Purchase Contract

(hereafter the "**Contract**")

1. CONTRACTUAL PARTIES

1.1 **Fyzikální ústav AV ČR, v. v. i.,**

with seat: Na Slovance 1999/2, 182 21 Praha 8, Czech Republic
represented by: RNDr. Michael Prouza, Ph.D., Director,
registered in the Register of public research institutions of the Ministry of Education, Youth and Sports of the Czech Republic.
ID No.: 68378271
Tax ID No.: CZ68378271

Bank: [redacted]
Account No. IBAN: [redacted]; SWIFT (BIC): [redacted]

(hereinafter the "**Buyer**")

and

1.2 **M Computers s.r.o.,**

with seat: Úlehlova 3100/10, 628 00 Brno-Líšeň,
represented by: Marek Vašíček, Executive,
registered at Local Court in Brno, Section C, Insert 121840.
ID No.: 26042029
Tax ID No.: CZ26042029

Bank: [redacted]
Account No. IBAN: [redacted]; SWIFT (BIC): [redacted]

(hereinafter the "**Seller**"),

(the Buyer and the Seller are hereinafter jointly referred to as the "**Parties**" and each of them individually as a "**Party**").

2. FUNDAMENTAL PROVISIONS

2.1 The Buyer is a public research institution whose primary activity is excellent scientific research in the area of physics, especially elementary particles physics, condensed systems, plasma and optics.

2.2 The Buyer wishes to acquire the subject of performance hereof in order to carry out cosmological N-Body simulations, solve non-linear partial differential equations on a lattice and to perform Monte Carlo Markov Chain based parameter estimation.

2.3 The Buyer is the beneficiary of the subsidy for the project **"Cosmology, Gravitation and Dark Sector – CoGraDS"**, Reg. No CZ.02.1.01/0.0/0.0/15_003/0000437 (hereinafter the **"Project"**), within the Operational Program Research, Development and Education (hereinafter the **"OP RDE"**) of the provider Ministry of Education, Youth and Sports of the Czech Republic. The subject of this public contract will be co-financed by the EU Structural Funds.

2.4 The Seller was selected as the winner of a public procurement procedure announced by the Buyer in accordance with Act No. 134/2016 Coll., on Public Procurement, as amended (hereinafter the "**Act**"), for the public contract called **"High-Performance computer cluster with GPU's for solving partial differential equations and running cosmological N-Body simulations"** (hereinafter the "**Procurement Procedure**"). Both the Procurement Procedure and the Contract shall be governed by the Act and the Rules for applicants and beneficiaries of OP RDE, which are publicly accessible and are binding on the Parties.

2.5 The documentation necessary for the execution of the subject of performance hereof consist of

2.5.1 Technical specifications of the subject of performance hereof attached as **Annex No. 1** hereto**.**

2.5.2 The Seller´s bid submitted within the Procurement Procedure in its parts which describe the subject of performance in technical detail (hereinafter the "**Sellers's Bid**"); the Sellers's Bid forms **Annex No. 2** to this Contract and is an integral part hereof.

In the event of a conflict between the Contract's Annexes, the technical specification / requirement of the higher level / quality shall prevail.

2.6 The Seller declares that he has all the professional prerequisites required for the supply of the subject of performance under this Contract, is authorised to supply the subject of performance and there exist no obstacles on the part of the Seller that would prevent him from supplying the subject of this Contract to the Buyer.

2.7 The Seller acknowledges that the Buyer considers him capable of providing performance under the Contract with such knowledge, diligence and care that is associated and expected of the Seller's profession, and that the Seller's potential performance lacking such professional care would give rise to corresponding liability on the Seller's part. The Seller is prohibited from misusing his qualities as the expert or his economic position in order to create or exploit dependency of the weaker Party or to

establish an unjustified imbalance in the mutual rights and obligation of the Parties.

2.8 The Seller acknowledges that the Buyer is not in connection to the subject of this Contract an entrepreneur and also that the subject of this Contract is not related to any business activities of the Buyer.

2.9 The Seller acknowledges that the production, delivery and handover of the subject of performance within the specified time and of the specified quality, as shown in Annexes No. 1 and 2 of this Contract (including invoicing), is essential for the Buyer.

2.10 The Parties declare that they shall maintain confidentiality with respect to all facts and information, which they learn in connection herewith and / or during performance hereunder, and whose disclosure could cause damage to either Party. Confidentiality provisions do not prejudice obligations arising from valid legislation.

3. SUBJECT-MATTER OF THE CONTRACT

3.1 The subject of this Contract is the obligation on the part of the Seller to deliver and transfer into the Buyer's ownership:

the High-Performance computer cluster with GPU's for solving partial differential equations and running cosmological N-Body simulations

(hereafter the **"Equipment"**)

and the Buyer undertakes to take delivery of the Equipment and to pay to the Seller the agreed upon price.

3.2 The following activities form an integral part of the performance to be provided by the Seller:

3.2.1 Transport of the Equipment incl. all accessories specified in Annexes 1 and 2 of the Contract to the site, un-packaging and control thereof,

3.2.2 Installation of the Equipment including connection to installation infrastructure at the site,

3.2.3 Execution of the acceptance tests specified in Annex 1 of the Contract,

3.2.4 Delivery of instructions and operating and repair manuals Equipment in Czech and English language to the Buyer, in electronic and hardcopy (printed) versions,

3.2.5 Free-of-charge warranty service,

3.2.6 Provision of technical support in the form of consultations during the warranty period.

3.3 The subject of performance (Equipment) is specified in detail in Annexes No. 1 and No. 2 hereto.

3.4 The Seller shall be liable for the Equipment and related services to be in full compliance with this Contract, its Annexes and all valid legal regulation, technical and quality standards and that the Buyer will be able to use the Equipment for the defined purpose. In case of any conflict between applicable standards it is understood that the stricter standard or its part shall always apply.

3.5 The Equipment and all its parts and accessories must be brand new, unused and intended for the end customer Fyzikální ústav AV ČR, v. v. i.

4. PERFORMANCE PERIOD

4.1 The Seller undertakes to deliver, install and handover the Equipment to the Buyer within **12 weeks** of the conclusion of the Contract.

4.2 The performance period shall be extended by a period during which the Seller could not perform due to obstacles on the part of the Buyer and / or obstacles beyond the control of both Parties.

4.3 If circumstances arise in the area of supplies of IT products that would result in the Seller not being able to perform within the period under the Contract, the Buyer will agree to extend the performance period accordingly. The Buyer reserves the right to refuse such an extension, during which the performance period would exceed 7 months.

5. PURCHASE PRICE, INVOICING, PAYMENTS

5.1 The purchase price is based on the Seller's submitted bid and amounts to **13 160 000,00 CZK** (in words: thirteen million one hundred and sixty thousand Czech crowns) excluding VAT (hereinafter the **"Price"**). VAT shall be paid by the Buyer and settled in accordance with the valid Czech regulation.

5.2 The Price represents the maximum binding offer by the Seller and includes any and all performance provided by the Seller in connection with meeting the Buyer's requirements for the proper and complete delivery of the Equipment hereunder, as well as all costs that the Seller may incur in connection with the delivery, installation and handover, and including all other costs or expenses that may arise in connection with creation of an intellectual property and its protection.

5.3 The Parties agreed that the Seller shall be entitled to invoice the Price after the Handover Protocol in accordance with Section 10.5 will have been signed. In case the Equipment will be handed over with minor defects and / or unfinished work, the Price shall be invoiced after removal of these minor defects and / or unfinished work.

5.4 All invoices issued by the Seller must contain all information required by the applicable laws of the Czech Republic. Invoices issued by the Seller in accordance with this Contract shall contain in particular following information:

5.4.1 name and registered office of the Buyer,

5.4.2 tax identification number of the Buyer,

5.4.3 name and registered office of the Seller,

5.4.4 tax identification number of the Seller,

5.4.5 registration number of the tax document (invoice),

5.4.6 scope of the performance (including the reference to this Contract),

5.4.7 the date of the issue of the tax document (invoice),

5.4.8 the date of the conclusion of the Contract,

5.4.9 purchase Price,

5.4.10 registration number of this Contract, which the Buyer shall communicate to the Seller based on Seller's request before the issuance of the invoice

5.4.11 5.4.11 declaration that the performance of the Contract is for the purposes of the project "Cosmology, Gravitation and Dark Sector – CoGraDS", Reg. No.: CZ.02.1.01/0.0/0.0/15_003/0000437

and must comply with the double taxation agreements, if applicable.

5.5 The Buyer prefers electronic invoicing, with the invoices being delivered to efaktury@fzu.cz. All issued invoices shall comply with any international double taxation agreements, if applicable.

5.6 Invoices shall be payable within thirty (30) days of the date of their delivery to the Buyer. Payment of the invoiced amount means the date of its remittance to the Seller's account.

5.7 If an invoice is not issued in conformity with the payment terms stipulated by the Contract or if it does not comply with the requirements stipulated by law, the Buyer shall be entitled to return the invoice to the Seller as incomplete, or incorrectly issued, for correction or issue of a new invoice, as appropriate, within five (5) business days of the date of its delivery to the Buyer. In such a case, the Buyer shall not be in delay with the payment of the Price or part thereof and the Seller shall issue a corrected invoice with a new and identical maturity period commencing on the date of delivery of the corrected or newly issued invoice to the Buyer.

5.8 The Buyer shall be entitled to unilaterally set off any of his payments against any receivables claimed by the Seller due to:

5.8.1 damages caused by the Seller,

5.8.2 contractual penalties.

5.9 The Seller shall not be entitled to set off any of his receivables against any part of the Buyer's receivable hereunder.

6. OWNERSHIP TITLE

6.1 The ownership right to the Equipment shall pass to the Buyer by handover. Handover shall be understood as delivery and acceptance of the Equipment duly confirmed by Parties on the Handover Protocol in accordance with Section 10.5.

7. PLACE OF DELIVERY AND HANDOVER OF THE EQUIPMENT

7.1 The place of delivery of the Equipment shall be the Server Computing Center of the Fyzikální ústav AV ČR, v. v. i., at Na Slovance 1999/2, Praha 8, Czech Republic.

8. PREPAREDNESS OF THE PLACE OF DELIVERY AND HANDOVER

8.1 The Seller shall notify the Buyer in writing of the exact date of installation of the Equipment at least 15 days prior to such date, ensuring that the deadline for the performance hereunder is maintained.

8.2 The Buyer shall be obliged to allow the Seller, once the deadline set forth in Section 8.1 hereof expires, to install the Equipment at the place of delivery and handover.

9. COOPERATION OF THE PARTIES

9.1 The Seller undertakes to notify the Buyer of any obstacles on his part, which may negatively influence proper and timely delivery and handover of the Equipment.

10. DELIVERY, INSTALLATION, HANDOVER AND ACCEPTANCE

10.1 The Seller shall transport the Equipment at his own cost to the place of delivery and handover. If the shipment is intact, the Buyer shall confirm the delivery note for the Seller.

10.2 The Seller shall perform and document the installation of the Equipment and launch acceptance tests in order to verify whether the Equipment is functional and meets the technical requirements of Annexes No. 1 and 2 hereof.

10.3 In the event that within the computing power acceptance tests specified in Annex No. 1 to the Contract the Equipment does not reach computing power declared in the Sellers's Bid, the Buyer is entitled to a

discount of 150 000,- CZK from the Price for each (started) percentage by which the computing power of the HPC cluster achieved within the acceptance test is lower than the computing power of the HPC cluster declared in the Sellers's Bid.

10.4 Handover procedure includes handover of any and all technical documentation pertaining to the Equipment, user manuals and certificate of compliance of the Equipment and all its parts and accessories with approved standards.

10.5 The handover procedure shall be completed by handover of the Equipment confirmed by the Handover Protocol containing specifications of all performed tests. The Handover Protocol shall contain the following mandatory information:

10.5.1 Information about the Seller, the Buyer and any subcontractors;

10.5.2 Description of the Equipment including description of all components, their and serial numbers;

10.5.3 Description of executed acceptance tests: type of test, duration and achieved parameters;

10.5.4 List of technical documentation including the manuals;

10.5.5 Eventually reservation of the Buyer regarding minor defects and unfinished work including the manner and deadline for their removal and

10.5.6 Date and signatures of the persons mentioned in Sections 13.1 and 13.2.

10.6 Handover of the Equipment does not release the Seller from liability for damage caused by its defects.

10.7 The Buyer shall not be obliged to accept Equipment which would show defects or unfinished work that would otherwise not form a barrier, on their own or in connection with other defects, to using the Equipment. In this case, the Buyer shall issue a record containing the reason for his refusal to accept the Equipment.

10.8 Should the Buyer not exercise his right not to accept the Equipment with defects or unfinished work, the Seller and the Buyer shall list these defects or unfinished work in the Handover Protocol, including the manner and deadline for their removal. Should the Parties not be able to agree in the Handover Protocol on the deadline for removal of the defects, it shall be understood that any defects shall be removed / rectified within 72 hours from the handover of the Equipment.

11. SYSTEM UPGRADE

11.1 The Buyer reserves the right to upgrade the system through the Seller or other qualified person.

11.2 For the purpose of this Contract, the upgrade is in particular installation of new nodes in the same

racks, installation of new memory or new disks within the existing nodes or adding new disks or controllers to the storage system.

11.3 In the event that the system upgrade is performed by another qualified person, the Buyer shall inform the Seller in advance of two weeks of the upgrade and of the person providing the upgrade and shall provide the Seller with the option to inspect the upgrade at his own cost.

12. TECHNICAL ASSISTANCE – CONSULTATIONS

12.1 The Seller shall be obliged to provide to the Buyer free-of-charge technical assistance by phone or e-mail relating to the Equipment during the entire term of the warranty period. The Seller undertakes to provide to the Buyer paid consultations and technical assistance also after the warranty period expires.

13. REPRESENTATIVES, NOTICES

13.1 The Seller authorized the following representatives to communicate with the Buyer in all matters relating to the Equipment delivery and handover:

[redacted]

13.2 The Buyer authorized the following representatives to communicate with the Seller in all matters relating to the Equipment delivery and handover:

[redacted]

13.3 All notifications to be made between the Parties hereunder must be made out in writing and delivered to the other Party by hand (with confirmed receipt) or by registered post (to the Buyer's or Seller's address), or in some other form of registered post or electronic delivery incorporating electronic signature (qualified certificate) to epodatelna@fzu.cz in case of the Buyer and to obchod@mcomputers.cz in case of the Seller.

13.4 In all technical and expert matters (discussions on the Equipment testing and demonstration, notification of the need to provide warranty or post-warranty service, technical assistance etc.) electronic communication between technical representatives of the Parties will be acceptable using e-mail addresses defined in Sections 13.1 and 13.2.

14. TERMINATION

14.1 This Contract may be terminated early by agreement of the Parties or withdrawal from the Contract on the grounds stipulated by law or in the Contract.

14.2 The Buyer is entitled to withdraw from the Contract without any penalty from the Seller in any of the following events:

14.2.1 The Seller is in delay with the handover of the Equipment longer than 2 weeks after the date pursuant to Section 4.1 hereof.

14.2.2 The technical parameters or other conditions set out in the technical specifications in Annexes 1 and 2 to this Contract and in the relevant applicable technical standards will not be met by the Equipment at acceptance.

14.2.3 Facts emerge bearing evidence that the Seller will not be able to deliver or hand over the Equipment.

14.2.4 The Seller was convicted of a misdemeanor or other serious infringement in the field of labour law and/or regulations concerning employment, health and safety at work within the proceedings initiated by a public authority.

14.2.5 The Seller was convicted of a misdemeanor or other serious infringement in the field of environmental law within the proceedings initiated by a public authority.

14.3 The Seller is entitled to withdraw from the Contract in the event of the Buyer being in default with the payment for more than 2 months with the exception of the cases when the Buyer refused an invoice due to defect on the delivered Equipment or due to breach of the Contract by the Seller.

14.4 Withdrawal from the Contract becomes effective on the day the written notification to that effect is delivered to the other Party. The Party which had received performance from the other Party prior to such withdrawal shall duly return such performance.

15. INSURANCE

15.1 The Seller undertakes to insure the Equipment against all risks, in the amount of the Price of the for the entire period commencing when transport of the Equipment starts until duly handed over to the Buyer. In case of breach of this obligation, the Seller shall be liable to the Buyer for any damage that may arise.

15.2 The Seller is liable for the damage that he has caused. The Seller is also liable for damage caused by third parties undertaken to carry out performance or its part under this Contract.

16. WARRANTY TERMS

16.1 The Seller shall provide warranty for a period of **60 months**.

16.2 The warranty term shall commence on the day following the date of signing of the Handover Protocol pursuant to Section 10.5 hereof.

16.3 The warranty covers the wear-out of SSDs and any HDDs.

16.4 The Seller undertakes to provide service support under the 8x5xNBD On-Site (NBD = Next Business Day) during the warranty period. Replacement of defective components is obligatory for the Seller to perform only at the place of installation of the Equipment. The repair time may not exceed 14 calendar days for compute nodes and 3 business days for other components. Seller is obliged to deliver a replacement HW before removing the HW claimed.

16.5 Should the Buyer discover a defect, he shall notify the Seller to rectify such defect using the e-mail address: support@mcomputers.cz. The Seller is obliged to notify the Buyer without delay about any change of this e-mail address.

16.6 Any component which carries its own warranty shall have the warranty period for the period specified therein but at least for the period defined in 16.1.

16.7 During the warranty period, any and all costs associated with defect rectification / repair including transport and travel expenses of the Seller shall be always borne by the Seller.

16.8 The repaired Equipment shall be handed over by the Seller to the Buyer on the basis of a protocol confirming removal of the defect (hereinafter the "**Repair Protocol**") containing confirmations of both Parties that the Equipment was duly repaired and is defect-free.

16.9 The repaired portion of the Equipment shall be subject to a new warranty term in accordance with Section 16.1 which commences to run on the day following the date when the Repair Protocol was executed.

16.10 For the duration of the warranty, the Seller undertakes to provide the Buyer for free with all relevant SW releases and SW versions of the active elements and minor SW releases for the application software offered by the manufacturer so that the delivered solution is in accordance with the Buyer's requirements set out in Annex No. 1. and works without any defects. The Seller further undertakes to obtain the SW products required in a legal way under the conditions specified by the Equipment manufacturer.

16.11 If the Equipment has defects, due to which it cannot be demonstrably used in full for more than 60 days (period of defects) during six or less consecutive months of the warranty period, the Seller is obliged to deliver new Equipment without defects within 60 days from the date on which the Buyer sent a written notice, unless the Parties agree otherwise.

16.12 In the case of system upgrade in accordance with Section 11., all the warranty terms herein shall remain valid. In the event that the system upgrade is performed by another qualified person, this warranty shall not cover any new components installed as a result of this upgrade. If the Seller refuses to perform a warranty repair due to a defective upgrade performed by a qualified person, he is required to specify the upgrade defect in sufficient detail. The burden of proof to prove defective performance lies with the Seller.

17. CONTRACTUAL PENALTIES

17.1 The Buyer shall have the right to a penalty in the amount of 0.1 % of the Price for each commenced day of delay with the performance pursuant to Section 4.1 hereof.

17.2 The Buyer is entitled to reimbursement for each commenced day of delay in removing defects covered by the warranty pursuant to Section 16.4 hereof in the amount of

17.2.1 12.000,- CZK in cases where the subject of performance delivers only 50 % or less of the maximum capacity of the particular affected subsystem;

17.2.2 3.000,- CZK in cases where the subject of performance delivers more than 50 % of the maximum capacity of the particular affected subsystem.

For the purpose of this Section, GPU and CPU compute nodes are considered separate subsystems.

17.3 In case of default in payment of any due receivables (monetary debt) under the Contract, the defaulting Buyer or Seller (the debtor) shall be obliged to pay a contractual penalty in the amount of 0.1 % of the owed amount for each commenced day of delay with the payment.

17.4 Contractual penalties are payable within 30 days of notification demanding payment thereof.

17.5 Payment of the contractual penalty does not prejudice the rights of the Parties to claim damages.

17.6 Payment of the contractual penalty cannot be demanded if the breach of the contractual obligation causes force majeure. Circumstances related to the Covid-19 epidemic shall be considered as force majeure cases despite the fact the epidemic is already underway at the date of this Contract.

18. DISPUTES

Any and all disputes arising out of this Contract or the legal relationships connected with the Contract shall be resolved by the Parties by mutual negotiations. In the event that any dispute cannot be resolved by negotiations within sixty (60) days, the dispute shall be resolved by the competent court in the Czech Republic based on application of any of the Parties; the court having jurisdiction will be the court where the seat of the Buyer is located. Disputes shall be resolved exclusively by the law of the

Czech Republic.

19. ACCEPTANCE OF THE PROJECT RULES

The Seller, using all necessary professional care, shall cooperate during financial inspections carried out in accordance with Act No. 320/2001 Coll., on Financial Inspections, as amended, or during other financial inspections carried out by any auditing entities (particularly by the Managing Authority of the Operational Program Research, Development and Education) and shall allow access also to those portions of the bid submitted within the Procurement Procedure, the Contract and related documents which may be protected by special legal regulation, given that all requirements set forth by legal regulation with respect to the manner of executing such inspections will have been observed.

20. FINAL PROVISIONS

20.1 This Contract represents the entire agreement between the Buyer and the Seller. The relationships between the Parties not regulated in this Contract shall be governed by the Act No. 89/2012 Coll., the Civil Code, as amended (hereinafter the **"Civil Code"**).

20.2 In the event that any of the provisions of this Contract shall later be shown or determined to be invalid, ineffective or unenforceable, then such invalidity, ineffectiveness or unenforceability shall not cause invalidity, ineffectiveness or unenforceability of the Contract as a whole. In such event the Parties undertake without undue delay to subsequently clarify any such provision or replace after mutual agreement such invalid, ineffective or unenforceable provision of the Contract by a new provision, that, in the extent permitted by the laws and regulations of the Czech Republic, relates as closely as possible to the intentions of the Parties to the Contract at the time of creation hereof.

20.3 This Contract may be changed or supplemented solely by means of numbered amendments in writing, furnished with the details of time and place and signed by duly authorised representatives of the Parties. The Parties expressly reject modifications to the Contract in any other manner.

20.4 The Parties expressly agree that the Contract as a whole, including all attachments and data on the Parties, subject-matter of the Contract, numerical designation of this Contract, the Price and the date of the Contract conclusion, will be published in accordance with Act No. 340/2015 Coll. on special conditions for the effectiveness of some contracts, publication of these contracts and Contract Register, as amended (hereinafter the "**CRA**"). The Parties hereby declare that all information contained in the Contract and its Annexes is not considered trade secrets under § 504 of the Civil Code and grant permission for their use and disclosure without setting any additional conditions.

20.5 The Parties agree that the Buyer shall ensure the publication of the Contract in the Contract Register in accordance with CRA.

20.6 This Contract becomes effective as of the day of its publication in the Contract Register.

20.7 The following Annexes form an integral part of the Contract:

Annex No. 1: Technical specification on the subject of performance

Annex No. 2: Technical description of the Equipment as presented in Seller's bid

Annex No. 3: Affidavit according to § 6 paragraph 4 of the Act

20.8 The Parties, manifesting their consent with the entire contents of this Contract, attach their signature hereunder.

In Prague	In Brno
For the Buyer:	For the Seller:
1. 12. 2021	26. 11. 2021
_____	_____
RNDr. Michael Prouza, Ph.D.	Marek Vašíček
Director	Executive

Annex No. 1 - Technical specification on the subject of performance

1 Acceptance tests

1.1 The Seller must verifiably and reproducibly demonstrate that the cluster meets the specified performance parameters during the acceptance tests once the cluster is installed. The tests mentioned below will be performed on the cluster to verify the Seller's performance claims.

1.2 In case of failure to achieve the specified performance, the Seller will have the option to optimize the hardware so that the system reaches the stated performance, but the acceptance protocol will not be signed until the stated performance is achieved.

1.3 **Test 1** - The minimum performance of any compute/GPU node
1.3.1 at least 440 points, as measured by the tool SPEC2017 FP, **Rate**, base.
1.3.2 at least 220 points, as measured by the tool SPEC2017 FP, Speed, base.

1.4 **Test 2** – The minimum performance of any login front-end node:
1.4.1 At least 370 points, as measured by the tool SPEC2017 FP, **Rate**, base.
1.4.2 At least 180 points, as measured by the tool SPEC2017 FP, Speed, base.

The results of the performance tests 1 and 2 must be supplied by running the benchmark on each of compute, GPU and login front-end nodes. During tests, the Buyer will have the root access to the particular tested node.

1.5 **Test 3** - The speed of the storage system will be measured for writing of a large data file from 8 clients from a single compute node, having the FS mounted over Infiniband. It will be determined using:

iozone -t 8 -Mce -s1000g -r256k -i0 -i1 -F file1 file2 file3 file4 file5 file6 file7 file8

Important are the results "Children see throughput for 8 initial writers" (for writing) and "Children see throughput for 8 readers" (for reading). The results of all tests must be for iozone version 3.490 (http://www.iozone.org).). The test will be performed on the storage disk arrays to verify the Seller's claim.

The minimum result of Test 3 should be:

- Read: at least 3.8 GB/s
- Write: at least 3.1 GB/s

- The determination of speed must not be based on a presumption of specific favourable conditions or a specific favourable measurement mode (e.g. cache operations), unless such

conditions or a mode are explicitly required or stated.

- The determination of data storage speed must be stated for the proposed/delivered configuration designed for standard operation (with full storage capacity). It must not be based on presumptions which cannot be ensured or which restrict the use of the data storage or other data storage solutions or which do not comply with the requirements or possible interests of the Buyer.

1.6 **Test 4**: System stability test. The test will be performed by a parallel Linpack HPL benchmark running as a multi-node task using MPI at all compute nodes (running on all CPU but not GPUs) for an uninterrupted 48-hour period. The HPL benchmark configuration file (HPL.dat) for the system stability test will be provided by the Buyer. At the same time, the Buyer will have the root access to the individual compute nodes during the stability test run in order to monitor the CPU load and temperature. Installation, compilation, and commissioning of the HPL test for system stability test will be carried out by the Seller.

1.7 **Test 5**: Infiniband Test. For this test, the Seller will establish an appropriate test environment on the systems, including IPoIB implementation (IP over Infiniband). The bandwidth of all Infiniband connections will be tested by an appropriate tool in this environment. It is possible to use e.g. iperf over the IPoIB network for each pair of servers connected to the Infiniband network. The bandwidth measurement for each connection must not be shorter than 5 minutes. The resulting bandwidth of each connection must be at least 90% from the nominal link speed. Gradual measurement is permitted, i.e. Seller does is not required to test all connections simultaneously.

2 Notes and definitions

2.1 Data speed/capacity are stated in units of

- 2.1.1 1MB = 1000000 bytes
- 2.1.2 1GB = 1000 MB
- 2.1.3 1TB = 1000 GB
- 2.1.4 1Gbit = 100000000 bits

2.2 Net usable capacity:

- 2.2.1 Net usable capacity of a storage solution is defined as the space available to the user as configured, not taking into account e.g. capacity used for protection (parity or mirroring) in redundant systems
- 2.2.2 The determination of the net usable capacity of a data storage solution must be stated for the proposed/delivered configuration designed for the standard operation and must not be based on presumptions, which cannot be ensured or which restrict the use of the data storage or other data storage solutions or which do not comply with the requirements or possible interests of the Client.

2.2.3 The determination of the net usable capacity must not count on or take into account system features or its components as potential additional space for data storage based upon presumptions, which cannot be ensured (compression, deduplication, etc.) or to allocate more space than it is physically possible or actually feasible without the need for other actions (oversubscription).

2.2.4 The tools, solutions used to determine the capacity must provide credible information and must work with a known size of a data block or a known and accurate unit.

Tab. 1: The Equipment must meet the technical conditions and include components listed in this table.
- DŮVĚRNÉ

No.	Description and minimum specification of the Equipment as defined by the Buyer	Description and specification of the Equipment offered by the Seller	Complies YES/NO
	1. General Cluster specifications		
1	The cluster is composed of: - A number of compute nodes - Two login front-end nodes - GPU nodes Storage system.		YES
2	The cluster must fit in one water-cooled rack which already exists at the premises of the Buyer. All nodes and switches must be rack mountable. Rack-mounting equipment must be part of the delivery and included in the Price.	Cluster will fit in one exists water-cooled rack. Rack-mounting equipment will be as a part of the delivery and included in the Price.	YES
3	The Seller must supply all necessary cables.	All necessary cables included	YES
	2. Common requirements for compute, GPU and login front-end nodes		
4	Each node must have support for PCI-e v4.0 minimum.	All node support PCI-E 4.0	YES
5	Nodes must have at least one 10Gb Ethernet adapter. Both Fibre or Copper based implementations of Ethernet are allowed.	Nodes have at least one 10GbE adapter. Cooper based	YES
6	Ethernet adapter must support booting through PXE.	Ethernet adapter support booting through PXE	YES
7	Each node must have one InfiniBand adapter, PCI-e 3.0 (or later) equipped with at least one EDR(or HDR) 100 Gb/s (or faster) port.	Each node have one InfiniBand adapter, PCI-E 3.0 (or later) equipped with at least one HDR100 port	YES
8	Nodes must contain OOB management controller (BMC)	Nodes contain OOB management controller (BMC)	YES
9	OOB management controller must be compatible with specification IPMI 2.0 or higher.	OOB management controller is compatible with specification IPMI 2.0 (HPE iLO)	YES
10	OOB management controller must provide at least following functionalities: – Remote power management (switch on,	OOB management controller provide at least following functionalities: - Remote power management (switch on, switch off, reset)	YES

	switch off, reset) – Remote health monitoring of the server (functionality of fans, temperature of the CPUs and motherboard) – Remote changing the boot sequence – API allowing implementation of power-saving features, e.g. IPMI or Redfish is implemented at the login front-end, compute and GPU compute nodes.	- Remote health monitoring of the server (functionality of fans, temperature of the CPUs and motherboard) - Remote changing the boot sequence - API allowing implementation of power-saving features, e.g. IPMI or Redfish is implemented at the login front-end, compute and GPU compute nodes.	
11	Specified functionalities of OOB management controller must be accessible from the command line from remote Linux system connected to the BMC via Ethernet interface.	Specified functionalities of OOB management controller is accessible from the command line from remote Linux system connected to the BMC via Ethernet interface	YES
12	OOB management controller can share Ethernet interface with the cluster node.	OOB management controller will be in own port	YES
13	Each node must allow local access to the console (keyboard, monitor) and support booting from an external device (USB drive).	Each node allow local access to the console (keyboard, monitor) and support booting from an external device (USB drive)	YES
14	Each node must allow remote access to the console (keyboard, monitor) and support boot from remote device (virtual media)	Each node allow remote access to the console (keyboard, monitor) and support boot from remote device (virtual media)	YES
15	Remote access to the console (keyboard, monitor) and virtual media mount must be accessible from web-browser available in Operating system installed at login front-end nodes.	Remote access to the console (keyboard, monitor) and virtual media mount is accessible from web-browser available in Operating system installed at login front-end nodes.	YES
16	Keyboard, monitor, KVM console and USB drive are not required to be part of delivery.	Keyboard, monitor, KVM console and USB drive are not in our delivery	YES
17	If special license/key is needed for remote firmware/BIOS upgrade of compute/GPU/login nodes, such a license/key must be part of the delivery.	Special license for remote firmware/BIOS upgrade of compute/GPU/login nodes is as a part of the delivery	YES
18	CPU generation and supported instruction set must be identical in all compute, GPU and login front-end node(s).	CPU generation and supported instruction set are identical in all compute, GPU and login front-end nodes	YES
	3. Compute node specifications		
19	Each compute node must have 2 CPU's with x86-64 architecture.	Each compute node has 2 CPUs with x86-64 architecture [redacted]	YES
20	Each compute node must have a minimum of 48 physical CPU cores, hyper-threading not taken into account.	Each compute node has 64 physical CPU cores, hype-threading not taken into account.	YES
21	The hardware of all compute nodes must be identical.	The hardware of all compute nodes is identical.	YES

	Compute node CPU performance requirements:		
22	The minimum performance of any compute node must be at least 440 points, as measured by the tool SPEC CPU2017 FP, Rate, base.	Performance of any compute node is 515 points, as a measured by the tool SPEC CPU2017 FP, rate, base	YES
23	The minimum performance of any compute node must be at least 220 as measured by the tool SPEC CPU2017 FP, Speed, base.	Performance of any compute node is at least 220 as a measured by the tool SPEC CPU2017 FP, speed, base	YES
	Compute node memory requirements:		
24	Each compute node must have a minimum of 8GB RAM per CPU core, ECC DDR4 2666 MT/s (or faster)	Each compute node has 512GB RAM DDR4 ECC reg 3200MHz. (its 8GB RAM per CPU core)	YES
25	All memory channels of all processors must be filled.	All memory channels of all processors are filled	YES
26	The same number of modules must occupy each channel	The same number of modules occupy each channel	YES
27	All DIMMs in all compute nodes must be identical.	All DIMMs in compute nodes are identical	YES
	Compute node local disk space:		
28	Each compute node must have at least 1 SSD to be used as a system and as a scratch space.	Each compute node has 1 SSD	YES
29	The interface of the SSD's must be PCI-e.	Inteface of the SSD is PCI-E (NVMe)	YES
30	The total net usable SSD capacity per node must be at least 1.5 TB.	NVMe SSD 1,92TB	YES
31	Minimum sequential read must be 1800 MB/s.	Read higher than 1800 MB/s	YES
32	Minimum sequential write must be 800 MB/s.	Write higher than 800 MB/s	YES
33	The DWPD of each SSD must be at least 1.0 or better.	DWPD 1	YES
	Compute node component sharing and redundancy requirements:		
34	Redundancy is required for all field replaceable components (e.g. power supplies, etc.) being shared by multiple compute nodes. Such a redundancy is not required for disk/SSD backplanes, power distribution boards, etc.	Redundancy of PWS We offered server where being shared some components by multiple compute nodes.	YES
35	In the case of a failure of a single active hardware component of a node, no more than that node is permitted to fail.	In the case of a failure of a single active hardware component of a node, no more than that node is permitted to fail.	YES
36	All repairs to one node, including its cut from the power source, must be performed without preventing the functioning of any other node.	All repairs to one node, including its cut from the power source, are performed without preventing the functioning of any other node.	YES
	4. GPU node specifications		
37	Each GPU node must have a minimum of 2 CPU's with x86-64 architecture.	Each GPU node has 2 CPUs with x86-64 architecture	YES
38	The exact CPU configuration and model must be identical to the CPU compute nodes.	The same CPU configuration and model as a in CPU compute nodes	YES

39	The hardware of all GPU nodes must be identical.	Hardware of all GPU nodes are identical	YES
40	GPU node memory requirements:		
41	Each GPU node must be equipped with ECC DDR4 (or newer) 2666 MT/s (or faster) operating memory (RAM)	Each GPU node is equipped with ECC DDR4 ECC reg 3200MHz RAM	YES
42	RAM memory capacity per GPU node must be equal or higher than 2.5x of total GPU memory of all GPU cards installed in particular GPU node.	RAM memory capacity per GPU node is 2048 GB (its higher than 2.5x of Total GPU memory of all GPU cards installed in particular GPU node. (GPU memory in GPU node is 640GB	YES
43	All memory channels of all CPUs must be filled.	All memory channels of all processors are filled	YES
44	The same number of modules must occupy each channel.	The same number of modules occupy each channel	YES
45	All DIMMs in all GPU nodes must be identical.	All DIMMs in compute nodes are identical	YES
	GPU node local disk space:		
46	Each GPU node must have at least 1 SSD to be used as a system and as a scratch space.	Each GPU node has 1 SSD	YES
47	The interface of the SSD's must be PCI-e.	The interface of the SSD is PCI-E	YES
48	The total net usable SSD capacity per node must be at least 1.5x of local RAM memory.	NVMe SSD 3,84TB (at least 1,5x of local memory)	
49	Minimum sequential read must be 1800 MB/s.	Read higher than 1800 MB/s	YES
50	Minimum sequential write must be 800 MB/s.	Write higher than 800 MB/s	YES
51	The DWPD of each SSD must be at least 1.0 or better.	DWPD 1	YES
	GPU node component sharing and redundancy requirements:		
52	In the case of a failure of a single hardware component of a GPU node, no more than that node is permitted to fail.	One GPU server – one node	YES
53	All repairs to GPU node, including its cut from the power source, must be performed without preventing the functioning of any other node.	One GPU server – one node (2 GPU servers each with 8 GPU cars)	YES
	Parameters of GPU accelerator(s) installed in GPU node(s)		
54	At least sixteen identical GPU cards shall be installed in one or more GPU nodes	16 identical GPU cars in total 2 GPU Nodes (each Node 8 GPUs)	YES
55	The minimum performance of any GPU must be at least 22.0 as measured by the tool SPEC Accel V1.3, metric SPECaccel_acc_base. The Seller shall state in his bid the values published for this GPU card on the website https://www.spec.org/accel/results/accel_acc.html when measured by the above-mentioned tool.	[redacted]. Performance of any GPU is higher than 22 measured by the tool SPEC Accel V1.3, metric SPECaccel_acc_base	YES
56	Each GPU must have 80GB RAM, ECC, minimum.	Each GPU has 80GB RAM, ECC	YES

57	Each GPU node shall be equipped with at least four GPU cards.	Each GPU node equipped with eight GPU cards	YES
58	Each GPU must support NVIDIA CUDA, compute capability 8.0 (minimum).	Each GPU support NVIDA CUDA, compute capability 10	YES
59	All GPU cards in single GPU node must be connected together through the manufacturer's proprietary interconnect.	All GPU cars in single GPU node has connected together through the manufacturer's proprietary interconnect	YES
	5. Login front-end specifications		
60	All minimal requirements of the login front-end nodes are identical to the compute nodes, apart from the parameters specified below.	Login front-end nodes are identical to compute nodes (SSD, Infiniband)	YES
	Login node CPU performance requirements:		
61	Each login node must have a minimum of 32 physical CPU cores, hyper-threading not taken into account.	Each login node has 32 physical CPU cores, hyper-threading not taken into account 2x [redacted]	YES
62	The minimum performance of any compute node must be at least 370 points, as measured by the tool SPEC2017 FP, Rate, base.	Performance of any login node is at least 370 point, as measured by the tool SPEC2017 FP, Rate, base.	YES
63	The minimum performance of any compute node must be at least 180 as measured by the tool SPEC2017 FP, Speed, base.	Performance of any Login node is at least 180 as measured by the tool SPEC2017 FP, Speed, base.	YES
64	The base clock of installed CPUs must be equal or above 3.1 GHz.	Base clock of installed CPUs has 3,5GHz	YES
	Login front-end node memory requirements:		
65	The RAM memory capacity per login front-end node must be equal or higher than 512GB.	512GB RAM	YES
	Login front-end node environmental requirements:		
66	All login front-end nodes must be equipped with two redundant power supplies connected to different power lines. Outage of single power line must not cause any downtime of any login front-end nodes.	All login nodes are equipped with two redundant PWS. PWS connected to different power lines. A single power failure will not cause any downtime to any of the login front-end nodes.	YES
	6. Storage system specifications		
67	The storage system must provide storage space over Infiniband network and 10-Gbit ethernet network using two storage front-end servers.	Storage system provide storage space over IB network and 10Gbit ethernet network using two storage front-end servers	YES
	Storage system:		
68	must have net total usable capacity of at least 200 TB.	Net total usable capacity is higher than 200TB	YES
69	must achieve sustainable aggregate speed of sequential operations for 256KB block of at least 3,8 GB/s for reading and 3,1 GB/s for writing.	Achieve sustainable aggregate speed of sequential operations for 256KB block of at least 3,8 GB/s for reading and 3,1 GB/s for writing.	YES
70	Storage system must provide redundancy and data protection:	Storage system provide redundancy and data protection	YES

71	- RAID6 in configuration 8+2 or better or using equivalent technology with the same level of protection (amount of parity data)	RAID 6 configuration 8+2	YES
72	- At least two hot-spares must be provided. Technologies like “distributed hot-spare" or similar are allowed, in such case, space available in such distributed hot-spare must be same or greater than the total capacity of two of the (spinning) hard-drives populating the disk array supplied	At least two hot-spares provided.	YES
73	- single failure of any data storage solution component (disk, power supply, RAID, switches, servers) must not interrupt data storage operation.	single failure of any data storage solution component (disk, power supply, RAID, switches, servers) not interrupt data storage operation.	YES
74	- storage solution component (disks, power supplies, RAID’s, switches, servers) must be replaceable during operation without causing any failure of the data storage operation.	storage solution component (disks, power supplies, RAID’s, switches, servers) are replaceable during operation without causing any failure of the data storage operation.	YES
75	All spinning hard drives must be of the same type and size and must be of enterprise class. All solid-state drives must be of enterprise class. It is allowed to combine solid-state and spinning hard drives to gain optimal performance.	All spinning hard drives are the same type and size and must be of enterprise class. All solid-state drives are enterprise class. We combine solid-state and spinning hard drives to gain optimal performance.	YES
76	RAID groups (or equivalent technology used to provide redundancy at the hard-drive level) must be able to rebuild within 30 hours during standard operation. Decrease of performance is acceptable during rebuild.	RAID groups (or equivalent technology used to provide redundancy at the hard-drive level) is able to rebuild within 30 hours during standard operation. Decrease of performance is during rebuild.	YES
77	The disks must be hot-swappable and accessible without dismounting the disk-array from the rack.	The disks are hot-swappable and accessible without dismounting the disk-array from the rack.	YES
78	There will be at least two identical storage front-end servers. Servers can be implemented as proprietary modules of storage vendor.	There will be two identical storage front-end servers.	YES
79	In case of failure one of the storage front-ends, the remaining node must take over. Reduction of performance is allowed. The failover must be done automatically.	If one of the storage front-ends fails, the remaining node takes over. possible reduction in performance. Failover is performed automatically.	YES
80	Storage front-end servers must export NFSv4 filesystem with Kerberos support.	Storage front-end servers export NFSv4 filesystem with Kerberos support.	YES
81	Filesystem must be exported (and available) using both:		YES
82	- Ethernet interface – link speed at least 10Gbit/s per port	Ethernet interface – link speed 10Gbit/s per port	YES

83	- Infiniband interface – specified in “Infiniband interconnect specifications”	Infiniband interface HDR100	YES
84	If the technical solution requires it, the storage space can be divided into up to two equally sized namespaces (partitions). Qualitative and quantitative properties of both such partitions must be equivalent.	Up two equally sized namespaces (partitions). Qualitative and quantitative properties of both such partitions are equivalent.	YES
85	At least 8 empty spinning hard drive slots for future use must be available in the storage solution.	12 empty spinning hard drive slot free for future use	YES
86	In case of Infiniband failure, the storage system must be able to fail over to Ethernet.	In case of Infiniband failure, the storage system will be able to fail over to Ethernet.	YES
87	At least 4 GB write-back cache is required for all hardware RAID controllers.	4GB write-back cahce is in each HW RAID controller	YES
	Storage system environmental requirements:		
88	All components of storage system must be equipped with two redundant power supplies connected to different power lines. Outage of single power line must not cause any interruption of the service provided by storage system.	All components of storage system are with two redundant power supplies. PWS connected to different power lines. Outage of single power line not cause any interruption of the service provided by storage system	YES
	7. Infiniband interconnect specifications		
89	Minimum Infiniband port bandwidth must be at least 100Gb/s.	Infiniband will be HDR	YES
90	If more than single Infiniband switch is used, the network must be setup with fat tree topology with blocking factor not higher than 2. (at least single uplink port per each two downlinks at leaf-switches)	One Infiniband switch is used	YES
91	All provided Infiniband switches must be managed with the possibility to run subnet manager.	Infiniband switches is managed with the possibility to run subnet manager.	YES
92	Subnet manger must be enabled and configured at one Infiniband switch.	.	YES
	Infiniband environmental requirements:		
93	All switches must be equipped with two redundant power supplies connected to different power lines. Outage of single power line must not cause shutdown of any Infiniband switch.	Two redundant PWS connected to different power lines. Outage of single power line not cause shutdown Infiniband switch	YES
94	All cables must be provided.	All cables are provided	YES
	8. 10-Gbit Ethernet interconnect specifications		
95	Ethernet switch(es) providing 1Gbit and 10Gbit connectivity must be provided.	Ethernet switches provided 10Gbib connectivity	YES
96	CPU compute nodes, GPU compute nodes, storage system and login front-end nodes must be connected by the 10Gbit Ethernet network.	CPU compute nodes, GPU compute nodes, storage system and login front-end nodes must be connected by the 10Gbit Ethernet	YES

		network	
97	An additional 36 ports of 10-Gbit T-base technology must be available for interfacing with the existing equipment	Additional at least 36 port 10Gbit T-base are available for interfacing with existing equipment	YES
98	All cables must be provided.	All cables provided	YES
99	Support for VLAN 802.1q required.	Support for VLAN 802.1q	YES
100	Support for NTP required.	Support for NTP	YES
101	Support for IPv6 required.	Support for IPv6	YES
102	Support for SNMP required.	Support for SNMP	YES
	Ethernet interconnect environmental requirements:		
103	All switches must be equipped with two redundant power supplies connected to different power lines. Outage of single power line must not cause shutdown of any Ethernet switch.	All switches are equipped with two redundant power supply connected to different power lines. Outage of single line will not cause shutdown of any Ethernet swtich	YES
	9. Environmental requirements		
	Dimensions:		
104	The whole system must fit within one currently empty 48U 19" rack which already exists at the premises of the buyer. The exact rack type is APC NetShelter E242296 The rack is equipped with water-cooled door of exact type knurr DCD35 H2200 B600, BOTTOM RIGHT.	The whole system will fit to customer 48U 19" rack	YES
	Power consumption:		
105	The maximum power consumption of all HPC cluster parts at full operation (including compute nodes, whole storage system, switches, login nodes, fans and all other powered components) must be less than 30kW. The maximum power consumption and its calculation must be explicitly stated.	The maximum power consumption of all HPC cluster parts at full operation (including compute nodes, whole storage system, switches, login nodes, fans and all other powered components) is to the 30kW	YES
106	Rack power distribution units (PDU) must be provided by Supplier including possibly needed splitter-boxes and cabling.	PDU will be provided by supplier including splitter-boxes and cabling	YES
107	All installed PDUs must provide information about total or per-socket power consumption using web and SNMP interface.	All installed PDUs provide information about total and per-socket power consumption using web and SNMP interface	YES
108	There are two AC-power sockets available in the Buyer's infrastructure reserved for this system: - Socket/power-line "A" - fused by breaker C/32A - available 22kW, backed by UPS - Socket/power-line "B" - fused by breaker C/32A - available 10kW, backed by UPS		YES

	and Diesel-generator - both sockets are of type 5-pole/32A (3P + N +E) 3 x 230/400 V Such a configuration/wiring is required, that outage of any power line must not cause any outage of: - login front-end servers - any component of storage-system - any Ethernet switch - any InfiniBand switch		
109	Redundant power wiring for compute and GPU nodes is not required and unspecified amount of compute or GPU nodes is allowed to fail during outage on any power-line.		YES
110	Maximum power ratings of both lines must not be exceeded.	Maximum power ratings of both lines will not be exceeded	YES
	10. Software requirements		
111	All software and libraries necessary to pass acceptance test must be pre-installed with the system.	All software and libraries will be pre-installed with the system	YES
112	All installed hardware must be compatible with CentOS 8(-stream) or higher.	All installed HW is compatible with CentOS 8 (-stream)	YES
113	Compute, login, and GPU nodes must be preinstalled with Centos 8(-stream) or higher.	Compute, login, and GPU nodes will be preinstalled with Centos 8(-stream) or higher	YES
114	Appropriate drivers for all file systems must be installed so that the storage system can be accessed by all the nodes, at minimum the speed specified in part (6).	Appropriate drivers for all file systems will be installed so that the storage system can be accessed by all the nodes, at minimum the speed specified in part (6).	YES

DŮVĚRNÉ

Tab. 2. - EVALUATION CRITERIA

Value of SPEC CPU 2017_FP_rate_base of one compute node (S)	515
Number of compute nodes + GPU nodes	22
Performance of the HPC cluster: S x (number of compute + GPU nodes)	11330

Annex No. 2

The Seller's bid in the extent it describes technical parameters of the Equipment

Důvěrné

Compute Node - [redacted]

Rozpis součástí	Počet [ks]	Cena za ks (bez DPH)	Cena CZK bez DPH	DPH 21%	Cena CZK s DPH
[redacted] Redundant PWS	1				
Number of NODe (each Node in configuration bellow):	4				
CPU [redacted] (32-core)	2				
RAM 512GB DDR4 3200MHz	1				
SSD NVMe 1,92TB (DWPD 1)	1				
LAN 10GbE RJ45, Dual Port	1				
HBA IB HDR100, Single port	1				
IB kabel	1				
Cables LAN and Power	1				
Warranty 5 years	1				
Celkem			[redacted]		[redacted]

GPU Node - [redacted]

	Počet [ks]	Cena za ks (bez DPH)	Cena CZK bez DPH	DPH 21%	Cena CZK s DPH
[redacted] (6U)	1				
CPU [redacted] (32-core)	2				
Total RAM 2048 TB DDR4 3200MHz	1				
NVMe SSD 3.68TB (DPWD 1)	1				
GPU [redacted]	8				
LAN 10GbE RJ45, Dual Port	1				
HBA IB HDR100, Single port	1				
Cable Infiniband	1				
Cables LAN and Power	1				
Warranty 5 years	1				
Celkem			[redacted]		[redacted]

Login front-end server

	Počet [ks]	Cena za ks (bez DPH)	Cena CZK bez DPH	DPH 21%	Cena CZK s DPH
[redacted] server 1U, 2x [redacted], 1,92TB MVMe, 2x 10GbE RJ45, Management, Redundant PWS	1				
HBA IB HDR100, Single port	1				
Cable Infiniband	1				
Cables LAN and Power	1				
Warranty 5 years	1				
Celkem			[redacted]		[redacted]

Storage systém

Rozpis součástí	Počet [ks]	Cena za ks (bez DPH)	Cena CZK bez DPH	DPH 21%	Cena CZK s DPH
[redacted] 1U server [redacted]), 1x [redacted] (16-core), 256GB DDR4 ECC reg, 2x SSD 480GB SATA for OS, 2x 10GbE RJ45, IPMI, Redundant PWS, Rails	2				
HBA SAS - Dual port PCI-E + cables	2				
HBA IB HDR100, Single port	1				
Cable Infiniband	2				
[redacted] 3U, 16-bay (3,5"/2,5"), Dual Controller, Redundant PWS, Rails	1				
[redacted] JBOD 3U, 16-bay (3,5"), Dual I/O, Redundant PWS, Rails	2				
[redacted] 2x 12Gb/s SAS port	2				
SSD 3,84TB SATA, DWPD 1 (+ MUX Adaptér)	2				
HDD [redacted] 10TB, SAS, 7200RPM	34				
Warranty 5 years	1				
Celkem			[redacted]		[redacted]

Network

Rozpis součástí	Počet [ks]	Cena za ks (bez DPH)	Cena CZK bez DPH	DPH 21%	Cena CZK s DPH
LAN Network [redacted] 48-port 10GbE RJ45, 6-port 100GbE QSFP28, Reudundant PWS	2				
Warranty 5 years	2				
IB Switch Mellanox HDR, 40-port HDR, Manage, Redundant PWS	1				
Warranty 5 years	1				
Celkem			[redacted]	[redacted]	[redacted]

PDU + SW

Rozpis součástí	Počet [ks]	Cena za ks (bez DPH)	Cena CZK bez DPH	DPH 21%	Cena CZK s DPH
PDUs provide information about total and per-socket power consumption using web and SNMP interface	1				
Splitter-boxes and cabling	1				
Instalation OS + SW	1				
Celkem			[redacted]	[redacted]	[redacted]

Položkový rozpočet

Název položky	Počet [ks]	Cena za ks (bez DPH)	Cena CZK bez DPH	DPH 21%	Cena CZK s DPH
Compute Node - [redacted]	5	[redacted]	[redacted]	[redacted]	[redacted]
GPU Node - [redacted]	2	[redacted]	[redacted]	[redacted]	[redacted]
Login front-end server	2	[redacted]	[redacted]	[redacted]	[redacted]
Storage systém	1	[redacted]	[redacted]	[redacted]	[redacted]
Network	1	[redacted]	[redacted]	[redacted]	[redacted]
PDU	1	[redacted]	[redacted]	[redacted]	[redacted]
Celkem			13 160 000,00	2 763 600,00	15 923 600,00

Důvěrné

Affidavit

Public Contract name:	**High-Performance computer cluster with GPU's for solving partial differential equations and running cosmological N-Body simulations**
Registered company name / Trade name / Name:	M Computers s.r.o.
Seat:	Úlehlova 3100/10, 628 00 Brno-Líšeň
Company Identification No.:	26042029

The Supplier of the above-mentioned Public Contract undertakes to:

a) ensure compliance with all labour law regulations (concerning remuneration, working hours, rest periods between shifts, paid overtime), as well as regulations concerning employment and safety and health protection for the entire duration of the contractual relationship established on the basis of this Public Contract, to all persons involved in the performance of the contract (regardless of whether the activities will be performed by the Supplier himself or his subcontractors) and

b) ensure compliance with legal regulations in the field of environmental law, which meets the objectives of environmental policy related to climate change, use of resources and sustainable consumption and production. The Supplier must therefore take all measures that can reasonably be required of him to protect the environment and reduce the damage caused by pollution, noise and other activities, and must ensure that emissions, soil pollution and waste water from his activities do not exceed the values laid down in the relevant legislation.

At the same time, the Supplier acknowledges that a breach of the above obligations may be a reason for the Contracting Authority to withdraw from the contract in accordance with its relevant provisions.

Signature of the person authorized to represent the Supplier:	
Place:	Brno
First name, Surname, Position in the company:	Marek Vašíček, Executive
Signature:	