



EuroHPC
Joint Undertaking

Above-threshold public contract for supplies

"LUMI-Q Quantum Computer"

Contracting Authority:

The European High-Performance Computing Joint Undertaking

Registered office: 12, Rue Guillaume J. Croll, L-1882 Luxembourg, Luxembourg,

The entity responsible for conducting the preliminary market consultation:

VSB-Technical University of Ostrava

IT4Innovations National Supercomputing Center

Registered office: Studentská 6231/1B, 708 00 Ostrava, Czechia,
(hereinafter referred to as "IT4Innovations")

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RESPONSE TO THE INQUIRIES ON THE INVITATION TO THE PRELIMINARY MARKET CONSULTATION

According to Art. 2.2.1 of the invitation to the preliminary market consultation (hereinafter referred to as "PMC"), participants are allowed to submit inquiries about the technical requirements specified in Annex 1 of the invitation to the preliminary market consultation or about other terms and conditions included in this invitation within the required period for submission of the LUMI-Q Quantum Computer design. The Contracting Authority shall answer these inquiries directly in writing or organize meeting in person or using teleconference if necessary.

All inquiries along with answers will be published on the IT4Innovations contracting authority's profile.

IT4Innovations received a set of questions to which it provides the answers below. Some of the responses are based on the individual communication between participants' and IT4Innovations' representatives.

Inquiry No. 1:

Regarding the Technical Specification, Section 6 – “Policy and Legal Aspects” and Section 7.7 – “Legal and Warranty”, do you wish for us to address at this PMC stage any legal terms other than the four-year period for the warranty and support, or will a full set of legal terms be a part of the procurement documents?

Response:

The procurement will be done by EuroHPC JU. We assume, that it will contain a binding, non-negotiable contract draft for you to sign as a part of the bid. Therefore, we assume, a full set of legal terms will be a part of the procurement documents. At this stage, please address the warranty and support inputs, however, you are free to address any other legal issues that you identify as important.

Inquiry No. 2:

Regarding the Technical specification, section 7 and item 9. “pricing of components”: are we requested to provide exact BoM costs of each component in this PMC stage of the process, and the final price, or approximately price in EUR?

Response:

Approximate prices in EUR for the major components should be provided. These do not have to be detailed (definitely not BoM level) and are non-binding.

Inquiry No. 3:

We also would like to understand whether there will be fixed price or maximum budget for the QC, and what is the final amount?

Response:

The budget is 7 000 000 EUR. While we would prefer fixed price, it is likely that the EuroHPC JU running the procurement will impose a maximum budget for the QC and the actual price will be subject of evaluation.

Inquiry No. 4:

Is IT4I the „Contracting Agency“?

Response:

No, the Contracting Authority is **The European High-Performance Computing Joint Undertaking** with its Registered office: 12, Rue Guillaume J. Croll, L-1882 Luxembourg, Luxembourg,

IT4Innovations is the entity responsible for conducting the preliminary market consultation.

Inquiry No. 5:

And is the bidding company/consortium the “Economic Operator”?

Response:

Yes, this specific legal term comes from procurement legal framework, and it means “the bidding company/consortium”. Accurate legal definition sets that Economic operator means any person or joint group of persons that offer supply of supplies, provision of services or execution of works.

Inquiry No. 6:

What's the estimated schedule (non-binding statement) of the next steps (final tender issuing date, final response by bidders).

Response:

According to information from Contracting Authority we expect that the subsequent procurement will be commenced at the beginning of October 2023. Time limit for the submission of tenders should last from 6 to 8 weeks.

Inquiry No. 7:

Does IT4I appreciate accept/appreciate preliminary versions on the requested "detailed technical proposal containing a full technical solution" in order to indicate where more explanations are desired?

Response:

IT4Innovations would rather receive final proposal which could be further discussed. However, the preliminary version can, for example, be the basis for a personal meeting prior to the submission of the final proposal.

Inquiry No. 8:

According to the PMC document, inquiries including answers will be published. In most cases, even verbatim publication may not be problematic. However, few inquiries may implicitly indicate technology choices and abilities which are not yet desired to become known to competitors. For example, if we ask about the eligibility of certain elements. How does IT4I intend to deal with such a situation?

Response:

All inquiries along with answers will be published on the IT4Innovations contracting authority's profile. However, the publication in no way concerns the technical designs themselves or the approach to the technical solution taken by the participants. It is merely intended to ensure equal and non-discriminatory access to information for all participants when the conditions set out in Annex 1 are modified by the contracting authority as a result of submitted inquiries.

Inquiry No. 9:

How will conversations (telephone, zoom, in person) be documented? As raw audio/video files? As written script word by word? As some kind of written summary?

Response:

From every meeting written summary (minutes) shall be prepared as well as audio-visual or sound recordings.

Inquiry No. 10:

If the tender is not "fixed price", do you know qualitatively how the tender would be shaped? Which percentage would the price have? What other categories do you expect? Or will there be a different procedure? We think that a rough understanding of these boundary conditions well will help all bidders to come up with an offer you like.

Response:

Cf. response to Inquiry No. 3.

Inquiry No. 11:

In particular, it would be important to understand whether overfulfilling the finally decided specs will give significant benefit or whether the highest quality and convincing solution within the demanded specs will be key.

Response:

All finally decided requirements published in the RFP will have to be met, overfulfilling does not provide an advantage, unless it is defined so within the evaluation criteria published as part of the RFP. The purpose of this PMC is also to identify relevant quality indicators. One or several of these indicators may be selected as a metric for the evaluation. In such a case, overfulfilling the selected, finally decided specs will give significant benefit in the evaluation (for example overfulfilling number of qubits, if such a metric is selected as an evaluation criteria).

Inquiry No. 12:

What exactly do you mean with “delivery of implementation services” in Sec. 2?

Response:

This wording in Art. 2 of Annex 1 to the PMC invitation is intended to emphasize that the subject of the subsequent procurement is not only the physical delivery of the system, but also its implementation, recovery and all other related supplies and services.

Inquiry No. 13:

Regarding “integration into the power and cooling infrastructure”, do you have local providers who already know your building well and whom you trust to the extent that you would recommend them as subcontractors? If yes, could you please provide some contact persons, ideally English speaking?

Response:

Contacts for possible subcontractors:

PRONIX s.r.o. – power supply, cooling circuits connectivity

www.pronix.cz

Ing. Petr Horák +420 602 436 344 petr.horak@pronix.cz

Ing. Jiří Aulehla +420 602 317 159 jiri.aulehla@pronix.cz

KAESER KOMPRESSOREN s.r.o. – compressed air source, different types of compressors - manufacturer/supplier, service support

www.kaeser.cz

p. Radim Kupčík +420 724 259 875 radim.kupcik@kaeser.com

EVIDEN (formerly ATOS IT solutions and services s.r.o.) – supplier of the supercomputing systems ANSELM and BARBORA

<https://eviden.com/>

Primary contact: Jaroslav Vojtěch +420 737 275 388 jaroslav.vojtech@eviden.com

Backup contact: Jakub Venc +420 737 264 182 jakub.venc@eviden.com

HEWLETT-PACKARD s.r.o. (HPE Central Europe) supplier of the supercomputing systems SALOMON and KAROLINA

<https://www.hpe.com/cz/en/home.html>

Lubos Kolar +420 603 144 421 lubos.kolar@hpe.com

Inquiry No. 14:

Beyond the minimum requirements, what do you plan to award with the best score: The best quantum hardware, the best usability and auxiliary services, or the most balanced package from all the different wishes stated in the PMC?

Response:

Cf. response to Inquiry No. 3. And No. 11

Inquiry No. 15:

For the star-shape topology, we find a central qubit as not very optimal, especially with research applications and potential future scaled systems in mind. Is there any specific reason for drawing a qubit a central element of the star?

Response:

The star shape topology with central qubit was provided as a generic implementation of one-to-all connectivity. We consider any architecture where at most two swap gate operations are needed to mediate two-qubit interaction between arbitrary two qubits a star-shape topology.

Inquiry No. 16:

We guess that any suggestion for additional specs, elements, services etc. should be included into the PMC along with a careful justification why you may benefit from them. Is that true?

Response:

Yes. For the sake of completeness, we refer to Art. 2 of the invitation to PMC, that says:

Where the final procurement documents contain information that has resulted from the PMC, the Contracting Authority will mark such information in the procurement documents, identify the persons who have taken part in the PMC, and provide all essential information that was the subject of the PMC. In the context of the below-mentioned requirements for the LUMI-Q Quantum Computer design, the Contracting Authority shall give notice that the procurement documents shall include only such information that shall be clearly substantiated and justified by the Contracting Authority.

Inquiry No. 17:

Are the specs demanded in the PMC of rather indicative nature or are they to be seen as fixed minimum requirements for the upcoming tender? The background of this question is that we see a few (not many) situations, where relaxing some spec could be in the interest of IT4I.

Response:

All the requirements are non-binding except requirement set for the QPU architecture in Art. 3 of Annex 1 to the PMC invitation:

QPU architecture: We require superconducting qubit technology, implementing at least 12 qubit. Further, we require the QPU qubits interconnected in a one-to-all, star-shape topology.

All other features should be understood as provisional and open for suggestions and changes. IT4innovations focuses on a detailed technical proposal containing full technical solution that satisfies the technical specifications as closely as possible. In case of deviation, the vendors are to propose and justify an alternate approach. (cf. Art. 7 of Annex 1 to the PMC invitation)

Inquiry No. 18:

Regarding IT & network, is it correct that all necessary elements should be provided by the bidder and included in the price? If so, are there restrictions or special requirements for the used (classical) server hardware? Background: Some HPC centers did have such requests to us in the past.

Response:

Yes, all necessary elements should be provided by the bidder and included in the price. At this stage, we provide complete freedom regarding the choice of the IT & network elements. However, it should be expected that a detailed specs according to our specific needs may be included in the RFP.

Inquiry No. 19:

It would be great to get a better explanation of the symbols and abbreviations used in Fig. 2 for the network integration.

Response:

The boxes are active, manageable network elements in redundant configuration, the lines are Ethernet cables, the ovals denote link aggregation. The WAN-SW denotes core L3 switches, the WAN for the Wide area network (Internet). LUMI-Q stands for the proposed quantum computer. All the rest denotes other ICT installations present on the computer room. The VI stands for Virtualization infrastructure, , Karolina for the Karolina supercomputer, DGX-2 for the DGX-2 supercomputer and Project for the PROJECT storage.

Inquiry No. 20:

Media: Is compressed air (>5bar) available in the data room or in auxiliary rooms?

Response:

No, It isn't available.

Inquiry No. 21:

Service agreement with service partner – do we have to have it in place before the tender?

Response:

No, It isn't demanded.

Inquiry No. 22:

Do we get known if anyone else responded to PMC? Understood you cannot name other possible vendors.

Response:

There are currently four possible vendors that expressed interest in participating in the PMC.

Inquiry No. 22:

How should we address our IP concerns/topics into the PMC response? In the legal chapter?

Response:

If there are such a concerns/topics, please, include them in your proposal in a separate chapter.

Inquiry No. 23:

Is the “track record” of vendors something will be considered in the RFP or should we address it somehow in the PMC?

Response:

What is entitled as “track record” should be part of the technical qualification in the form of list of significant supplies or significant services provided over relevant period before the commencement of the procurement procedure. It is typically not a part of the evaluation, but it is a mandatory requirement to fulfil by the supplier to ensure participation in the procurement. Those qualification criteria will be set by the Contracting Authority.

Inquiry No. 24:

Are bidders allowed to have non-European partners?

Response:

From the information from Contracting authority we assume, that some restrictions for non-EU economic operators are being prepared. However, we do not know their specific content.

Inquiry No. 25:

Regarding uptime: is calibration and planned service / maintenance considered downtime as well?

Response:

As published in Annex 1, Table 3, the Availability of the quantum computer includes: calibration cycles, quality benchmarks subroutines.

Inquiry No. 26:

Updating of SW: we believe the vendor will have a remote access to the computer for maintenance and update purposes? Are there other requirements for SW updates or should we address this in our PMC response?

Response:

A protected remote access to the computer for maintenance and update purposes. SW updates should be provided whenever necessary to maintain functionality, integrity and security of the installation. Please address this topic in the PMC response.

Inquiry No. 27:

Are international supplier excluded?

Response:

Cf. response to Inquiry No. 24.

Inquiry No. 28:

How long is the delivery/ETA? 1 year or 2 year?

Response:

Delivery should not exceed 1 year. We even expect shorter delivery between 6 and 9 months.

Inquiry No. 29:

On the technical specification document, is "expected performance for the targeted QPU with star-shaped topology" a requirement or provisional?

Response:

Cf. response to inquiry No. 17.

Inquiry No. 30:

It would greatly help us to better understand your request if further details about this requirement can be shared.

In particular, could you please describe some use cases for the data in such a database that you have in mind?

Can you also provide background, about which data exactly you would like to collect from measurements (e.g. raw analog data and/or interpreted qubit read-out data for every measurement, statistically averaged read-out data for all measurements in a batch of program executions, other measurement data [temperature, or other sensors], ...)?

Response:

We currently do not prescribe or require the exact nature of the measured data to be stored. Meaningful/useful data should be continuously collected for analysis and troubleshooting purposes. In your PMC response, please propose the set of data that you see as useful.

Inquiry No. 31:

What's the maximum pressure drop supported by the primary cooling circuit? It is required to push enough cooling water through the heat exchangers in the compressors. For 19° temperature of the inflowing water, 1-1.5bar (differential pressure) is needed. For 10°, it is probably a bit less. But the number is important.

Response:

The maximum pressure loss of the cooling circuit with water (6-15oC) is 100 kPa (design value).

Postponement of the deadline for submission of the proposal:

Based on a request from one of the PMC participants, the deadline for the submission of the LUMI-Q Quantum Computer design has been postponed until **1 September 2023**. However, we ask all PMC participants to send their designs, if possible, within the original deadline, i.e. until 14 August 2023. Extending the deadline for the submission of the LUMI-Q Quantum Computer design jeopardises the smooth conduct of the subsequent procurement procedure.

Reflecting the above, the period within which the site survey can be carried out has been changed. The site survey can take place from 12 July 2023 to 31 August 2023 where 31 August 2023 is the last possible day of the survey.

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