

CENTRE FOR DEVELOPMENT OF ADVANCED COMPUTING (C-DAC)
A Scientific Society under the Department of Information Technology,
Ministry of Communications and IT, Govt. of India
No.1, CDAC Knowledge Park, Old Madras Road, Byappanahalli, Bangalore-560038
Ph: 080-66116400-03 Fax:080-25247724

REQUEST FOR PROPOSAL

C-DAC Knowledge Park, Bangalore a Scientific Society under the Department of Information Technology, Ministry of Communications & Information Technology, Govt. of India, invites sealed offers in **Two-Bid System** from the shortlisted bidders who have been shortlisted against submission of Expression of Interest (EOI) invited vide Tender Notice No C-DAC/EOI/FGPA Cluster/11-12 dated 22.07.2011 to provide “ **FPGA Cluster based on Xilinx Virtex6 LX 550T / Equivalent FPGA at C-DAC Knowledge Park, Bangalore**”

TENDER SCHEDULE

1. **Date of Release of Tender** : January 18, 2012.
2. **Last date of submission of Bids** : February 08, 2012, 1500 Hrs
3. **Date of opening of Technical Bids** : February 08, 2012, 1530 Hrs

SECTION I: INVITATION FOR BIDS (IFB)

1. Centre for Development of Advanced Computing invites sealed bids for Supply, Installation, testing & commissioning of FPGA Cluster based on Xilinx Virtex6 LX 550T / Equivalent FPGA at C-DAC Knowledge Park, Bangalore.

2. Two Bid System :

The two bid system will be followed for this tender. In this system bidders must submit their offer in two separate sealed envelopes as explained below

• Envelope No.1: “Technical Bid” shall contain :

- a) The Demand draft towards Earnest Money Deposit for **Rs.3,00,000/-**
- b) Duly filled Technical Bid with proper seal and signature of authorized person on each page of the bid submitted.
- c) The detailed Bill of Materials, technical specification, make & model and compliance to the Schedule of Requirement (Section IV) for which bid is submitted.
- d) The soft copy of Technical Bid (.doc / .xls format) in a CDR (except certificates, brochures, order copies etc.)
- e) Copy of the Un-Priced Commercial Bid with commercial terms and conditions as attached in the “Commercial Bid” without mentioning any price.
- f) Undertaking to the effect that a Security Deposit of 5% of the order value will be submitted in case C-DAC decides to place the Purchase Order.
- g) If the bid is in foreign currency, the name and address of supplier abroad on whom the order is to be placed and LC is to be opened. In this case a letter from supplier abroad is required stating that they would have no objection if C-DAC places a Purchase Order on them through the bidder. Also an undertaking from the bidder is required to the effect that the order and LC will be placed on supplier abroad only for administrative purpose and the bidder is responsible and single point contact for the effective execution of Purchase Order.
- h) Other related documents as mentioned in the tender document but not listed here.

• Envelope 2 : “Commercial Bid” shall contain:

Price Schedule completed in all respects with proper seal and signature of the authorized person with the same commercial terms and conditions as submitted with technical bid.

Both the technical bid and commercial bid envelopes should be sealed separately and clearly marked as “Envelope No. 1 – Technical Bid” and “Envelope No. 2 – Commercial Bid” and addressed to:

**The Joint Director (Admin)
Centre for Development of Advanced Computing (C-DAC),
C-DAC Knowledge Park, No.1 Old Madras Road,
Byappanahalli,
Bangalore – 560 038**

Please write the **tender number** on each envelope and seal all the envelopes.

Note: Please do not put "Commercial Bid" (prices quoted) in the technical bid envelope. If the price quoted is submitted with technical bid the tender will be rejected.

No queries shall be entertained after the Pre-Bid Meeting.

3. Date of Submission of bids and opening of the technical bids.

Last date for submission of bids is February 08, 2012 up to 1500 hrs at

Centre for Development of Advanced Computing (C-DAC),
C-DAC Knowledge Park, No.1 Old Madras Road,
Byappanahalli,
Bangalore – 560 038

Technical bid will be opened on February 08, 2012 at 15.30 Hrs.

The bid can be submitted in person or through post/courier (C-DAC shall not be responsible for any postal delays resulting in disqualification / rejection of any bid) so as to reach on or before the due date and time.

The representative(s) of bidders may choose to attend the opening of the technical bids. In case bidder requires any clarification / information they may contact C-DAC at the address mentioned above.

The technical bids will be evaluated to shortlist the eligible bidders. The technical bids of only the short listed eligible bidders shall be considered for technical evaluation.

Bidder whose technical bid is found to be acceptable and meeting the eligibility requirements as specified in this tender will be informed about the date and time of the opening of commercial bid.

4. Opening of Commercial Bid

The Commercial bids of the short listed bidders only will be opened, in the presence of the bidders or their authorized representative, who choose to attend, at the time, place and date to be informed later.

The authorized representative of bidder, present at the time of opening of the bids shall be required to sign an attendance register as a proof of having attended the commercial bid opening.

The bidder's name, bid prices, discounts and such other details considered as appropriate by C-DAC, will be announced at the time of opening of the bids.

(Technically accepted competitive bids ONLY will be considered for the opening of Commercial Bids)

END OF SECTION I

SECTION II: INSTRUCTION TO BIDDERS (ITB)

1. Delivery Period / Timelines

The Supply, Installation, Testing and Commissioning at site must be completed within 8 weeks, after placement of Purchase order or opening of LC, as the case may be.

2. Location for the Supply, Installation & Warranty Services.

The FPGA Cluster and other items covered by this document are required to be supplied and installed at C-DAC, CDAC Knowledge Park, Bangalore-560038.

3. Order Placement and Release of Payment

The Purchase Order and payment shall be processed by:

Centre for Development of Advanced Computing (C-DAC),
C-DAC Knowledge Park, No.1 Old Madras Road,
Byappanahalli,
Bangalore – 560 038

4. Eligible Bidders:

4.1 This invitation for bids is open to those shortlisted bidders who have been qualified against submission of Expression of Interest (EOI) invited vide Tender Notice No C-DAC/EOI/FPGA Cluster/11-12 dated 22.07.2011 to provide **“FPGA Cluster based on Xilinx Virtex6 LX 550T / Equivalent FPGA at C-DAC Knowledge Park, Bangalore”**

4.2 The bidder should be either a principle manufacturer or authorized distributor/reseller for all the items as mentioned in the tender document.

4.3 Bidders should not be under a declaration of ineligibility for **corrupt and fraudulent** practices.

4.4 Bidders should be registered with Sales Tax / Income Tax Department of Government of India and should hold a valid VAT registration certificate, as applicable.

4.5 The bidder should submit the relevant and necessary documents along with the technical bid.

4.6 The Bidder should have the main / branch office at Bangalore to ensure satisfactory after sales service support.

Note: C-DAC reserves the right to award/reject the orders to any particular bidder without assigning any reasons thereof.

5. Amendment to Bidding Documents:

5.1 At any time prior to the deadline for submission of bids, C-DAC may, for any reason, whether on its own initiative or in response to the clarification request by a prospective bidder, modify the bid document.

5.2 The amendments, if any, will be notified in writing to the bidders and such amendments/modifications will be binding on bidders.

- 5.3 C-DAC at its discretion may extend the deadline for the submission of bids if the bid document undergoes changes during the bidding period, in order to give prospective bidders time to incorporate the amendments while preparing the bids.

A. PREPARATION OF BIDS:

Bidders should avoid, as far as possible, corrections, overwriting, erasures or postscripts in the bid documents. In case however any corrections, alterations, changes, erasures, amendments and/or addition have to be made in the bids, they should be supported by dated signatures of the same authorized person signing the bid documents.

6. Earnest Money Deposit (EMD)

- 6.1 The tender documents must be accompanied by Earnest Money Deposit of Rs.3,00,000/- (Rupees Three Lacs only) in the form of Demand Draft (DD) drawn in favour of C-DAC payable at Bangalore.

Bids submitted without EMD will stand rejected. EMD will not be accepted in the form of cash/cheque/FDR/BG or any other form except DD. No interest shall be payable on EMD.

- 6.2 The EMD will be returned to the bidder(s) whose offer is not accepted by C-DAC within 30 days from the date of opening of commercial bids. In case of the bidder(s) whose offer is accepted, the EMD will be returned on submission of Security Deposit (Refer clause 4 of Section III). However, if the return of EMD is delayed for any reason, no interest/penalty shall be payable to the bidder.

- 6.3 The successful bidder, on award of contract / order must send the contract / order acceptance in writing within 10 days of award of contract/order, failing which the EMD will be forfeited and the order will be placed on the next successful bidder.

- 6.4 The EMD shall be forfeited:

- 6.4.1 If the bidder withdraws the bid during the period of bid validity specified in the tender.
- 6.4.2 In case a successful bidder, fails to furnish the security deposit (Refer clause 4 of Section III)
- 6.4.3 If the bidder fails to furnish the acceptance in writing, within 10 days of award of contract/order.

7. Period of validity of bids:

- 7.1 Bids shall be valid for a minimum 120 days from the date of submission. A bid valid for a shorter period shall stand rejected.

- 7.2 C-DAC may ask for the bidder's consent to extend the period of validity. Such request and the response shall be made in writing only. The bidder is free not to accept such request without forfeiting EMD. A bidder agreeing to the request for extension will not be permitted to modify his bid.

B. SUBMISSION OF BIDS

The bid should be neatly arranged, pages numbered and secured properly. Each page of the bid should be signed by the authorized representative. They should not contain any terms and conditions, printed or otherwise, which are not applicable to the bid. The conditional bid will be summarily rejected. Insertions, postscripts, additions and alterations shall not be recognized, unless confirmed by bidder's signature.

8. Deadline for Submission of Bids:

8.1 Bids must be received by C-DAC before the due date and time at the address specified in the tender document. In the event of the specified date for the submission of bids being declared as a holiday for C-DAC, the bid-closing deadline will stand extended to the next working day up to the same time.

8.2 C-DAC may extend this deadline for submission of bids by amending the bid document and the same shall be suitably notified to the bidders.

9. Late Bids:

9.1 Any bid inadvertently received by C-DAC after the deadline for submission of bids, will not be accepted and returned unopened to the bidder.

C. BID OPENING AND EVALUATION OF BIDS

10. Opening of Bids:

10.1 The technical bids will be evaluated to shortlist the eligible bidders. The technical bids of only the eligible bidders shall be considered for further processing (Technical evaluation)

10.2 During the evaluation process, C-DAC may seek clarification from the bidder, if required. The bidder may submit clarification as required and / or submit the documents, catalogs, literature etc., in response to the clarifications. However, any changes in make/model quoted, quantity offered, configuration, capacity, speed etc., will not be permitted.

10.3 Bidder whose technical bid is found to be acceptable and meeting the eligibility requirements as specified in this tender will be informed about the date and time of the opening of the commercial bid.

10.4 C-DAC will open commercial bids of only the technically short listed bids, in the presence of the bidder or their authorized representative who choose to attend the bid opening, at the time and date to be informed later.

10.5 The bidder's authorized representative who attends the bid opening shall sign an attendance register as a proof of having attended the bid opening.

10.6 The bidder's name, bid prices, discounts and such other details considered as appropriate by C-DAC, will be announced at the time of opening of the commercial bids.

11. Comparison of Bids:

11.1 Only the short-listed bids from the technical evaluation shall be considered for commercial comparison.

11.2 The Schedule of Requirements stipulates the system requirements and features only and is not complete Bill of Materials. The commercial comparison will include all such items that are required to achieve the system requirements. Bidders, in their own interest, should quote for all the items essential for this purpose.

11.3 In case of optional items, only the technically qualifying options will be considered for commercial comparison.

11.4 The prices for the complete solution (all essential items put together) only will be compared.

11.5 For the purpose of comparison, the exchange rate as on the date of opening of commercial bids will be considered.

11.6 The comparative statement shall also indicate the delivery schedule offered in the technical bid. The bid not adhering to the delivery/installation period as mentioned in Clause 1 of Section II will stand rejected.

D. AWARD OF CONTRACT

12. Award Criteria

12.1 C-DAC shall award the contract to the eligible bidder whose technical bid has been accepted and determined as the lowest evaluated commercial bid.

12.2 If more than one bidder happens to quote the same lowest price, C-DAC reserves the right to split the order and award the contract to more than one bidder.

13. Purchaser's Right to amend / cancel

13.1 If, for any unforeseen reasons, C-DAC is required to change/reduce the Scope of Supply, this change shall be acceptable to the bidder without change in the unit price quoted.

13.2 C-DAC reserves the right to cancel the tender without assigning any reasons there for.

14. Corrupt or Fraudulent Practices.

14.1 It is expected that the bidders who wish to bid for this project have highest standards of ethics.

14.2 C-DAC will reject bid if it is revealed that the bidder has engaged in corrupt and / or fraudulent practices while competing for this contract

14.3 C-DAC may also declare a bidder ineligible, either indefinitely or for a stated duration, for participating in C-DAC's tender process, if it is revealed that the bidder has engaged in corrupt and / or fraudulent practices while competing for this contract.

15. Interpretation of the clauses in the Tender Document / Contract Document:

15.1 In case of any ambiguity / dispute in the interpretation of any of the clauses in this tender document, interpretation of Executive Director, CDAC shall be final and binding on all parties.

END OF SECTION II

SECTION III: SPECIAL CONDITIONS OF CONTRACT (SCC)

1. Prices

- 1.1 The prices quoted shall be considered firm and no price escalation will be permitted during the validity of the bids.
- 1.2 Bidder may bid in Foreign Currencies or in INR or partly in foreign currency & partly in INR. If bidder chooses to bid in foreign currency, the bidder must provide the name and address of the supplier abroad on whom the purchase order is to be placed. The LC would be opened, if applicable, favoring the same supplier abroad. The payment in foreign currency shall be made only if the order and LC is in the name of supplier abroad.
- 1.3 The prices quoted should be inclusive of freight, insurance & packing till C-DAC, Bangalore. The packing shall be transport worthy so as to prevent their damage or deterioration to goods during transit to their final destination.

2. Taxes and Duties:

- 2.1 The prices quoted should be inclusive of applicable taxes and duties, except customs duty and/or Central Excise Duty, as applicable. The items being imported in India are exempted from payment of Customs duty under Customs Notification No. 51/96 as amended by 24/2007, dated 1.3.2007. The Customs Duty Exemption Certificate shall be arranged by C-DAC as & when required. The Excise Duty exemption certificate will be issued under Notification No. 16/2007-Central Excise, dated 1.3.2007. The Customs duty payable after availing exemption, will be extra at actual.
- 2.2 Bidder shall arrange to clear the consignment after following customs formalities at port of landing in India and arrange to deliver the consignment to C-DAC, Bangalore. The cost and risk of the consignment rests with the bidder till it is delivered to C-DAC Bangalore.
- 2.3 If the taxes and duties are quoted separately, the exact rates and amounts of taxes should be mentioned. No concessional tax form (C/D) will be given by C-DAC.

3. Software Licenses:

The Software mentioned in Schedule of Requirement is for Government R & D purpose only. The bidder may quote for appropriate licenses. The software licenses shall be required in the name of C-DAC. The licenses shall contain paper licenses and at least one set of media (CDs).

4. Security Deposit (SD)

The successful bidder will be required to furnish the Security Deposit for 5% of the order value within 10 days of receipt of Purchase Order. The Security Deposit will be in INR and shall be submitted in the form of Demand Draft drawn in favor of C-DAC payable at Bangalore. The Security Deposit will be returned upon completion of installation & commissioning and submission of Performance Bank Guarantee (PBG). The Security deposit from the Indian representative is acceptable.

5. Performance Bank Guarantee (PBG)

The successful bidder will be required to furnish the Performance Bank Guarantee for the 10% amount of the Purchase Order, as per the format attached to this document (Refer Annexure – B) on successful installation & commissioning of the system. This bank guarantee shall remain valid for the entire period of warranty. This Performance Bank Guarantee must be in INR, issued by any Indian bank only. In case of order in foreign currency, for calculating the equivalent amount in INR, the RBI exchange rate as on date of invoice shall be considered.

6. Completeness Responsibility

Notwithstanding the scope of work, engineering, supply and services stated in bid document, any equipment or material, engineering or technical services which might not be even specifically mentioned under the scope of supply of the vendor and which are not expressly excluded there from but which are necessary for the performance of the system in accordance with the specifications and executing the contract to establish achievement of performance guarantee parameters, are to be provided for and rendered by the vendor without any extra charge.

7. Warranty & Support

All the items offered / ordered, shall carry minimum 3 (three) years on site comprehensive warranty & Support from the date of acceptance. The Warranty and support should be provided by OEM. The repairing/ rectification/ replacement/ configuration required, if any, of the items under warranty must be done at site only at free of charge, including to and fro transportation costs of the items. These items shall not be allowed to be taken outside the country for warranty repairs.

The PBG will be released only after the submission of satisfactory performance certificate issued by C-DAC after the completion of warranty period.

Bidder shall quote for the 4th and 5th year extended warranty rates in terms of percentage of the basic cost. However, CDAC reserves the right to enter or not to enter for 4th and 5th year extended warranty.

8. Payments:

8.1 In case of orders in INR - 80% of the payment will be made against receipt of material at site and 10% against successful installation & commissioning duly certified by C-DAC.

Balance 10% payment will be made on the completion of warranty period OR against submission of Bank Guarantee of equivalent amount from any Indian bank valid for the entire period of warranty.

8.2 In case of orders in foreign currencies – 80% Payment shall be made against irrevocable Letter of Credit (LC) at sight and 10% payment will be made by sight draft, against successful installation & commissioning of the system duly certified by C-DAC. The balance 10% shall be paid against submission of Performance Bank Guarantee as per clause 5 of Section III given above. In case of foreign bidder, the Performance Bank Guarantee submitted by bidder's Indian office/ representative/ distributor will be acceptable.

9. Training:

The Bidder should give training to a group of CDAC personnel on theory and hands-on of their FPGA Cluster system immediately after delivering the system, and subsequently thrice during the first 2 years depending on CDAC's need and convenience. The training should be arranged at CDAC, Bangalore. All the four training duration should be minimum of 5 days (06 hours per day).

10. C-DAC, Bangalore reserves the right to increase or decrease the Bill of Material as per the requirement without any change in the quoted rates.

11. Penalty for delayed Deliveries / Services.

C-DAC reserves the right to levy penalty @ of 0.5% of order value per week of delay beyond the scheduled deliveries / execution of the order successfully, subject to maximum of 10% of the order value.

C-DAC reserves the right to cancel the order in case the delay is more than 10 weeks.

The penalties, if any shall be recovered from Security Deposit / Performance Bank Guarantee.

12. Responsibilities:

In case the bid is submitted by Indian Representative or authorized distributor/ reseller, with the instruction to place the purchase order on their principles, all the terms and conditions stipulated in this document shall apply to the principles on whose name the Purchase Order is placed.

13. Jurisdiction:

The disputes, legal matters, court matters, if any shall be subject to Bangalore jurisdiction only.

14. Force Majeure:

C-DAC may consider relaxing the penalty and delivery requirements, as specified in this document, if and to the extent that, the delay in performance or other failure to perform its obligations under the contract is the result of a Force Majeure. Force Majeure is defined as an event of effect that cannot reasonably be anticipated such as acts of God (like earthquakes, floods, storms etc.), acts of states, the direct and indirect consequences of wars (declared or undeclared), hostilities, national emergencies, civil commotion and strikes at successful Bidder's premises.

15. Arbitration & Laws

Except where otherwise provided for in the contract, all questions and disputes relating to interpretation and application of the provisions of the contract shall be settled mutually within thirty (30 only) days (or such longer period as may be mutually agreed upon) from the date that either party notifies in writing that such dispute or disagreement exists, under the Rules of India Arbitration and Conciliation Act, 1996. The venue of Arbitration shall be specified in the purchase agreement. The jurisdiction of the courts shall be specified in the purchase agreement.

END OF SECTION III

ANNEXURE A

Checklist: Eligibility Criteria for Bidders

Bidders to indicate whether the following are enclosed by striking out the non-relevant option.

1.	The Demand Draft for Rs.3,00,000/- towards Earnest Money Deposit	Yes/No
2.	Undertaking that the successful bidder agrees to submit the Security Deposit amounting to 5% of the order Value	Yes/No
3.	Undertaking that the successful bidder agrees to give a Performance Bank Guarantee amounting to 10% of the Purchase order Value.	Yes/No
4.	Duly filled Technical Bid with proper seal and signature of authorized person on each page of the bid submitted	Yes/No
5.	Duly filled Financial Bid with Proper Seal and signature of authorized person on each page of the bid submitted	Yes/No
6.	Self Attested copy of Tax Registration Certificate(s) as applicable	Yes/No
7.	Self Attested copy of Sales Tax, Service Tax & other required authorities as applicable	Yes/No
8.	A copy of the Un-priced Financial Bid	Yes/No
9.	Benchmarking Results (Refer table 11.1 under section IV)	Yes/No
10.	Compliance sheet with any deviation	Yes/No

ANNEXURE – B

(ON STAMP PAPER)

PERFORMANCE BANK GUARANTEE:

To,
The Director General
Center for Development of Advanced Computing,
C-DAC Knowledge Park
No. 1, Old Madras Road
Byappanahalli
Bangalore 560 038.

In consideration of Center for Development of Advanced Computing (hereinafter called the Purchaser) having agreed on the terms and conditions of Order No. : _____ dated: (hereinafter called the Contract) made between M/s. (Vendor), having its Registered Office at: _____, and corporate office at _____, (hereinafter called the Contractor) and the Purchaser in connection with supply of _____ materials, the Purchaser stipulated in the contract that the balance 10% (Ten Percent only) payment of the purchase price shall be payable to the contractor only against a Bank Guarantee for 10% (Ten percent only) value of order valid till warranty period contained in the purchase order i.e. 36 months min. from the date of commissioning or min. 40 months from the date of despatch.

We, _____ (bank name & full address), (hereinafter referred to as the Guarantor), do hereby undertake and agree to indemnify and keep indemnified the Purchaser from time to time to the extent of Rs. _____ /-(Rs. _____ Only) against any cost, charges and expenses suffered by the Purchaser by reasons of any breach or breaches committed by the said Contractor of any of the terms and conditions contained in the contract and the improper performance of the products during the warranty period and unconditionally pay the amount claimed by the Purchaser on demand and without demur to the aforesaid.

We, (bank name) further agree that the Purchaser shall be the sole judge of and as to whether the said Contractor has committed any breach or breaches of any of the terms and conditions of the said contract and the extent of costs, charges and expenses suffered by the Purchaser on account thereof and the decision of the Purchaser that the said contractor has committed such breach or breaches and as to the amount or amounts of costs, charges and expenses suffered by the Purchaser from time to time, shall be final and binding on us.

We, (bank name), further agree that the Guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said contract subject, however, that the Purchaser shall have no claim under this Guarantee after the expiry of the warranty period as mentioned in the Order No.: _____.

The Purchaser shall have the fullest liberty without affecting in any way the liability of the Bank under this Guarantee or Indemnity from time to time to vary any of the terms and conditions of the said Contract or to the extent the time of performance by the said Contractor or to postpone for any time and from time to time any of the powers exercisable by it against the said Contractor and either to enforce or forbear from enforcing any of the

terms and conditions governing the said contract or securities available to the Purchaser and the said Bank shall not be released from its responsibilities under these presents by any exercise by the Purchaser to the said contractor or of any other matter or thing whatsoever which under the Law relating to securities would but for this provision have the effect of so releasing the Bank from its such liability.

It shall not be necessary for the Purchaser to proceed against the Contractor before proceeding against the Bank and the Guarantee herein contained shall be enforceable against the Bank, notwithstanding any securities which the Purchaser may have obtained from the Contractor, shall at the time when proceeding are taken against the Bank hereunder be outstanding or unrealized.

We, the said bank, lastly undertake not to revoke this Guarantee during its Currency except with the previous consent of the Purchaser in writing and agree that any change in the constitution of the said contractor or the said bank shall not discharge or liability hereunder.

Notwithstanding anything to the contrary contained hereinbefore our liability under this guarantee is restricted to Rs._____/ - (Rs., in words), our liability under this Guarantee shall remain in force until (date). Unless a demand or claim is made on us in writing, within the said period, that is on or before (date). All rights of the Purchaser under the said Guarantee shall be forfeited and we shall be relieved and discharged from all liabilities.

This Guarantee should be returned to us on expiry.

Dates this _____ day of (month) of ____ (year).

Sd/- (Bankers)
Authorized signatory
With bank seal & full address.

SECTION IV – Schedule of Requirements

1) Hardware Specification

- The FPGA cluster should at least have 21 Virtex6 LX550T -2 speed grade / equivalent FPGAs.
- Each FPGA board should at least have PCI Express Gen2 x4 connectivity to the host machine
- The data transfer path from host machine I/O to the end FPGA board should be at least PCI Express Gen2 x4 bus
- The data transfer path from host machine I/O to all FPGA board I/O should be PCI Express Gen2 compatible
- The data transfer path from FPGA board I/O to end FPGA should be PCI Express Gen2 / equivalent standard / equivalent proprietary bus
- The system should support the minimum data transfer rate of 3.5 Mbytes per second both ways (host to FPGA and FPGA to host) simultaneously. This 3.5Mbytes per second of data transfer rate is the actual user data transfer to each FPGA simultaneously accounting all levels of protocol overhead of software / firmware implementation
- The FPGA cluster system should support high speed interconnection between FPGAs
- The system should have hot pluggable / swappable FPGA boards and the required software / firmware. (Optional)
- Each FPGA board should at least support 2GB of DDR2/better SODIMM/equivalent RAM
- Each FPGA board should at least have one JTAG port which should support real time debugging of all FPGAs in the board using tools like ChipscopePro
- All 21 FPGAs should be independently configurable through PCI Express and JTAG at different instance of time
- All 21 FPGAs should be independently re-configurable with full-size bit file on the fly without prompting the host machine to reboot to take effect of the new full-size bit file at different instance of time.
- Board schematic of all FPGA boards may be delivered with the system (Optional)
- The FPGA system should be covered with the enclosure and 19 inch rack mountable. The power supply needs to be housed within the enclosure. The power supply should cater the power requirement of all FPGAs in the enclosure where each FPGA consumes of 50W of power
- Proper enclosure for the system with suitable internal power supply (assume each LX550T-2/ equivalent FPGA consumes 50W of power) must be supplied.
- All the power supplies should be dual redundant. In case one power supply fails other should cater the full load of board/system
- The power supply should have overload / short-circuit protection
- Proper heat sink / cooling fan / liquid cooling arrangements (considering 50W of power consumption by each FPGA and ambient temperature 20 deg Celsius) for all individual FPGAs to run continuously all FPGAs with 80% of logic utilization with the frequency of 200MHz

- The FPGA system should be designed and integrated so as to run it continuously at a stretch for at least one month. (Heat dissipation and power supply issues should not interrupt this 24X7 functionality).
- The board should support to monitor temperature of all individual FPGAs
- LED indication to say board is powered up and healthy
- The FPGA cluster system should be covered for a minimum of 3 years warranty
- Vendors should quote for the 4th and 5th year extended warranty rates in terms of percentage of the basic cost. However, C-DAC reserves the right to enter or not to enter for 4th and 5th year warranty.
- Vendor should provide 19 inch rack(s) to house the FPGA cluster and host machine. Host machine with monitor needs to be 19" rack mountable. Extra space need to be provided in the rack to house any additional hardware. The rack specification is given below
- Cables, connectors and all other accessories as applicable need to be delivered with the system
- The vendors should provide a minimal system for evaluation and benchmarking at the time of submitting the bids. Reliability evaluation reports / calculations should be enclosed with the technical bid.

2) Rack Specification

- Minimum Size of Height: 42U, Width: 19 inch, Depth: 800mm with height adjustable sub-racks.
- The width and depth can be bigger than the above mentioned size in order to fit the FPGA cluster system.
- Superior ventilation need to be provided with perforated doors and vented covers
- Vented top cover with cable entry provisions at top and bottom.
- Removable side panels. All around accessibility
- Rear mounting angles supplied with split pairs to allow easy adjustments for equipment of different depths
- Side panel with slam latches and indents for improved strength
- Load rating – 1000 kilograms
- Two Power distribution Unit (PDU) vertical units at the back of the rack with minimum of 24 power sockets. PDU should at least have one Miniature Circuit Breaker (MCB) each
- Front door – tinted glass or fully perforated steel
- Rear steel door – single or dual, fully perforated steel
- Front & rear door, roof and side panels need to be grounded

3) Server / Host Machine specification

- Processor – Minimum two processors; Each processor with 4 or more cores
- Processor Speed – 2.4GHz or better
- Motherboard – Express chipset on board Video/LAN Preferred; At least two SATA II/better ports, four USB 2.0/better ports
- RAM – 8 GB (2x4GB) DDR3 expandable to 16GB
- HDD – SATA II 1TB or more (minimum 7200 RPM)
- Keyboard – USB standard
- Mouse – USB optical mouse
- Monitor – 17” wide screen flat Monitor
- Operating System – 64 bit Windows7 / 64 bit Linux
- The server should be rack mountable in a 19" rack and shall be of 4U size preferably. Space shall exist for populating the rack with more such modules. The equipment shall have mother board construction to facilitate plugging of additional modules.

4) Software and Firmware Specification

- 64-bit software API's source code(C/C++) compatible with loaded operating system must be provided
- Software API should support the function of configure FPGAs, clear FPGAs, data transfer to FPGAs (from host to FPGA & from FPGA to host) in FPGA specific manner and temperature monitoring of all individual FPGAs. Concurrent data transfer between different FPGAs and the host and vice versa should be feasible
- At any instant reconfiguration of each FPGA should be independently feasible without interrupting other FPGAs functional status. It should be feasible to program different FPGAs with different bit file at different instances of time
- PCI express Gen2 / standard bus / proprietary bus firmware source code (VHDL/Verilog) must be provided as per the interface provided for each FPGA / FPGA board
- Any FPGA firmware which is used for board interface must be provided with source code(VHDL/Verilog)
- The HDL code(VHDL/Verilog) of IP cores(if any) must be provided

5) Other Terms and Conditions (Technical)

- Vendor who gets the purchase order should provide the training to CDAC team on theory and hands-on of their FPGA cluster system immediately after delivering the system, and subsequently thrice during the first 2 years depending on CDAC's need and convenience. All the training should be provide at C-DAC's premises. All the four training duration should be minimum of 5 days (6 hours per day)
- List of software modules with detailed functionality report should be enclosed with the technical bid
- List of firmware modules with detailed functionality report should be enclosed with the technical bid.
- Power requirement from mains (230V AC – 50Hz) report should be enclosed with the technical bid

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- Expandability report which explains how can the existing system be expanded to increase the system performance should be enclosed with the technical bid
 - The drawing of the system's layout with the required cables, connector and other accessories should be enclosed with the technical bid
 - The detailed technical literature of the FPGA system should be enclosed with the technical bid
 - The FPGA system should be Electromagnetic Interference (EMI), Electromagnetic Compatibility (EMC) complied. The successful bidder should provide the copy of EMI and EMC certificate which comply any standard tests for EMI, EMC
 - The FPGA system should be modular for easy servicing and maintenance
 - The detailed specification of the product should be enclosed with the technical bid
 - Vendor's assistance is required for conducting the Acceptance Test Procedure (ATP)
 - Vendors should undertake that all technical specifications listed above are 100% complied