</th><th>Request for Information</th></tr>
<tr><td>Processor architecture:</td><td>Processor range available.</td></tr>
<tr><td>Processor sockets:</td><td>Minimum and Maximum number of processor sockets.</td></tr>
<tr><td>Memory:</td><td>Maximum installable memory.</td></tr>
<tr><td>Disk Drives:</td><td>Maximum internal disk capacity installable and supported disk types.</td></tr>
<tr><td>Disk Bays:</td><td>Maximum number of disk bays.</td></tr>
<tr><td>RAID for internal disks:</td><td>Supported RAID Levels and Passthrough</td></tr>
<tr><td>Network Interfaces:</td><td>Maximum number of on board Ethernet interfaces and capability for Wake-on-LAN and PXE booting.</td></tr>
<tr><td>Form factor and size:</td><td>Rack unit and width of equipment.</td></tr>
<tr><td>Internal PCIe slots:</td><td>Number and type of PCIe slots.</td></tr>
<tr><td colspan="2">Table 6: Request for Information for Hardware</td></tr>
</table></td><td></td><td></td></tr>
</table>

Requirement number	Requirement	Detailed Description	Self-Score
Future Acquisition Requirements			
R(41)	Tenderers will provide any information regarding support for virtualisation within their product range, not limited to any specific software solution.		
R(42)	Tenderers will provide any information regarding the sustainability of their product range (e.g. energy efficiency, recyclability, environmental impact on disposal, etc.).		

1.4. Bologna Data Centre Environmental Requirements

The general arrangement of the ECMWF Bologna Data Centre is shown in the site overview drawings presented in Appendix 4:

a) Figure 1: Bologna Data Centre Layout
b) Figure 2: Bologna Data Centre - Access Routes
c) Figure 3: Bologna Data Centre - available space to Tenderer

The ECMWF Data Centre will be located in Bologna in the Emilia Romagna region of Italy.

Bologna is identified as in an area subject to seismic activity, with a description of an "intermediate risk" with a maximum anticipated acceleration of 0.166G or 1.47m/s. Tenderers are required to take account of this when considering the installation of their equipment and any necessary measures required for installation in Bologna should be identified and explained within the Tender response.

Site space/floor loadings

The layout of the area is shown in Appendix 4, Figure 3: Bologna Data Centre - available space to Tenderer

The new Data Centre environment in Bologna will meet the following requirements:

- Electrical, nominally 400V, 50 Hz, 3-phase.
- Mechanical, Air is maintained at a nominal temperature of 24˚C and 45%-50% relative humidity

Requirement number	Requirement	Detailed Description	Self-Score
Bologna Data Centre Environmental Requirements			
M(43)	Tenderers shall provide firm details of machine configurations (preferably with indicative system layout drawings), power requirements, cooling requirements, sizes, weights and rack space requirements.		
R(43)	Tenderers shall provide details of power and environmental requirements for the tendered Hardware. Tenderers will indicate how many kWh each Server consumes under normal operation.		
R(44)	Any restrictions on the distance between connected machines and items of plant shall be highlighted in the Tender.		

Requirement number	Requirement	Detailed Description	Self-Score
Bologna Data Centre Environmental Requirements			
R(45)	Tenderers shall describe the impact on the Works of potential seismic activity in Bologna up to 0.166G or 1.47m/s and if mitigating measures are required.		
R(46)	Tenderers shall state the air temperature limits and rate of change within which their equipment can operate.		
R(47)	Tenderers shall state any requirements for space in the computer rooms that is in addition to the floor space required for their Systems, for example storage space for items that must be kept in an air-conditioned environment etc.		
R(48)	Tenderers shall state any requirements they may have relating to the quality of the electrical power supply. If possible, Tenderers shall also provide details of the size and duration of voltage fluctuations that their equipment will tolerate.		
R(49)	Where equipment has multiple sources of electrical supply, Tenderers should provide details of how the equipment operates if one or more sources of supply fail, for example is the load transferred to the remaining power sources or does the equipment power down etc.		
R(50)	Tenderers are requested to highlight any aspects of their Initial Installation, including manufacturing and disposal practices, that minimise its environmental impact.		
R(51)	Tenderers shall state whether the System can be supplied directly from unconditioned mains or whether the System must be supplied via an uninterruptible power supply (UPS) system.		
R(52)	Tenderers shall provide floor plans illustrating the space required for the Initial Installation.		

1.5. Configuration, Management and Monitoring

Requirement number	Requirement	Detailed Description	Self-Score
Configuration, Management and Monitoring Requirements			
R(53)	Tenderers shall state whether their server equipment can normally be expected to come to an operational state without human intervention, following an unscheduled power loss and subsequent restoration of power. If not, the extent to which human intervention is required shall be described.		
R(54)	Tenderers shall describe the nature and frequency of any routine human intervention needed to keep the server in an operational condition.		
D(55)	The server should send notification of any required human intervention to ECMWF staff located remotely from the equipment.		
M(56)	Administrative software tools must be optionally available that enable staff to: • monitor the status of the Hardware and its components; • monitor requests that have been issued to the server by client applications; • gain access to real-time server logs;		
M(57)	The administrative software tools must be accessible remotely from the network, on other hosts in the LAN, for example through an Application Program Interface (API), or by a Web browser or dedicated Graphical User Interface (GUI).		
R(58)	Tenderers shall describe the type of monitoring and logging provided and how ECMWF staff can access that information.		
R(59)	Tenderers are asked to provide any details regarding monitoring capabilities of the tendered Hardware, in particular support for IPMI, SNMP and Self-Monitoring, Analysis and Reporting Technology (SMART) for internal disks.		
R(60)	Tenderers shall describe any diagnostic software that will be provided as part of their Initial Installation, and also any additional optional diagnostic software and state its cost.		

Requirement number	Requirement	Detailed Description	Self-Score
Configuration, Management and Monitoring Requirements			
R(61)	Tenderers shall describe the physical network interfaces that are provided to manage the Hardware.		
H(62)	It is highly desirable that microcode, firmware or other software required to run the Hardware can be quickly and easily upgraded or downgraded. Tenderers shall explain the process, impact and the time taken to perform this procedure.		
R(63)	Tenderers shall describe all management activities that cannot be achieved remotely, such as those that must be done via a front panel, field engineer's laptop or by physical manipulation.		
R(64)	Tenderers shall describe and, if applicable, give the price of any other management tools that are relevant to the Initial Installation.		

1.6. Compatibility

Requirement number	Requirement	Detailed Description	Self-Score
Compatibility Requirement			
R(65)	Tenderers shall state which hardware platforms, operating systems and server management software products support the Initial Installation.		

1.7. General Hardware Requirements.

Requirement number	Requirement	Detailed Description	Self-Score
General Hardware Requirements			
R(66)	Tenderers shall describe the recovery procedure from one of the following circumstances: • partial power loss • total power loss • loss of control path		

1.8. Operational and Support Requirements

1.8.1. Resilience and Serviceability

Requirement number	Requirement	Detailed Description	Self-Score
Resilience and Serviceability Requirements			
R(67)	Tenderers shall list and describe all service operations which would entail service disruption, such as (but not limited to): • equipment replacement (in whole or in part) • software/firmware upgrades • server preventative maintenance, etc.		
R(68)	For each major component of the server, Tenderers shall provide Mean Time Between Failures (MTBF) and Mean Time To Repair (MTTR) statistics appropriate to a 24x7x365 operational environment.		
D(69)	It is highly desirable that the Hardware is highly resilient. Tenderers shall list and describe all attributes that achieves such resilience, such as (but not limited to): dual power supplies; redundant accessors; hot-pluggable components; etc.		

Requirement number	Requirement	Detailed Description	Self-Score
Resilience and Serviceability Requirements			
M(70)	Once Hardware is operational, it is imperative that adding any server equipment to the configuration incurs minimum disruption. Tenderers shall describe the procedure that they propose for performing such installations, emphasizing any downtime required.		

1.8.2. Support of the Tendered Hardware and Software

Requirement number	Requirement	Detailed Description	Self-Score
Support of the Tendered Hardware and Software Requirements			
M(71)	Tenderers will be responsible for the provision of maintenance, spare parts, support software and all firmware & hardware acquired under this ITT. Tenderers must provide prices for the different support options described in the pricing spreadsheet.		
M(72)	Where the provision of M(71) involves an arrangement with a third party, responsibility for the provision of such maintenance and support must in any case rest with the Tenderer. Tenderers must agree with the third party to supply the maintenance and support under the contracted terms and conditions.		
R(73)	Tenderers shall describe their policy regarding maintenance, spare parts and support for the hardware, firmware and software of the Initial Installation on reaching their respective end of life. In particular, any replacement policy or policies for components that will no longer be supported should be stated.		
R(74)	Tenderers shall describe the terms and duration of any warranty on the Initial Installation and any discounts on the Maintenance and Support Services during the warranty period.		
M(75)	Tenderers must commit to a response time of less than four hours during the period of support cover for the Hardware. Where remedial action is required, Tenderers must commence such remedial action (possibly by remote means) within four hours of an initial response.		

Requirement number	Requirement	Detailed Description	Self-Score
Support of the Tendered Hardware and Software Requirements			
R(76)	In the event that a significant number of server components become unavailable at the same time, ECMWF would consider this to be a critical situation requiring immediate engineer support. Tenderers shall describe the conditions and potential costs involved in providing support against failures outside office hours, should exceptional circumstances require ECMWF to issue such a request.		
D(77)	It is desirable that Tenderers provide a quote for guaranteed hardware repair times of not more than 12 hours from the time of a fault being reported. Should such guaranteed repair time not be available, Tenderers must state what guarantees are available.		
D(78)	It is desirable that Tenderers provide a quote for a complete set of on-site spares for commonly replaceable components, explaining any processes they have to manage the stock of on-site spares and any training offered to operational staff to replace such components.		
R(79)	Tenderers shall describe the conditions under which they expect ECMWF staff to perform remedial actions such as the installation of customer replaceable units.		
R(80)	Tenderers shall state the geographical locations where support staff are located and spares are held for supporting ECMWF at Bologna.		
R(81)	Tenderers shall describe what contingency plans are in place to continue the supply of spare parts after the failure of the normal sources of such parts.		
R(82)	Tenderers shall describe how they will provide the maintenance specified. In particular they should cover how calls are taken and tracked, any escalation procedures and the involvement and responsibilities of any third party equipment manufacturers. They shall also describe whether onsite and remote support is provided by their own engineers and employees, and at what point third party engineers and employees are expected to take over management and resolution of reported issues.		
R(83)	If a Tenderer depends on third party support (e.g. reseller making use of equipment manufacturer support), said Tenderer will explain how ECMWF is able to follow the status of calls entered on behalf of ECMWF with said third party.		

Requirement number	Requirement	Detailed Description	Self-Score
Support of the Tendered Hardware and Software Requirements			
R(84)	The Tenderer will also explain what methods can be used to escalate issues, and at what point direct contact between ECMWF and said third party can be established.		
R(85)	Tenderers shall state the organisation or organisations whose staff (whether supplier, manufacturer or otherwise) will: • take and log maintenance calls for the equipment; • attend ECMWF's premises when service is required or for ad-hoc meetings; • track the overall performance of the maintenance operation.		
R(86)	Tenderers shall explain the options for providing field engineer standby for the Bologna site during normal business hours basis. Tenderers shall describe what other services a field engineer could provide on-site.		
R(87)	Tenderers shall describe what type of help and support will be made available to ECMWF once the Hardware has been installed and accepted. In particular, Tenderers shall state which of the following will be available: • remote diagnosis service; • "Call-Home" functionalities where a component reports errors to a remote support centre; • corrective action to rectify software bugs and performance limiting factors; • response to simple telephone enquiries; • detailed response to more complicated enquiries; • escalation procedures for problems that cannot be fixed in a timely manner; • software/firmware upgrades; • preventative maintenance; • regular (monthly/quarterly) support review meetings.		

Requirement number	Requirement	Detailed Description	Self-Score
Support of the Tendered Hardware and Software Requirements			
R(88)	Tenderers shall describe any remote monitoring and diagnostic capabilities, such as analytics that may be used to proactively identify failures.		
R(89)	Tenderers shall make clear exactly what support and assistance are included in their Maintenance and Support Service, tendered in response to the Initial Installation, and which are provided at additional cost. The cost for any such additional Services shall be given in Annex 0.		

1.8.3. Security of ECMWF Information Assets

Requirement number	Requirement	Detailed Description	Self-Score
Security Requirements			
R(90)	Tenderers should describe support and engineering roles and levels of access required.		
R(91)	Tenderers shall describe their remote diagnostic service and explain: a) the rules for how such a service could operate through ECMWF's firewall; b) what scope there is for remote services personnel to access other equipment at ECMWF not supplied by the Tenderer; c) their procedures to protect their remote access to ECMWF, including monitoring for unauthorised use and their procedures in the event of misuse or security breach.		
R(92)	Tenderers are requested to supply their endpoint security policies for any device used to carry out local or remote service, this should include any measures taken for the physical protection of such devices.		
R(93)	Tenderers shall describe how their personnel are trained in information security, and how they would be informed of the security policies of ECMWF.		
R(94)	Tenderers shall describe how they monitor and manage technical vulnerabilities in firmware, and how these are corrected for.		

1.8.4. Documentation

Requirement number	Requirement	Detailed Description	Self-Score
Documentation Requirements			
M(95)	Tenderers must provide access to relevant documentation for the Hardware, describing where these documents can be accessed.		

Appendix 3 Pricing for Initial Installation, Further Call-Offs and Agreement

ECMWF expects to see full pricing transparency in your response with summary level views and itemised breakdowns (where applicable), and to be able to understand the figures without the need to clarify with the Tenderer in question.

Where applicable, please ensure that all and any conditions and/or restrictions are made explicit e.g. unanticipated expenditures (rush charges, etc.) and including the net pass-through of third party costs/commissions/discounts.

When providing full and transparent breakdown of any summary figures, be specific on how these are derived i.e. unit costs, day rates, quantities, discounts, exchange rate, how effort is split between phases of work, etc.

1.9. Pricing and Agreement

Requirement number	Requirement	Detailed Description	Self-Score
Pricing and Agreement			
M(96)	ECMWF requires Tenderers to contract with ECMWF to cover all the Works and all related costs, including the following: • all equipment; • all software/firmware licences relating to the Works (if applicable) and including but not limited to any cost related to licence keys required to unlock features required to satisfy the requirements set below; • all Maintenance and Support Services, are required for 24hours/day, 7 days/week for the equipment and software (if applicable) based on 3 -year parts, 3-year labor and (optional) 3-year onsite support – you must also detail all the support level options and associated SLAs; • site preparation including any connections that are needed to ECMWF's infrastructure • delivery and installation and miscellaneous ancillary equipment; • acceptance testing • support during the stabilization period after a system launch i.e. "hypercare" (expected to be two months duration) • documentation and training;		

Requirement number	Requirement	Detailed Description	Self-Score
Pricing and Agreement			
M(97)	Tenderers must provide a summary of their pricing and discounts for **Lots 1 and/or 2** using the spreadsheet "**ITT019 – Servers and Hyperconverged Systems – Pricing Spreadsheet.xlsx**". No pricing or discount information should appear elsewhere in Tenders.		
M(98)	For the Initial Installation all prices must: a. encompass the costs of the mandatory features as described in this ITT; b. be quoted in Euros (€) c. be inclusive of shipping, delivery and site preparation charges; d. be inclusive of installation charges and all relevant cabling and miscellaneous ancillary equipment; e. be exclusive of all appropriate import duties and UK and / or Italian taxes; f. be valid for three (3) months after the closing date for receipt of tenders.		
M(99)	Items deemed desirable in this ITT (marked **D**) must, where appropriate, be priced separately. Where the pricing of such an item depends upon the implementation or installation of an item not deemed mandatory (marked **M**), this dependency must be stated explicitly.		
M(100)	Tenderers must quote firm and fixed prices for the Initial Installation.		
M(101)	For additional call off purchases made at any time during the contract lifetime the Tenderers must: • provide list prices current at the closing date of this ITT and also explain how future list prices will be made available on demand to ECMWF during the course of the contract. • provide guaranteed levels of discount on their standard list prices for all components of the Works. However, if such a form of price guarantee is not acceptable to the Tenderer, then they must include a proposal for price variation for all the components of the Works; such proposal must include a formula for calculating maximum prices, preferably based on the Tenderer's list price or a capacity model, that offers the **best possible value for money** over the life of the call-off contract. • be exclusive of all appropriate import duties and UK or Italian taxes.		

1.10. Pricing Spreadsheet

The Server and Hyperconverged Systems pricing spreadsheet is in a separate document within the ITT pack:

- ITT019 – Servers and Hyperconverged Systems – Pricing Spreadsheet.

Appendix 4 Floor space for the Server deployments

Figure 1: Bologna Data Centre Layout

Figure 2: Bologna Data Centre - Access Routes

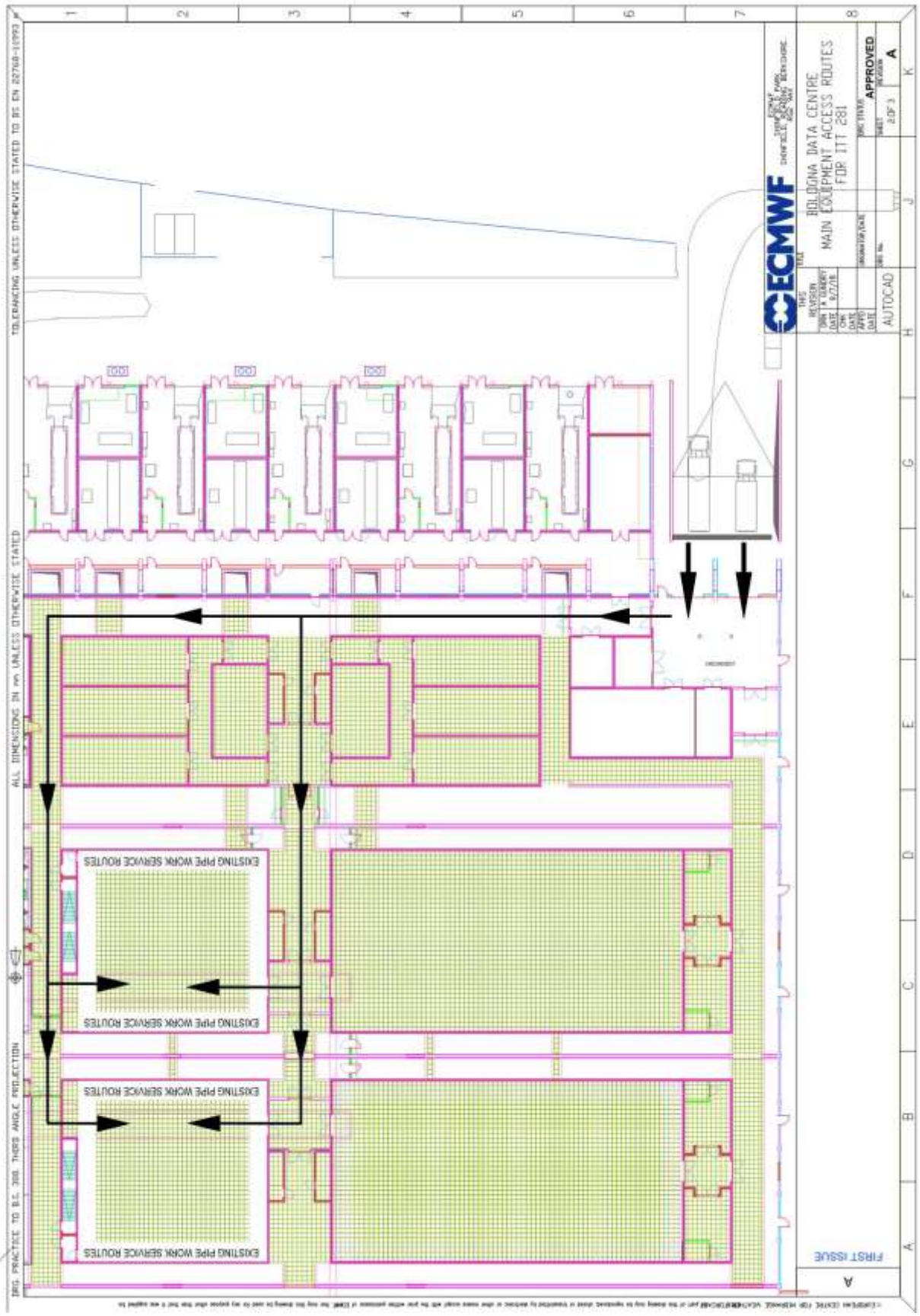
ECMWF
BOLOGNA DATA CENTRE
MAIN EQUIPMENT ACCESS ROUTES
FOR ITT 281
APPROVED
AUTOCAD
FIRST ISSUE
EXISTING PIPE WORK SERVICE ROUTES
EXISTING PIPE WORK SERVICE ROUTES
EXISTING PIPE WORK SERVICE ROUTES
EXISTING PIPE WORK SERVICE ROUTES

Figure 3: Bologna Data Centre - available space to Tenderer