

# RFP NO. 3647/30/08/2024: THE PROVISION OF QUANTUM COMPUTING ACCESS SERVICES TO THE CSIR

## RESPONSE TO QUESTIONS

QUESTION	ANSWER
<p>Regarding RFP No. 3647/30/08/2024, we do have the following clarifying questions:</p> <ol style="list-style-type: none"> <li>What is the precise definition of “the time period in which quantum information is preserved”? Does it correspond to the median T_1 time of the qubits, to the median T_2 time or to something else?</li> <li>Single-qubit and two-qubit gates may have different durations. This introduces ambiguity in the computation of the time needed to implement a layer of quantum gates and, in turn, in the calculation the maximum number of layers (i.e. the “circuit depth”). Is it okay to consider as the effective duration of a “layer of quantum gates” the average of single and two-qubit gate durations?</li> </ol>	<p>The minimum of the median T_1 and the median T_2 can serve here serve as measure for the time period in which quantum information is preserved.</p> <p>The average duration is permissible.</p>
<p><i>We are preparing to submit a proposal in response to the RFP, utilizing a consumption-based pricing model. To ensure we provide the most competitive and accurate pricing, we have a few questions that need clarification.</i></p> <p><i>Please find the two tabs in the attached workbook for your review and consideration.</i></p> <p><i>Thank you in advance for your assistance.</i></p>	<p>Please see attached Excel spreadsheet with estimates.</p> <p>The numbers are based on an estimate of 15 researchers/students in QC, each submitting one job per working day (20 working days/month) in each category (SV1=State vector simulator, TN1= Tensor network simulator, DM1, Density Matrix simulator with realistic noise, Computer Jobs, Hybrid Jobs).</p>
<p>In order to service the RFP for the CSIR in the best possible manner we would like to file a formal request for an extension to give us 8</p>	<p>RFP closing date extended from 30/08/2024 to 09/09/2024 at 16h30</p>

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<p>additional weeks with a deadline of deadline to October 30 in order for us to fully respond to this excellent opportunity to begin working with you.</p> <p>We look forward to hearing from you.</p>	
<p><i>I'm working on a proposal for the following RFP - <b>The Provision of Quantum Computing Access services to the CSIR RFP No. 3647/30/08/2024</b></i></p> <p><i>Reviewing the technical evaluation matrix on pages 25-28 and Annexure G on page 37, I just have a few questions:</i></p> <ol style="list-style-type: none"> <li><i>1. For circuit depth, specified by the number of layers, how is this evaluated by the reviewers? The RFP defines this by the number of layers that can be executed within the coherence time, but does not specify what defines an individual layer, how many 1-qubit or 2-qubit gates are expected, and what is the required fidelity.</i></li> <li><i>2. For the number of qubits, we have multiple machines at different qubit counts. We could submit for different machines to be used through cloud access, but we would need to know - What is the expected period of performance?</i></li> <li><i>3. Is the funding of up to R50 000 000 for a 1-year period of performance? What would be the expected start and end date if selected?</i></li> </ol> <p><i>Any guidance here would be tremendously appreciated.</i></p>	<p>1.A layer consists of an arbitrary non-zero number of single-qubit gates and two-qubit gates that are executed in parallel. There is no fidelity required for the gates here. The minimal error rates score as given in the third row of the evaluation matrix.</p> <p>2. We estimate the number of iterations required for the execution of Variational Quantum Algorithms to be up to 3000 with 10000 shots per iteration. The performance time should allow to the execution of the corresponding hybrid jobs.</p> <p>3. The intended start date is at least 01 January 2025.</p>
<p>We intends to respond to the above tender. We have aligned with our OEM, however, request an extension based on the escalation of special pricing and discounts requested which must follow an internal process within our OEM. This process requires Delegation of Authority</p>	<p>RFP closing date extended from 30/08/2024 to 09/09/2024 at 16h30</p>

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<p>and approvals at different levels within the Global Organisation and hence more time is requested to complete this process.</p> <p>Kindly advise if the extension can be granted?</p>	
<p><i>Kindly forward a link to the briefing session recording.</i></p>	<p>Sharing of recordings with service providers not allowed.</p>
<p>We are developing a proposal to respond to RFP No. 3647/30/08/2024 entitled, "The Provision of Quantum Computing Access services to the CSIR," and had the following questions:</p> <ol style="list-style-type: none"> <li>1. Is there a recording of the Proposer Day associated with this RFP or an online document with questions that have been submitted regarding the RFP and corresponding answers?</li> <li>2. In the RFP, it states "Pricing proposal must be cross-referenced to the sections in the Technical Evaluation Criteria (Phase 2)." Can you please provide further information and clarity? Do we need to reference specific items from the Technical Evaluation Criteria in the pricing proposal template provided?</li> <li>3. If we are selected, would CSIR directly pay our bank account in the U.S. or would we need to establish a local bank account?</li> </ol> <p>Thanks for your assistance.</p>	<ul style="list-style-type: none"> <li>• No, we are not allowed to share any recordings with service providers</li> <li>• Pricing should be based on the Pricing Schedule, see page 29 of 52</li> <li>• The CSIR can provide payments in all currencies</li> </ul>

Reference Document	Section (Para/Page)	Requirement	Question	CSIR Response
Main RFP 3647/30/08/2024	Annex C	28.2 Technical Evaluation Criteria (Phase 2). No. 1	Could CSIR clarify whether you are only considering gate-model quantum computers in the technical evaluation? Are other modalities such as quantum annealing or analog Hamiltonian simulation under consideration? If so, on what basis will technical merits be evaluated since the circuit depth / qubit count / fidelity characteristics are very different across different modalities?	Multiple programming paradigms score in the <i>Programming Paradigms and Software Ecosystems</i> Category. Circuit-based QC is for our purposes the most important paradigm and the criteria are thus formulated for this paradigm.
Main RFP 3647/30/08/2024	Annex C	28.2 Technical Evaluation Criteria (Phase 2). No. 2	Could CSIR clarify how we should quantify the executable circuit depth? Is it based on use of all qubits to a certain fidelity threshold?	It is the number of layered gates that can be executed consecutively within the coherence time. Fidelity (corresponding to Error) is asked for elsewhere.
Main RFP 3647/30/08/2024	Annex C	28.2 Technical Evaluation Criteria (Phase 2). No. 3	Could CSIR clarify requirements for the error rate - are the %s provided intended to be averages? Median? Best?	All error rates must be less than the percentages given.
Main RFP 3647/30/08/2024	Annex D	28.2 Technical Evaluation Criteria (Phase 2). No. 5	Would CSIR consider different availability criteria rather than reservation time? For example, based on consumption of compute resources rather than time.	The run time reservation scores according to the evaluation matrix.
Main RFP 3647/30/08/2024	Annex D	28.2 Technical Evaluation Criteria (Phase 2). No. 5	Is reservation time intended to be exclusively available to CSIR? Or is queuing with other customers permissible?	Queuing is permissible.
Main RFP 3647/30/08/2024	Annex D	28.2 Technical Evaluation Criteria (Phase 2). No. 7	Does the future proofing criteria include adding new and different QPUs over the life of the contract? Or just evaluating improvements on the current hardware?	Both options can score.

