



**GOVERNMENT OF TAMIL NADU**

**Tamil Nadu e-Governance Agency**

**Request for Proposal for Selection of Implementation Partner for TNeGA to design, develop and deploy Nambikkai Inaiyam (Tamil Nadu Blockchain Backbone Infrastructure)**

**Bid Document**

**Tender Ref No: TNeGA/OT/BlockchainNI/2020-21**

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**Important Notice**

This Tender (RFP) process is governed by The Tamil Nadu Transparency in Tenders Act 1998 and The Tamil Nadu Transparency in Tenders Rules 2000 as amended from time to time.

In case of any conflict between the terms and conditions in the tender document and the Tamil Nadu Transparency in Tenders Act 1998 and The Tamil Nadu Transparency in Tenders Rules 2000, the Act and Rules shall prevail.

**Letter of Undertaking**

To  
Chief Executive Officer,  
Tamil Nadu e-Governance Agency (TNeGA),  
807, 2<sup>nd</sup> Floor,  
PT Lee Chengalvarayan Naicker Building,  
Anna Salai, Chennai - 600 002.

Sir,

**Subject:** Undertaking for participating in Request for Proposal for **Selection of Implementation Partner for TNeGA to design, develop and deploy Nambikkai Inaiyam (Tamil Nadu Blockchain Backbone Infrastructure) - Reg**

**Reference No:** Tender Ref. **TNeGA/OT/BlockchainNI/2020-21**

I/We do hereby submit my/our bid for Selection of Implementation Partner for TNeGA to design, develop and deploy Nambikkai Inaiyam in accordance with the Terms and Conditions of this RFP.

I/We have examined the details of the tender and have carefully noted the conditions and specifications of contract, the stipulations of which I/We agree to comply with. I/We hereby undertake to complete the assigned tasks at the places mentioned in the specification of all the articles within as per RFP & tender schedule from the date of communication of acceptance of my/our tender.

I/We further agree that the acceptance of this tender shall result in a valid and concluded contract binding on me/us the terms whereof shall be taken to be those mentioned in the form of agreement hereby annexed notwithstanding the non-execution of the said agreement.

I/We hereby declare that I/We agree to do the various acts, deeds and things referred to herein including the condition relating to non-withdrawal of this tender above set out in consideration of the TNeGA and considering this my/our tender.

I/We ----- hereby confirm that our Company/ Companies (in case of bidding consortium) was/were not blacklisted by any State Government/ Central Government/ Public Sector Undertakings during the last three years. We also hereby confirm that our EMD/SD was not forfeited by any State Government / Central Government / Public Sector Undertakings during the last three years due to our non-performance, non-compliance with the tender conditions etc.

I/We ----- hereby confirm that our Company has not violated / infringed on any Indian or foreign trademark, patent, registered design or other intellectual property rights any time anywhere in India.

I/We..... shall not sub-contract any works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority.

I/We..... have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India, as per Government of Tamil Nadu G.O.Ms.No.343, Finance (Salaries) department, dated 18.9.2020; I certify that this bidder is not from such a country or, if from such a country, has been registered with the Competent Authority. I certify that this bidder fulfils all requirements in this regard and is eligible to be considered.

I/We ----- hereby declare that all the particulars furnished by us in this Tender are true to the best of my/our knowledge and we understand and accept that if at any stage, the information furnished is found to be incorrect or false, we are liable for disqualification from this tender and also are liable for any penal action that may arise due to the above.

I/We \_\_\_\_\_ certify that we are liable and responsible for any disputes arising out of Intellectual Property Rights.

In case of violation of any of the conditions above, I/We .....understand that I/We are liable to be blacklisted by TNeGA/Government of Tamil Nadu for a period of three years.

**Name of Bidding Entity / Primary Partner in Bidding Consortium:**

**Signature of Signing Authority:**

**Name of Signing Authority**

**Designation of Signing Authority:**

Note:

1. Declaration on the single bidding entity's / primary bidding entity's (for bidding consortium) letter head should be submitted as per format given above
2. If the bidding firm / any partner in case of a bidding consortium has been blacklisted by any State Government/ Central Government/ Public Sector Undertakings earlier, then the details should be provided

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## 1. Introduction

### 1.1 Tamil Nadu e-Governance Agency

Tamil Nadu e-Governance Agency (TNeGA) is responsible for driving all technology initiatives for the Government of Tamil Nadu. Its primary aim is to develop low cost, technology enabled scalable solutions to impact Governance in a significant way. It aims to create an inclusive, equitable, and universally accessible G2C service delivery mechanism for barrier free access to Governance. TNeGA offers IT solutions and consultancy services to Government departments for their technology needs. Tamil Nadu e-Governance Agency has also established Centre of Excellence (CoE) in the emerging technologies and is functioning under the Information Technology Department, Government of Tamil Nadu.

With the rapid urbanization and technology revolution India is set to take its stride in adoption and implementation of new technologies. Here digital transactions, easing business processes and enabling transparency is opening new doors for innovation and deployment of new age technologies. As various technologies are setting their foot, blockchain has found traction across the spectrum both the public and private sector.

Adoption of blockchain technology has increased rapidly from proof of concepts to pilots to production rollouts in the last two years. The Indian Government too has taken cognizance of its potential and is now exploring this technology in multiple domains such as asset registration, recordkeeping, benefit transfers, and so on.

The Government of Tamil Nadu has been evaluating this technology for applications in e-Governance. TNeGA is poised to take the leap into a new era of digital management and actively implement blockchain technology within the Governance structure.

Blockchain technology's applicability and transformative potential and the range of possibilities and have been researched and understood by TNeGA. A blockchain-based approach would increase the efficiency of Government/Non-Government process flows and reduce fraud. To unlock the full potential of this technology, TNeGA will need to work as a facilitator, by providing an enabling environment to interested players; eventually we plan to develop uniform standards, assess infrastructure requirements, allay security concerns, raise stakeholder awareness, and build trust within the ecosystem.

### 1.2 Nambikkai Inaiyam (NI)

TNeGA aims to setup and maintain a state-wide Blockchain Backbone Infrastructure that can be leveraged by all government departments and agencies, public sector enterprises, startups, blockchain developer's community and private sector enterprises as decided by TNeGA on a case to case basis.

This blockchain will be used by qualifying parties to build transparent, efficient and secure citizen centric and inter-organizational workflows. Enterprise grade G2G and G2C products and services will be implemented using this infrastructure. It will also be used to augment legacy platforms and existing IT infrastructure by providing an immutable ledger secured by cryptography.

This platform will be called Nambikkai Inaiyam (NI). This platform will enable the government of Tamil Nadu to establish a single trusted source of truth that will be used to create an efficient and secure system for government processes. This platform will have a major impact on the lives of the residents of Tamil Nadu. It will help us redesign processes and workflows to create secure, transparent and efficient IT systems in multiple domains of governance including agriculture, land records, public distribution system, benefits tracking and distribution, data integrity and healthcare to name a few.

Additionally, Nambikkai Inaiyam will also host a Zero-knowledge proof Identity Wallet. The wallet will allow residents of Tamil Nadu to securely share their personal documents in a digital format for identity verification and validation without compromising their privacy if they choose to sign up for this service. Once this wallet is online, residents of Tamil Nadu can present their details including identity documents, education certificates and degrees, income certificates, etc. to authorities for employment, admissions, passport verifications, etc. without physically carrying and producing their documents. Nambikkai Inaiyam will ensure that the digital copies produced are authentic and not tampered. At the same time using Zero-knowledge proof workflow it will ensure that the citizen's privacy is maintained when carrying out this verification. This service can be leveraged by all residents of Tamil Nadu if they choose to avail it.

The Blockchain Backbone Infrastructure platform will be hosted on a hybrid infrastructure. Nodes can be either on a cloud or State SDC or on premise of a stakeholder. The NI platform will also function as a Blockchain As A Service (BAAS) provider to Government departments and Public and private sector organizations, agencies and companies, startups and blockchain developers. Organizations that do not want the custody or overhead of hosting a node can access the blockchain through an API Gateway.

In addition to the Blockchain Backbone Infrastructure, the project will also consist of blockchain applications developed leveraging this platform. These applications can be categorized as below -

1. Applications with Digital Assets which are non transferable
2. Applications with Digital Assets which are transferable
3. Applications with Physical Assets which are transferable

Based on these categories, the development lifecycle of applications on Nambikkai Inaiyam platform can be categorized into 3 phases.

This RFP is for the Blockchain Backbone Infrastructure and the Phase 1 Apps i.e. apps which will use digital assets that are non transferable. The use case and scope for the Blockchain Backbone Infrastructure and the Phase 1 applications are defined in depth in section 4.0 of this document.

The Blockchain Backbone Infrastructure will need to support all these categories of use cases in the future.

## 2. Tender Schedule and Data Sheets

S.No.	Activity	Description and Details
1	Tender inviting Authority, Designation and Address	Chief Executive Officer, Tamil Nadu e-Governance Agency, 807,2 <sup>nd</sup> Floor, PT Lee Chengalvarayan Naicker Building, Anna Salai, Chennai - 600 002. Tel No: +91-44-40164907
2	Name of the Work	Request for Proposal for Selection of Implementation Partner for TNeGA to design, develop and deploy Nambikkai Inaiyam (Tamil Nadu Blockchain Backbone Infrastructure)
3	Tender Reference Number	Tender Ref No: <b>TNeGA/OT/BlockchainNI/2020-21</b>
4	Earnest Money Deposit (EMD)	Rs. 5,00,000 should be paid through online mode
5	Contract Period	2 years Development and 1 year free warranty. O&M Work Order may be issued in future.
6	Tender Document	The Tender document can be downloaded from the URL <a href="https://www.tnega.tn.gov.in">https://www.tnega.tn.gov.in</a> <a href="https://tntenders.gov.in">https://tntenders.gov.in</a> <a href="http://www.tenders.tn.gov.in">http://www.tenders.tn.gov.in</a>
7	Mode of Submission	E-Submission through <a href="https://tntenders.gov.in">https://tntenders.gov.in</a> and the Bids cannot be submitted after the due date and time.
8	Date and Place of Pre-bid Meeting	Pre-bid meeting is scheduled through online through video conference on 8 <sup>th</sup> March 2021 @ 11.30 Hrs and the link for VC is given below - <a href="https://tnega.webex.com/tnega/j.php?MTID=m6beb2a2a0d8a6300d84e3bd0785fcd36">https://tnega.webex.com/tnega/j.php?MTID=m6beb2a2a0d8a6300d84e3bd0785fcd36</a>
9	Due date and Time for Bid Submission	On 6th April 2021 upto 11:00 Hrs
10	Date, Time and Place of Opening of Technical Bid	On 6th April 2021 @ 11:30 Hrs
11	Date, Time and Place of Opening of Price Bid	Price Bid Opening Date & Time will be communicated to Technically Qualified Bidders Only

**Note:** *Neither the TNeGA nor their representatives are obligated to inform any bidders who have not qualified in any of the stages of bid process management*

### 3. General Instructions

#### 3.1 General

- The Bidders are requested to examine the instructions, terms and conditions and specifications given in the Request for Proposal (RFP). Failure to furnish all required information in every respect will be at the Bidder's risk and may result in the rejection of bid.
- It will be imperative for each Bidder(s) to familiarize itself/ themselves with the prevailing legal situations for the execution of contract. TNeGA shall not entertain any request for clarification from the Bidders regarding such legal aspects of submission of the Bids.
- It will be the responsibility of the Bidder that all factors have been investigated and considered while submitting the Bids and no claim whatsoever including those of financial adjustments to the contract awarded under this tender will be entertained by TNeGA. Neither any time schedule nor financial adjustments arising thereof shall be permitted on account of failure by the Bidder to appraise themselves.
- The Bidder shall be deemed to have satisfied itself fully before Bidding as to the correctness and sufficiency of its Bids for the contract and price quoted in the Bid to cover all obligations under this Tender.
- It must be clearly understood that the Terms and Conditions and specifications are intended to be strictly enforced. No escalation of cost in the Tender by the Bidder will be permitted throughout the period of Agreement or throughout the period of completion of contract whichever is later on account of any reasons whatsoever.
- The Bidder shall make all arrangements as part of the contract to Develop Software Applications of Government Departments and Applications to the beneficiaries at various locations at their own cost and transport.
- The Bidder should be fully and completely responsible to TNeGA and State Government for all the deliveries and deliverables. In case of a bidding consortium, the Primary partner will be held responsible for all the deliveries and deliverables
- The Bidder shall submit the scanned copy bid document (in .pdf) and corrigendum (if any) as an acceptance of the bid.

### 3.2 Clarifications to the RFP

A prospective Bidder requiring any clarification in the RFP may notified by E-mail to [tenders.tnega@tn.gov.in](mailto:tenders.tnega@tn.gov.in) or through online mode in <https://tntenders.gov.in> (Clarification Forum). Clarifications to the queries (if any) by the bidders and corrigendum's (if any) will be published in the websites <https://www.tnega.tn.gov.in>, <https://tntenders.gov.in> and <http://www.tenders.tn.gov.in> .

### 3.3 Amendments to the Tender

- A Pre-bid meeting will be held for addressing the clarifications on the date and time mentioned in the Tender Data Sheet or any other date to be decided by TNeGA. The Bidders are requested to participate in the Pre-bid meeting and get the clarifications.
- Before closing of the Tender, clarifications and corrigendum (if any) will be notified in the websites mentioned in the Tender Schedule. The Bidders shall periodically check for the amendments or corrigendum of information in the websites till the closing date of this Tender. TNeGA will not make any individual communication and will in no way be responsible for any information missed out by the bidders.
- No clarifications would be offered within 48 hours prior to the due date and time for submitting the Tender.
- Before the closing of the Tender, TNeGA may amend the Tender document as per requirements or wherever it feels that such amendments are absolutely necessary.
- Amendments also may be given in response to the queries by the prospective Bidder(s). Such amendments will be notified in the websites mentioned in the tender schedule. It is bidder responsibility to keep checking the website for any changes or clarifications or corrigendum to the tender document.
- TNeGA at its discretion may or may not extend the due date and time for the submission of bids on account of any amendments.
- TNeGA is not responsible if bidder misinterprets any provision of this tender document

### 3.4 Language of the Bid

The bid prepared by the Bidder as well as all correspondences and documents relating to the bid shall be in English only. The supporting documents and printed literature furnished by the Bidder may be in another language provided they are accompanied by an accurate translation in English duly notarized, in which case, for all purposes of the bid, the translation shall govern. Bids received without such translation copy are liable to be rejected.

### **3.5 Bid Currency**

Price should be quoted in Indian Rupees (INR) only and Payment shall be made in Indian Rupees only.

### **3.6 Contacting Tender Inviting Authority**

- Bidders shall not make attempts to establish unsolicited and unauthorized contact with the Tender Accepting Authority, Tender Inviting Authority or Tender Scrutiny Committee after the opening of the Tender and prior to the notification of the Award and any attempt by any Bidder to bring to bear extraneous pressures on the Tender Accepting Authority shall be sufficient reason to disqualify the Bidder
- Notwithstanding anything mentioned above, the Tender Inviting Authority or the Tender Accepting Authority may seek bonafide clarifications from Bidders relating to the tenders submitted by them during the evaluation of tenders.

### **3.7 Force Majeure**

Neither the Purchaser / nor the Successful Bidder shall be liable to the other for any delay or failure in the performance of their respective obligations due to causes or contingencies beyond their reasonable control such as:

- Natural phenomena including but not limited to earthquakes, floods and epidemics.
- Acts of any Government authority domestic or foreign including but not limited to war declared or undeclared, priorities and quarantine restrictions.
- Accidents or disruptions including, but not limited to fire, explosions, breakdown of essential machinery or equipment, power and water shortages.

### **3.8 Arbitration**

In case of any dispute, the matter will be referred to a sole Arbitrator to be appointed by the CEO, Tamil Nadu e- Governance Agency (TNeGA) under the "Arbitration and Conciliation Act 1996". The arbitration shall be held in Chennai, Tamil Nadu, India and the language of arbitration shall be English. The Courts at Chennai alone shall have Jurisdiction in the matter.

## 4. Minimum Eligibility Criteria (MEC) and Technical Evaluation System (TES)

The Bidders should have the following MEC for participating in the Tender and will be evaluated on the following TES. The Bidder can be a 'Single Bidder' or a 'Bidding Consortium'.

### 4.1 Bidding Consortium

- A consortium of 2 partner companies can bid, with one of them designated as primary partner and the other as the secondary.
- A legally valid agreement shall be executed for the consortium binding all the partners in INR 100 Non-Judicial stamp paper. Consortium agreement should be registered in Chennai.
- The consortium agreement should bind partners of the consortium to be liable jointly and severally for the execution of the contract in accordance with the contract terms. The consortium agreement should precisely indicate the role of each partner of the consortium in respect of the contract.
- The consortium agreement shall authorize one of the partners of the consortium as primary partner by submitting of Power of Attorney signed by the legally authorized signatories of both partners. The other partner should be explicitly designated as the secondary partner
- Consortium agreement shall be enclosed with the technical bid. Alternatively, a Letter of Intent to execute a consortium agreement in the event of a successful bid shall be signed by both the partners and submitted with the bid along with the copy of the proposed agreement.
- The primary partner of the consortium shall be authorized to incur liabilities and receive instruction for and on behalf of both partners of the consortium through the entire execution of the contract.
- Payments shall be done exclusively to the primary partner.
- The primary partner would be considered successful bidder should the consortium qualify in the final evaluation of the bid.
- No partner of the consortium should bid individually or as a partner of another consortium

## 4.2 Minimum Eligibility Criteria (MEC)

The Bidders should have the following Eligibility for participating in the Tender. The Bidders should enclose documentary evidence for fulfilling the Eligibility in the Technical Bid. **If a Bidder fails to enclose the documentary proof for eligibility, their bid will be summarily rejected.**

Sl. No.	Eligibility Criteria	Documentary Proof
4.2.1	<p><b><u>Company Profile – Registered Entity and Years of Operation</u></b></p> <p>In case of <b>Single Bidder</b>, the bidder should be a <b>registered company</b> (registered under Indian Companies Act, 1956 or Indian Companies Act, 2013) in India. The bidder should have been in operation for <b>atleast three financial years</b> (FY2017-18, FY2018-19, FY2019-20) and <b>current financial year</b></p> <p>In case of <b>Consortium of Bidders</b>, both partners should be <b>registered companies</b> (registered under Indian Companies Act, 1956 or Indian Companies Act, 2013) in India and should have been conducting operations for <b>atleast three financial years</b> (FY2017-18, FY2018-19, FY2019-20) and current financial year</p>	<p>For <b>Single Bidders</b>,</p> <ol style="list-style-type: none"> <li>1. Copy of Letter of Incorporation/ Certificate of Registration attested by Authorized signatory of the company</li> <li>2. Certificate issued by the CA (with CA's Registration Number/ Seal) regarding the company having operations in India for <b>atleast three financial years</b> (FY2017-18, FY2018-19, FY2019-20) and <b>current financial year</b></li> </ol> <p>For a <b>Bidding Consortium</b>, all consortium partners individually should submit the below documents -</p> <ol style="list-style-type: none"> <li>1. Copy of Letter of Incorporation/ Certificate of Registration attested by Authorized signatory of the company</li> <li>2. Certificate issued by the CA (with CA's Registration Number/ Seal) regarding the company having operations in India for <b>atleast three financial years</b> (FY2017-18, FY2018-19, FY2019-20) and <b>current financial year</b></li> <li>3. Consortium Agreement or Letter of Intent as stated in cl. 4.1</li> </ol>
4.2.2	<p><b><u>Company Profile – Annual Turnover</u></b></p> <p><b>Single Bidder</b> should have an average annual turnover of <b>INR 10 Cr</b> in the last three financial years (FY2017-18, FY2018-19, FY2019-20)</p> <p>In case of a consortium of bidders, The <b>Primary partner</b> should have an average annual turnover of <b>INR 10 Cr</b> in the last three financial years (FY2017-18, FY2018-19, FY2019-20)</p>	<p>Single Bidder / Primary partner in bidding consortium has to submit Audited Balance Sheet and Profit &amp; Loss account statements or Certificate issued by the CA (with CA's Registration Number/ Seal) for last 3 financial years (FY2017-18, FY2018-19, FY2019-20).</p> <p>For FY2019-20 provisional statements are acceptable</p>



<p><b>4.2.3</b></p>	<p style="text-align: center;"><b><u>Blockchain Projects Experience</u></b></p> <p><b>Single bidder or atleast one of the partners in case of a bidding consortium</b> should have successfully developed, deployed and provided technical support for an “external paying customer” for a <b>Blockchain software solution</b> (in India or abroad) / (public or private sector) meeting the below criteria (an “external paying customer” is a customer outside the bidder’s organization who pays for the solutions being provided).</p> <p>- One blockchain solution for an external paying customer with value not less than INR 2 Cr;</p> <p style="text-align: center;">-OR-</p> <p>- Two blockchain solutions for one or more external paying customers with value not less than INR 1 Cr each;</p> <p style="text-align: center;">-OR-</p> <p>Four blockchain solutions for one or more external paying customers with value not less than INR 50 Lakhs each</p> <p>Projects should have been executed during the last three financial years (FY2017-18, FY2018-19, FY2019-20) or current financial year</p>	<p>Single bidder or any one of consortium partner (in case of a bidding consortium) with blockchain experience needs to submit the below documents –</p> <p>Completion Certificates from the client; OR</p> <p>Work Order + Payment received from the client</p> <p>Technical presentation needs to be made by bidders who qualify the MEC for all such projects</p>
<p><b>4.2.4</b></p>	<p style="text-align: center;"><b><u>Local Office in Chennai</u></b></p> <p><b>Single Bidder or atleast one of the partners (in case of a bidding consortium) shall have office in Chennai for 24x7 support</b> or should furnish an undertaking to establish an office in Chennai immediately within 15 days from the issue of Letter of Acceptance (award of work) of the bid</p>	<p>The single bidder or any one of consortium partner (in case of a bidding consortium) to furnish proof for their office in Chennai or an undertaking from the authorised signatory to assure establishment of office within 15 days of issue of LoA</p>

Only those bidders who have submitted required documents listed in section 4.2 (Minimum Eligibility Criteria) and who meet the Minimum Eligibility Criteria as mentioned above and as determined by the Tender Scrutiny Committee (TSC) shall be considered for further technical evaluation as per clause 4.2.

### 4.3 Technical Evaluation System (TES)

The Bidders should enclose documentary evidence for fulfilling the following Technical Evaluation Criteria. The Tender Scrutiny Committee (TSC) will evaluate the bids as per the below criteria. **Bidders qualifying for TES need to make a presentation for clauses 4.3.4 and 4.3.5**

Clause	Criteria/Sub-Criteria	Marking Systems	Maximum Marks
4.3.1	<p align="center"><b><u>Bidder Turnover</u></b></p> <p>Average turnover in last three financial years (FY2017-18, FY2018-19, FY2019-20) for a <b>Single bidder or Primary partner in a bidding consortium.</b></p> <p><b>Supporting Document to be provided:</b> Extracts from the audited Balance sheet and Profit &amp; Loss statement; --OR-- Certificate from CA (with CA's Registration Number/ Seal)</p> <p>For FY2019-20 provisional statements are acceptable</p>	<ul style="list-style-type: none"> <li>• Greater than INR 20 Cr: - 10 marks</li> <li>• Between INR 15 Cr to INR 20 Cr - 7 marks</li> <li>• Between INR 10 Cr to INR 15 Cr - 5 marks</li> </ul>	<b>10</b>
4.3.2	<p align="center"><b><u>Relevant Certifications</u></b></p> <p>The single bidder/ any one partner in consortium should hold certification(s) recognized in the industry for quality management standards, information security standards etc.</p> <p>The following certifications will be considered -</p> <ul style="list-style-type: none"> <li>• ISO 9001 (quality management systems)</li> <li>• SEI CMM Level 3 or above (software development)</li> <li>• ISO 27001 (for information security) or equivalent</li> <li>• ISO20000-1 (for IT Service Management)</li> </ul> <p><b>Supporting Documents to be provided:</b> Copy of certificate valid on bid submission date</p>	<p>For a single bidder</p> <ul style="list-style-type: none"> <li>• Any one certification – 2 marks</li> <li>• Any two certifications – 4 marks</li> <li>• Three or more certifications – 5 marks</li> </ul> <p>At least one partner in the bidding consortium should hold the certifications.</p> <ul style="list-style-type: none"> <li>• Any one certification – 2 marks</li> <li>• Any two certifications – 4 marks</li> <li>• Three or more certifications – 5 marks</li> </ul>	<b>5</b>

<b>Technology Leadership Team</b>			
<b>Clause</b>	<b>Criteria/Sub-Criteria</b>	<b>Marking Systems</b>	<b>Maximum Marks</b>
4.3.3	<p style="text-align: center;"><b><u>Project Manager</u></b></p> <ul style="list-style-type: none"> <li>• Should have B.Tech/ B.E or equivalent degree in Computer Science /IT/ Any other Engineering discipline.</li> <li>• Should have overall experience of atleast 8 years in software design, development, testing and implementation</li> <li>• Should have project management experience of atleast 3 years</li> <li>• Project Management Certification (PMP/Prince 2/Six Sigma/ITIL/Agile) is desirable</li> <li>• Blockchain projects implementation experience is desirable</li> </ul> <p><b>Supporting Documents to be provided:</b> Copy of resume of proposed team member</p>	<ul style="list-style-type: none"> <li>• Overall IT Experience - 2 marks</li> <li>• Project management experience - 3 marks</li> <li>• Project Management Certification (PMP/Prince 2/Six Sigma/ITIL/Agile) - 1 mark</li> <li>• Blockchain projects implementation experience - 2 marks</li> </ul> <p>Qualitative assessment would be carried out of submitted resumes on the basis of the above parameters for their suitability for proposed role.</p>	<b>8</b>
4.3.4	<p style="text-align: center;"><b><u>Business Solution Architect</u></b></p> <ul style="list-style-type: none"> <li>• Should have B.Tech/ B.E or equivalent degree in Computer Science /IT/ Any other Engineering discipline.</li> <li>• Should have overall experience of atleast 8 years in software design, development, testing and implementation</li> <li>• Should have experience designing enterprise solution architecture for atleast 3 years</li> <li>• Should have experience designing solution architecture for atleast two Blockchain applications</li> </ul> <p><b>Supporting Documents to be provided:</b> Copy of resume of proposed team member</p>	<ul style="list-style-type: none"> <li>• Overall IT Experience - 1 mark</li> <li>• Enterprise solution design experience - 3 marks</li> <li>• Blockchain projects implementation experience – 4 marks</li> </ul> <p>Qualitative assessment would be carried out of submitted resumes on the basis of the above parameters for their suitability for proposed role.</p>	<b>8</b>

Clause	Criteria/Sub-Criteria	Marking Systems	Maximum Marks
4.3.5	<p style="text-align: center;"><b><u>Enterprise Software Architect</u></b></p> <ul style="list-style-type: none"> <li>• Should have B.Tech/ B.E or equivalent degree in Computer Science /IT/ Any other Engineering discipline.</li> <li>• Should have overall experience of atleast 8 years in software design, development, testing and implementation</li> <li>• Should have experience designing technical architecture for enterprise software solutions for atleast 3 years</li> <li>• Should have experience designing technical architecture for SAAS products or should have Cloud technical architecture design experience</li> <li>• AWS / Azure/ Google Cloud developer certification or equivalent is desirable</li> <li>• Should have experience designing technical architecture for atleast two Blockchain applications using Hyperledger Fabric / /Quorum/Corda /Ethereum</li> </ul> <p><b>Supporting Documents to be provided:</b> Copy of resume of proposed team member</p>	<ul style="list-style-type: none"> <li>• Overall IT Experience - 1 mark</li> <li>• Technical architecture design experience - 2 marks</li> <li>• SAAS / Cloud technical architecture design experience - 1 mark</li> <li>• AWS / Azure/ Google Cloud developer certification or equivalent – 1 mark</li> <li>• Blockchain projects implementation experience – 4 marks</li> </ul> <p>Qualitative assessment would be carried out of submitted resumes on the basis of the above parameters for their suitability for proposed role.</p>	<b>9</b>

<b>Technical Presentation</b>			
<b>Clause</b>	<b>Criteria/Sub-Criteria</b>	<b>Marking Systems</b>	<b>Maximum Marks</b>
4.3.6	<p style="text-align: center;"><b><u>Experience with Blockchain Technology</u></b></p> <p>Presentation to be made for Blockchain projects submitted in MEC (Minimum Eligibility Criteria) <b>clause 4.2.3</b></p>	<p>Marks will be awarded out of 20. Upto 4 projects can be submitted. Submissions will be judged by evaluating the below parameters overall -</p> <ol style="list-style-type: none"> <li>1. Business use case(s) / workflow complexity</li> <li>2. Integration with legacy enterprise IT systems</li> <li>3. Overlap with use cases and technical components in scope of this RFP</li> <li>4. Risks and challenges faced during implementation and steps taken for mitigation</li> <li>5. No. of active users/transactions in production (Any relevant links / URLs to block explorers /dashboards or reports)</li> </ol>	<b>20</b>
4.3.7	<p style="text-align: center;"><b><u>Project Execution Strategy and Technical Approach for Nambikkai Inaiyam and hosted applications</u></b></p> <p>Demonstration of</p> <ul style="list-style-type: none"> <li>• Understanding of project requirements</li> <li>• Necessary implementation strategy and resources required</li> <li>• Proposed Solution and Technical Architecture</li> </ul>	<p>Presentations would be evaluated based on the following –</p> <ol style="list-style-type: none"> <li>1. Technology stack (blockchain, middleware, frontend, etc) proposed. Comparative analysis of chosen blockchain platform with others and rationale for selection (security, scalability, contracts flexibility, etc.) - 2 marks</li> <li>2. Infrastructure that must provide for the hosting the platform - 2 marks</li> <li>3. Project Plan and Timelines - 4 marks</li> <li>4. Risks &amp; challenges likely to be encountered during implementation - 4 marks</li> </ol> <p style="text-align: right;"><b>Continued on next page</b></p>	<b>40</b>

Request for Proposal for Selection of Implementation Partner for TNeGA to design, develop and deploy Nambikkai Inaiyam (Tamil Nadu Blockchain Backbone Infrastructure)

Clause	Criteria/Sub-Criteria	Marking Systems	Maximum Marks
4.3.7 (Contd..)	<p align="center"><b><u>Project Execution Strategy and Technical Approach for Nambikkai Inaiyam and hosted applications</u></b></p> <p align="center"><b><u>(Contd.)</u></b></p> <p>Demonstration of</p> <ul style="list-style-type: none"> <li>• Understanding of project requirements</li> <li>• Necessary implementation strategy and resources required</li> <li>• Proposed Solution and Technical Architecture</li> </ul>	<p>5. Proposed Solution and Technical architecture for the Blockchain Backbone Infrastructure and any 2 applications listed in Scope of Work (Any two from 8.2.1 / 8.2.2.1 / 8.2.2.2 / 8.2.2.3 / 8.2.2.4 – All POC cases / 8.2.2.5) - 14 marks</p> <p>6. Security planning including details such as issuing identities, secure key management, access controls etc; - 2 marks</p> <p>7. Risk/Feasibility Assessment of proposed architecture/design vis-a-vis</p> <ol style="list-style-type: none"> <li>a. data security</li> <li>b. data privacy</li> <li>c. scalability and availability ( due to increase in users and/or hosted applications)</li> <li>d. interoperability with other blockchain networks (govt / private sector)</li> <li>e. threats from future tech (Eg. . from quantum computing)</li> <li>f. implementing future use cases What are the recommended mitigation strategies for the above? - 12 marks</li> </ol> <p>Qualitative assessment would be carried out of presentations on the basis of the above parameters</p>	
<b>Total Marks (TES)</b>			<b>100</b>

**The bidder shall be required to get at least 70 marks out of 100 marks to qualify for next stage i.e. opening of the financial bids.**

**Valuation of technical proposal:**

- 1) TSC will evaluate whether all the points/ requirements mentioned in the RFP are understood and addressed well. TSC will also evaluate whether the implementation methodology is in line with the requirement. The bidder must make a technical presentation and live demonstration of projects as per cl. 4.3.6 and 4.3.7 to the TSC.
- 2) To declare a bidder as technically qualified, the bidder has to score a minimum of 70 marks based on the above said cl.4.3 (TES) and the financial bids of only those bidders who score 70 or above in the TES shall be opened.

#### **4.4 Final Evaluation of Bid**

The Final Evaluation will be done on Quality-cum-Cost-Based-System (QCBS) with the weight age of Technical & Price Bid score in the ratio 80:20. The final evaluation of shall be done as described below,

The marks scored in Technical Bid will be evaluated as follows:

$$T_N = T_B / T_{MAX} * 100$$

$T_N$  = Normalized technical score of the bidder under consideration

$T_B$  = Evaluated technical score for the bidder under consideration

$T_{MAX}$  = Maximum technical score for any bidder

- For Technically Qualified Bidders, the commercial scores will be calculated as

$$F_N = F_{MIN} / F_B * 100$$

Where,

$F_N$  = Normalized financial score of the bidder under consideration

$F_B$  = Evaluated cost for the bidder under consideration

$F_{MIN}$  = Minimum evaluated cost for any bidder

- Both the Technical Bid mark & Price Bid mark will be added to arrive at the total mark as follows:

$$B_N = 0.8 * T_N + 0.2 * F_N$$

Where,

$B_N$  = overall score of bidder under consideration

$T_N$  = Normalized technical score for the bidder under consideration

$F_N$  = Normalized financial score of the bidder under consideration

The total mark will be arranged in the descending order. The Highest scorer (H1) will be declared as the Successful Bidder.

## 5. Bid Preparation and Submission

### 5.1 Cost of Bid

The Bidder should bear all costs associated with the preparation and submission of Bids. TNeGA will in no way be responsible or liable for these charges/costs incurred regardless of the conduct or outcome of the bidding process.

### 5.2 Earnest Money Deposit (EMD)

- 1) An EMD amount as specified in the Tender Schedule should be paid through ONLINE mode.
- 2) The EMD of the unsuccessful Bidders will be auto-refunded to their bank account within a reasonable time consistent with the rules and regulation in this behalf
- 3) The EMD amount held by TNeGA till it is refunded to the unsuccessful Bidders will not earn any Interest thereof.
- 4) The EMD amount of the Successful Bidder shall be converted as part of the Security Deposit (SD) for successful execution of the work and will be returned only after the successful fulfillment of the Contract.
- 5) The EMD amount will be forfeited by TNeGA, if the Bidder withdraws the bid during the period of its validity specified in the tender or if the Successful Bidder fails to sign the contract or the Successful Bidder fails to remit Security Deposit within the due date.



### 5.3 Letter of Authorization

A letter of authorization from the Board of Directors / appropriate authority authorizing the Tender submitting authority or a Power of Attorney should be submitted in the tender; otherwise the Bids will be summarily rejected.

### 5.4 Two Part Bidding

Bidders should go through all Instructions, Terms and Conditions and Technical specifications given in the Tender Document. Failure to furnish information required in the Bid document or submission of a Bid not substantially responsive in every respect will be at the Bidders risk and may result in rejection of Bids. Bidders should strictly submit the Bid as specified in the Tender, failing which the bids will be non-responsive and will be rejected.

#### 5.4.1 Technical Bid

The first part of the bid is called Technical bid and it requires submission of the following documents

- 1) A Letter of Undertaking on company's letter head in .pdf
- 2) Copy of supporting documents for MEC (cl. 4.2) & TES (cl 4.3) as .rar file (Zipped) / .pdf file have to be submitted.

#### 5.4.2 Financial Bid (Price Bid Form)

Second part of the bid is called the Price Bid which should be submitted in the Bill of Quotation (BOQ) given in the tender document.

- 1) The rate quoted by the Bidder should include of Manpower, Software Development, UAT, Pilot Run, Go-Live of the backbone and applications. Supervision, Training, Administration, Overheads, Travel, Lodging, Boarding, In-station & Outstation expenses, etc and any other cost involved in the successful implementation of Scope of Work mentioned will not be borne by TNeGA. No other charges will be allowed by the TNeGA other than the Service charges quoted. The price bid shall be furnished in the format specified in the RFP.
- 2) Total Bid price (contract price) is the summation of the rates quoted for line items R1,R2,R3,R4,R5,R6,R7,R8,R9,R10,R11,R12 (Item No. 1.01 to 1.12 in sheet BOQ1) including GST. Successful bidder will be determined based on this total bid price and applying QCBS formula as per cl.4.4 of RFP.
- 3) The rates quoted for Price Discovery items should be quoted in sheet BOQ2. **Price discovery will not be included in the bid value (total bid price).** Please quote Price discovery rate for the following items in sheet BOQ2
  - Development charges (per man month) for designing, developing and deploying any additional use cases on the Blockchain Backbone Infrastructure (For line item R13 - 2.01)

- Support charges (per man day of 8 hrs) for providing technical support for integrating applications developed by third party to the Blockchain Backbone Infrastructure (For line item R14 - 2.02)
  - Charges for providing O&M support for 5 years for Blockchain Backbone Infrastructure and all hosted applications (Line item R15 – 2.03). If work order is issued for O&M, payment will be released end of every quarter on pro-rata basis, upon approval from TNeGA
  - Charges for providing physical (hard copy) versions of blockchain secured documents secured with a passive ID tag or any other similar technology. Please provide charges for generating upto 1lakh certificates (For line item R16 – 2.04), greater than 1 lakh and upto 5 lakh certificates(For line item R16 – 2.05) and more than 5 lakh certificates (For line item R16 – 2.06)
- 4) A free warranty period for 12 months should be included after the go live of Blockchain Backbone Infrastructure and each implemented application. This M22 (Month 22) in the Implementation Plan (Cl. 11). Support for blockchain applications delivered before, will be carried out in the development phase of the Blockchain Backbone Infrastructure.
  - 5) Bill of Quotation (BOQ) should not contain any conditional offers or variation in clause; otherwise the Bids will be summarily rejected.
  - 6) The Prices quoted shall be only in INDIAN RUPEES (INR) only. The tender is liable for rejection if BOQ contains conditional offers.
  - 7) The cost quoted by the Bidder shall be kept firm for a period specified in the Tender from the date of opening of the tender. The Bidder should keep the Price firm during the period of Contract including during the period of extension of time (if any). Escalation of cost will not be permitted during the said periods or during any period while providing services whether extended or not for reasons other than increase of duties / taxes payable to the Governments in India. The Bidders should particularly take note of this factor before submitting the bids.

### 5.5 Details of the Documentary proofs to be uploaded on the Website

<b>Letter of Undertaking</b>		<b>Upload Format</b>
A Letter of Undertaking in company's letterhead	<b>1</b>	PDF <b>(Max 2 MB)</b>
<b>Consortium Declaration -Appendix – III (in case Bidder is a Bidding Consortium)</b>		<b>Upload Format</b>
Consortium Declaration duly signed by both partners and explicitly mentioning primary partner and secondary partner	<b>1</b>	PDF <b>(Max 2 MB)</b>
<b>Minimum Eligibility Criteria (4.2)</b>		<b>Upload Format</b>
<b>1</b>	Copy of documentary proofs for clause 4.2.1 as PDF	<b>4</b> (All these PDF have to placed in a folder, and zipped as .rar file before submission) RAR (WinRAR) <b>(Max 20 MB)</b>
<b>2</b>	Copy of documentary proofs in chronological order for clause 4.2.2 as merged PDF	
<b>3</b>	Copy of documentary proofs for clause 4.2.3 as merged PDF	
<b>4</b>	Copy of documentary proof for clause 4.2.4 as PDF	
<b>Technical Evaluation Criteria (4.3)</b>		<b>Upload Format</b>
<b>1</b>	Copy of documentary proofs for clause 4.3.1 as merged PDF	<b>7</b> (All these PDF have RAR (WinRAR)

2	Copy of documentary proofs for clause 4.3.2 as merged PDF	to placed in a folder, and zipped as .rar file before submission)	<b>(Max 30 MB)</b>
3	Curriculum vitae of the human resources for clause 4.3.3		
4	Curriculum vitae of the human resources for clause 4.3.4		
5	Curriculum vitae of the human resources for clause 4.3.5		
6	Presentation deck for clause 4.3.6 with the details mentioned in marking scheme		
7	Presentation deck for clause 4.3.7 with the details mentioned in marking scheme		
<b>Price Bid</b>			
Bill of Quotation (BoQ)		<b>1</b>	.XLS
<b>Total</b>		<b>14</b>	

## 5.6 Bid closing date and time

The Bids should be submitted not later than the date and time specified in the Tender Schedule or Corrigendum (if any). Bid cannot be submitted after closing date and time. Hence the Bidders should submit the Bids well in advance to avoid disappointments.

## 5.7 Online Submission of Bids - <https://tntenders.gov.in>

- a) Bidder should read all the terms and conditions and accept the same to proceed further to submit bids. Tendering system will give a successful bid update message after uploading all the bid documents submitted. A print out of Bid Submission Confirmation showing the bid number, the date and time of

submission of the bid with all other relevant details can be taken from the website and kept as an acknowledgement for submission of bid. This acknowledgement will act as a proof of bid submission.

- b) The bidders can resubmit the bid as many times as possible till the closing time of the bid submission. Withdrawal of the bid is also possible before the closing time of the bid submission.
- c) The time settings fixed in the server and displayed at the top of the tender site, will be valid for all actions of bid submission, bid opening etc., in E-Tender system.

## 5.8 Modification and withdrawal of Bids

The Bids once submitted cannot be modified or amended or withdrawn. No documents can be added or modified after submission of Bids.

## 6. Tender Opening and Evaluation

### 6.1 Technical Bid Opening

The Technical Bid will be opened on the date and time as specified in the Tender schedule or in the Corrigendum issued by us (if any).

**NOTE:**-If the date fixed for opening of the tender happens to be a Government holiday, the tender will be opened on the next Working day at the time specified in the Tender Schedule.

### 6.2 Tender Validity

The offer submitted by the Bidders shall remain valid for a minimum period of 120 days from the date of opening of the Tender.

### 6.3 Initial Scrutiny

Initial Bid scrutiny will be conducted, and incomplete details as given below will be treated as non-responsive. If Tenders are:

- 1) received without the Letter of Authorization
- 2) received without the Letter of Undertaking on the company letter head per the template given in RFP
- 3) received without EMD amount
- 4) found with suppression of details

- 5) with incomplete information, subjective, conditional offers and partial offers
- 6) submitted without support documents as per the Eligibility Criteria and Evaluation Criteria
- 7) non-compliance of any of the clauses stipulated in the Tender
- 8) lesser validity period

All responsive Bids will be considered for further evaluation. The decision of TNeGA /Government will be final in this regard.

## 6.4 Clarifications

When deemed necessary, TNeGA may seek bona-fide clarifications on any aspect of the bid submitted by a Bidder. However, that would not entitle the Bidder to change or cause any change in the substance of the Bid or price quoted. During the course of Technical Bid evaluation, TNeGA may seek additional information or historical documents for verification to facilitate decision making. In case the Bidder failed to comply with the requirements of TNeGA as stated above, such Bids may at the discretion of TNeGA, be rejected as being technically non-responsive.

## 6.5 Tender Evaluation

### 6.5.1 Suppression of facts and misleading information

- 1) During the Bid evaluation, if any suppression or misrepresentation is brought to the notice of TNeGA, TNeGA shall have the right to reject the Bid, and if this happens after the bidder is selected TNeGA shall have the right to terminate the contract. Termination of the contract will be without any compensation to the Bidder and the EMD / SD, as the case may be, shall be forfeited.
- 2) Bidders should note that if any figures in the proof documents (supporting documents) submitted by the Bidders for proving their eligibility are found suppressed or erased, TNeGA shall have the right to seek the correct facts and figures or it may reject such Bids.
- 3) It is up to the Bidders to submit the full copies of the proof documents to meet out the Minimum Eligibility Criteria and Technical Evaluation Criteria. Otherwise, TNeGA at its discretion may or may not consider such documents.
- 4) The Tender calls for full copies of documents to prove the Bidder's experience and capacity to undertake the project.

### 6.5.2 Technical Bid Evaluation

The Tender Evaluation Committee reserves the right to reject any or all bids. Each of the responses shall be evaluated as per the criteria and requirements specified in this RFP. The steps for evaluation are as follows:

**Minimum Eligibility Criteria (MEC):**

TSC will examine the technical bids as per Cl.4.2 MEC given in the tender document. The documents which did not meet the MEC in the first stage of scrutiny will be rejected in that stage itself and further evaluation will not be carried out for such bidders. The eligible Bidders satisfying all the criteria in cl. 4.2 – MEC alone will be considered for further evaluation as per TES (cl.4.3). The decision of TNeGA will be final in this regard.

**Technical Evaluation system (TES):**

TSC will examine the bids as per clause 4.3 - TES from documentary evidence enclosed by bidder in the Technical Bid. The bidder shall be informed to demonstrate their projects to TSC as per cl.4.3.5 and 4.3.6 of TES and marks will be awarded. If the bidder fails to demonstrate, their bid will be summarily rejected. Minimum marks to be scored by the bidders in the TES as per cl. 4.3 above is 70 (seventy) out of 100, to declare the bid as technically qualified. Bidders who score 70 and above marks in the cl.4.3 (TES) shall be deemed technically qualified and financial bids of those only bidders will be opened.

**Financial bid evaluation**

- a. Bidders should fill price quote details ONLY in Bill of Quotation (BoQ).
- b. All the taxes indicated in the Price Bid will be taken for the Price Bid evaluation as per the Tamil Nadu Transparency in Tender Rules 2000 with latest amendments.
- c. The Bidders should quote for all the items. Failure to submit the price for all the items (Including price discovery items) or partial offer will be liable for rejection of the bid itself. The decision of TNeGA will be the final.
- d. Bidders who satisfy the MEC (4.2), scored 70 or more out of 100 in TES (4.3) and has highest QCBS score (H1) per cl. 4.4 (Final evaluation of bid) would be declared as the successful bidder (H1)

## **6.6 Negotiations**

Negotiations will be conducted with the Successful Bidder for improvement in the Scope of Work, Specification, further reduction in price and advancement of delivery schedule.

## **6.7 Award of Contract (through <https://tntenders.gov.in>)**

- a) Award of Contract (Letter of Acceptance) shall be issued online through <https://tntenders.gov.in> to the successful bidder (H1). After acceptance of the tender and LOA issued by TNeGA, the successful bidder (H1) shall have no right to withdraw their tender or claim higher price.
- b) No dispute can be raised by any Bidder who's Bid has been rejected and no claims will be entertained or paid on this account.

## 6.8 TNeGA reserves the right:-

1. Modify, reduce or increase the quantity requirements to an extent of tendered quantity as per the provisions of Tamil Nadu Transparency in Tenders Act 1998 and Tamil Nadu Transparency in Tenders Rules, 2000.
2. Inspect the Bidders' Premises/Company before or after placement of orders and based on the inspection, reserves a right to modify the quantity ordered.
3. Withhold any amount for the deficiency in Quality/Service aspect of the ordered items supplied to the customers.
4. Accept or reject any or all of the tenders in full or in parts without assigning any reason whatsoever. The Tender Accepting Authority may also reject all the tenders for reasons such as change in Scope, Specification, lack of anticipated financial resources, court orders, calamities or any other unforeseen circumstance.

## 7. Execution of Work

### 7.1 Acceptance/Rejection of the Tender

The final acceptance of the tender is entirely vested with TNeGA, and it reserves the right to accept or reject any or all of the tenders in full or in parts without assigning any reason whatsoever. The Tender Accepting Authority may also reject all tenders for reasons such as significant changes in estimated price - discovered price difference, scope, specification, lack of anticipated financial resources, court orders, calamities or any other reason. After acceptance of the Tender by TNeGA, the Successful Bidder shall have no right to withdraw their tender or claim higher price.

### 7.2 Letter of Acceptance (LOA)

After acceptance of the Tender by TNeGA, a Letter of Acceptance (LOA) will be issued to the Successful (H1) Bidder by TNeGA.

### 7.3 Payment of Security Deposit (SD) or Bank Guarantee

The successful Bidder will be required to remit a Security Deposit (SD) or **Bank Guarantee of 5% contract value**, inclusive of EMD by way of **Demand Draft/ Banker's cheque** payable at Chennai or in the form of unconditional irrevocable Bank Guarantee valid for a period of **37 months** from the date of acceptance of the tender on receipt of confirmation from TNeGA. **The SD shall be paid within a week from the date of issue of Letter of Acceptance (LOA) by TNeGA. In case bidder is awarded work order for O&M, Bank Guarantee should be extended for the additional months for which O&M work order is issued.**



The EMD & Security Deposit will be forfeited if the Successful Bidder withdraws the Bid during the period of Bid validity specified in the Tender or if the Bidder fails to sign the contract

## **7.4 Execution of Contract**

1. The Successful Bidder should execute a Contract on an INR 100 non-judicial Stamp Paper bought in Tamil Nadu in the name of the Bidder within 15 working days from the date of Letter of Acceptance issued by TNeGA with such changes/modifications as may be indicated by TNeGA at the time of execution on receipt of confirmation from TNeGA.
2. The Successful Bidder (Single Bidder or Bidding Consortium) shall not assign or make over the contract, the benefit or burden thereof to any other person or persons or body corporate for the execution of the contract or any part thereof without the prior written consent of TNeGA. In case of a Bidding Consortium the primary partner can assign the contract in part or whole to the secondary partner and submit the same to TNeGA for approval. TNeGA reserves its right to cancel the work order either in part or full, if this condition is violated. If the Successful Bidder fails to execute the agreement within the stipulated period of 15 days, the SD of the Successful Bidder will be forfeited and their tender will be held as non-responsive.
3. The expenses incidental to the execution of the agreement should be borne by the Successful Bidder.
4. The conditions stipulated in the agreement should be strictly adhered to and violation of any of the conditions will entail termination of the contract without prejudice to the rights of TNeGA. TNeGA also has the right to recover any consequential losses from the Successful Bidder.

## **7.5 Release of Work Order**

After execution of the contract and payment of security deposit, TNeGA will issue the award of contract to the successful bidder through online mode.

## **7.6 Refund of EMD**

The EMD amount paid by the Successful Bidder(s) will be adjusted towards Security Deposit (SD) payable by them. If the Successful Bidder submits Security Deposit (SD) for the stipulated value in full by way of Bank Guarantee, the EMD will be refunded. The EMD amount of the Unsuccessful Bidder will be refunded after finalization and issue of Firm Work Order to the Successful Bidder.

## 7.7 Release of SD

The Security Deposit will be refunded to the Successful Bidder on completion of entire Contract Period subject to satisfaction of TNeGA. Such completion would be arrived at when the entire Scope of Work is executed by the Bidder as per the Contract Agreement and as per Order(s) issued by TNeGA from time to time.

## 7.8 Forfeiture of EMD and SD

1. If the successful Bidder fails to act according to the tender conditions or backs out, after the tender has been accepted, the EMD will be forfeited.
2. If the Successful Bidder fails to remit the SD, the EMD remitted by him will be forfeited to TNeGA and the tender will be held void.
3. If the Successful Bidder fails to act on the tender conditions or backs out from the contract, the SD mentioned above will also be forfeited by TNeGA.

## 7.9 Termination of Contract

### 7.9.1 Termination for default

- a) TNeGA may without prejudice to any other remedy for breach of contract, by written notice of default with a notice period of 7 days, sent to the Successful Bidder, terminate the contract in whole or part,
  - i. if the Successful Bidder fails to deliver any or all of the service within the time period(s) specified in the Contract, or fails to supply the items as per the Delivery Schedule or within any extension thereof granted by TNeGA; or
  - ii. If the Successful Bidder fails to perform any of the obligation(s) under the contract; or
  - iii. If the Successful bidder, in the judgment of TNeGA, has engaged in fraudulent and corrupt practices in competing for or in executing the Contract.
- b) In the event TNeGA terminates the Contract in whole or in part, TNeGA may procure, upon terms and in such manner as it deems appropriate, the goods and services similar to those delivered and the Successful Bidder shall be liable to TNeGA for any additional costs for such similar goods and service. However, the Successful Bidder shall continue the performance of the contract to the extent not terminated.

### 7.9.2 Termination for Insolvency

TNeGA may at any time terminate the Contract by giving written notice with a notice period of 7 days to the Successful Bidder, if the Successful Bidder becomes bankrupt or otherwise insolvent. In this event, termination will be without compensation to the Successful Bidder, provided that such termination will not prejudice or affect any right of action or remedy that has accrued or will accrue thereafter to TNeGA.

### 7.9.3 Termination for Convenience

TNeGA may by written notice, with a notice period of 7 days sent to the Successful Bidder; TNeGA may terminate the Contract, in whole or in part, at any time for its convenience. The notice of termination shall specify that termination is for TNeGA's convenience, the extent to which performance of work under the Contract is terminated, and the date upon which such termination becomes effective. On termination, the successful Bidder is not entitled to any compensation whatsoever.

### 7.10 Single Point of Contact and Project Manager

The Successful Bidder should nominate and intimate to TNeGA, the Project Manager for Single Point of Contact (SPOC), who should be responsible for effective delivery of work complying with all the terms and conditions. The Successful Bidder should ensure that the Project Manager fully familiarizes with the Tender Conditions, Scope of Work and deliverables.

### 7.11 Liquidated Damages (LD)

The Bidder must strictly adhere to the implementation schedule, specified in the clause 12 of the RFP. Any delay in the implementation schedule will lead to levying liquidated damages by TNeGA to the bidder as given below:

- a. Claim liquidated damages at 0.5% of the project cost per week subject to a maximum of 10% of project cost. If the liquidated damages reach 10% of the project cost, TNeGA may invoke termination of the contract. However LD clause will not be applicable if the delay is not attributable to the bidder.
- b. In case of the termination of the work order by TNeGA due to non performance of the obligations arising out of the work order, the Earnest Money Deposit (EMD)/ Security Deposit (SD) will be forfeited.
- c. In addition, TNeGA reserves the right to award the work to any other party /parties and the loss / expenses incurred thereafter will be recovered from the Successful Bidder.

The RFP, bid submitted by the successful bidder, negotiated offer of the successful bidder, contract and the work orders will form part of this contract. Wherever the offer conditions furnished by the successful bidder

are at variance with conditions of this contract or conditions stipulated in the work order, the latter shall prevail over the offer conditions furnished by the successful bidder

Notwithstanding anything contained in the penalty clause, TNeGA reserves the right to blacklist the Successful Bidder from taking part in any of the procurement operations of TNeGA for a minimum period of three years from the date of blacklisting for failure to carry out supply in time or according to the quality and quantity prescribed or any such similar reasons. This penalty shall be over and above all other penalties. Such bidders would be automatically banned for 3 years from taking part in TNeGA's Tenders.

### **7.12 Penalty for Non-Fulfilment of Tender**

A penalty will be levied at the rate specified in the Agreement Format in the event of non-fulfillment or non-observance of any of the conditions stipulated in the Agreement, Terms and Conditions and Work Order.

### **7.13 Other Conditions**

1. The final decision would be based on the technical capacity and pricing of the Bidder. TNeGA does not bind itself in selecting the Bidder offering lowest prices.
2. TNeGA reserves the right not to accept lowest price, to reject any or all the tenders without assigning any reason, to relax or waive any of the conditions stipulated in the terms and conditions of tender as deemed necessary in the best interest of TNeGA/Government for good and sufficient reasons.

### **7.14 Arbitration and Jurisdiction**

Except as otherwise provided elsewhere in the contract, if any dispute, difference, question or disagreement arises between the parties hereto or their respective representatives or assignees, at any time in connection with development, maintenance, operation, effect, interpretation or out of the contractor breach thereof, the same shall be decided by Sole Arbitrator appointed by the CEO, TNeGA.

If the Arbitrator so appointed dies, resigns, becomes incapacitated or withdraws for any reason from the proceedings, another Arbitrator shall be appointed by the CEO, TNeGA. The Arbitrator so appointed shall proceed with reference from the stage, where his/her predecessor had left if both parties consent for the same, otherwise, he shall proceed de novo.

It is a term of the contract that the party invoking arbitration shall specify all disputes for arbitration at the time of invocation of arbitration and not thereafter.

It is also a term of the contract that neither party to the contract shall be entitled to seek interest and the arbitrator shall not grant interest.

The Arbitral Tribunal shall give reasoned award and the same shall be final, conclusive and binding on the parties.

The venue of the arbitration shall be Chennai and language will be English.

The fees of the Arbitrator and expenses incidental to the arbitration proceedings shall be borne equally by the parties.

Subject to as aforesaid, the provisions of the Arbitration and Conciliation Act, 1996 and any statutory modifications or re-enactment in lieu thereof shall apply to the arbitration proceedings under this Clause.

Subject to the above, the Courts in Chennai alone shall have jurisdiction in this matter.

## **8. Proposed Scope of Work**

The scope of work for this RFP can broadly be divided into the following –

1. Building Nambikkai Inaiyam – The Tamil Nadu Blockchain Backbone Infrastructure
2. Applications to be developed with Nambikkai Inaiyam – A suite of solutions that need to be developed for departments as part of this RFP leveraging the Nambikkai Inaiyam platform
3. Integration support for third party apps deployed to Nambikkai Inaiyam

The following sections discuss each of these components in detail.

### **8.1 Building Nambikkai Inaiyam (NI) – Tamil Nadu Blockchain Backbone Infrastructure**

The successful bidder will be responsible for designing and implementing an enterprise grade private Blockchain Backbone Infrastructure for the state of Tamil Nadu. The software should be built using open source technology. The Blockchain Backbone Infrastructure should be capable enough to support development of micro services architecture based enterprise grade applications according to the needs of TNeGA. These applications will be used by the government departments and public sector enterprises, agencies and organizations to deliver value added services and improve transparency and efficiency in government. Nambikkai Inaiyam should be designed in a “privacy first” mode and should be compliant with the upcoming Personal Data Protection Bill, 2019 and should have a tamperproof consent mechanism.

Following are the high level features of this Blockchain Backbone Infrastructure:

- The Blockchain Backbone Infrastructure will have a peer-to-peer architecture consisting of nodes spread across the hosted infrastructure of various stakeholders and participants of the blockchain network. This hosted infrastructure could be in the State Data Centre (SDC) or on premise or hosted in the cloud.

- Authorized participants can connect to the network by installing the blockchain node software, assisted by the successful bidder. The node software should follow a containerization ecosystem. Different components of the blockchain software can be deployed to the infrastructure of the participants through container images and components that are no longer required or outdated can be uninstalled by removing these containers.
- The platform should also support a Blockchain-As-A-Service (BAAS) model. Select nodes on this network will host an API gateway that can be used by qualifying participants to carry out read, write and other operations on the blockchain network. The required access controls should be configured to ensure only authorized parties can access this service and the parties can only execute permitted operations. Client side SDKs should also be developed for using this gateway.
- The blockchain platform used to build the backbone should implement a proven consensus or ordering mechanism for creating blocks and adding transactions to the network. The consensus/ordering mechanism should ensure that data captured to the ledgers is immutable
- The Blockchain Backbone Infrastructure should have the capability of creating and deploying private ledgers. Only the participants of these private ledgers can view and access the data on these ledgers. The data should be hidden from the other participants of the network
- The Blockchain Backbone Infrastructure should allow the option of sharing private data between network participants. This is data that is not stored on the blockchain ledger but its integrity is maintained by capturing the hash of the data on the blockchain
- The Blockchain Backbone Infrastructure should have the option of securely sharing digitized files between the nodes of Nambikkai Inaiyam through a pluggable document sharing module. This can be a peer-to-peer file sharing network independent of the blockchain core platform. Document stored on the document storage system should only be accessible by authorized parties.
- The Blockchain Backbone Infrastructure should host an identity service that uses public key cryptography for identifying the nodes and other participants of the network. A suitable infrastructure should be in place for securely storing and using these keys.
- The Blockchain Backbone Infrastructure should allow creation and configuration of access policies based on the identity of the participants and nodes to allow/restrict access to read/write data on the private blockchain ledgers.
- This platform should be industrially scalable, should grow linearly with time and the performance of the system should not be effected by the increase in number of users/applications. The system should be highly scalable and provide at least **2000 transactions** in less than a second.
- The platform should support writing and deploying of smart contracts or event based distributed workflows secured by the immutability property of the blockchain and authenticated by public key cryptography

The following section discusses the components of the Blockchain Backbone Infrastructure in details

### 8.1.1 Blockchain Backbone Infrastructure specifications

The Blockchain Backbone Infrastructure should consist of the following components -

### **8.1.1.1 User Interface - Screens**

- The Blockchain Backbone Infrastructure should include an operation and administration dashboard for monitoring, maintaining and governing the platform.
- Citizen / Government employees should be able to access the applications built on the Blockchain Backbone Infrastructure through user interfaces available on smartphones as well as web browsers. The user interfaces should be designed to meet the requirements of the business use case
- User interface should be tightly coupled with a robust authentication mechanism that maintains a log of all successful authentications and unsuccessful authentication attempts. In case of successful authentication it should keep a log of all operations carried out by the user.

### **8.1.1.2 API Gateway**

- The API Gateway will be used by authorized parties to access the shared ledger and carry out operations on the ledger.
- This gateway is responsible for collecting and processing, signing and verifying workflow requests and then relaying the request to the blockchain core layer.
- This layer needs to ensure authentication of the identity of the service requestor. Only the valid requestors should be able to access the services offered
- The API Gateway should include load balancers and fallback servers for handling high volume of requests and ensuring availability
- SDKs(Software Development Kit) need to be created for the APIs exposed by the API Gateway
- Comprehensive documentation need to be produced and delivered by the successful bidder, for the APIs that are being designed.
- Secure API development practises should be followed during development of these APIs such as suitable access controls, tokenization, data classification, encryption, checksum verification, etc.

### **8.1.1.3 Business Adaptor Layer**

- The business adaptor layer will consist of a suite of plug and play modules. These modules will house business logic, oracle gateways, off chain databases and additional components for implementing off chain workflows i.e. workflows implemented outside of the blockchain layer.
- This layer will aggregate the incoming requests from client applications or from the API Gateway; process any off chain operations that are required to be carried out. It'll then forward the request to the blockchain layer to execute the transactions and update the state of the distributed system or fetch data from the shared ledger.

- The modules need to be designed in such a way that they can be accessed and integrated by multiple applications including those running on legacy IT infrastructure as well as new applications developed using the blockchain platform.
- The business adaptor layer would also need to publish a 'widely-witnessed event'. This is an event that publishes the top root hash generated from the Merkle tree of transactions processed for a specific time period. Alternatively it can also publish a ledger snapshot for a time period. This data can then be published in a widely published newspaper/website, sent through a group email to the stakeholders of the blockchain or shared through any other appropriate means with the all the participants to ensure immutability of the blockchain. The schedule and the exact mechanism of the widely witnessed event, would be decided during the design stage
- The business adaptor layer should account for scalability mechanisms for handling large volume of requests
- Appropriate queuing protocols should be used to ensure the requests are serviced and routed to relevant nodes of departments, to reduce latency. Additionally protocols should also be built in for ensuring critical transactions are added to the blockchain ledger on priority.
- The components of the business adaptor layer are described in the section 8.1.4

#### ***8.1.1.4 Blockchain Core Layer***

- The Blockchain Core layer will operate as a distributed state machine which will interact with business adaptor layer and manage the immutable blockchain ledger.
- It should operate on a proven consensus or ordering algorithm to ensure data integrity across all the cores connected to the network. Additionally any malicious attempt to modify the data in the blockchain at core level should be resisted through the consensus mechanism of the peer-to-peer network.
- Digital signing workflows and authentication should rely on proven cryptographic algorithms.
- Design considerations for the core, should take into account for evolutions in technology and ensure that the threats from such evolutions are addressed at the design stage.

#### **8.1.2. Transaction submission process**

For submitting a request to the blockchain, participants should have access to a Software Development Kit (SDK). This needs to be provided by the successful bidder. Submitted requests are aggregated and processed by the business adaptor layer. Depending on the use case, the business adaptor will invoke the necessary plug-and-play modules to process the transaction request before submitting a transaction to the blockchain core layer. All transactions submitted to the core layer need to be signed using a secret private key linked to a public key. Once a transaction is submitted, the business adaptor needs to return the transaction details to the requestor. These details will include but not be limited to the transactions hash, transaction index, block number / ledger number, timestamp and any use case related data returned from smart contracts. Events should be created as per the requirements of the business use case to share data with the transactions requestor and other subscribers after successful state-change



### **8.1.3 Data Integrity Verification process:**

A participant should be able to independently verify the authenticity of data captured to the blockchain, verify the identity of the participants submitting and validate the authenticity of any state-changes in the blockchain. Suitable verification workflows leveraging cryptographic functions should be implemented for the same

An identity service for the blockchain network needs to be implemented using public key pair cryptography and digital signatures to ascertain the identity of the transaction submitter.

Blockchain peers should only update an incoming transaction to the local state database if the read-write set of the transaction does not violate the existing values in the database. Verification workflows should allow the participants to individually verify the read-write set of a transaction successfully committed to the ledger.

An audit workflow should also allow participants to view a key-value pair's history in the state database by accessing all write transactions committed to the shared ledger

### **8.1.4. Components of Business Adaptor**

The following sections discuss in detail the plug and play modules that will constitute the Business Adaptor Layer. The below list is only indicative and modules might be added /removed based on the requirement of the applications to be developed (Discussed in the following sections). The final architecture and modules will be finalized in the design stage of the project.

#### **8.1.4.1 Wallet**

Blockchain offers immense potential for modernizing government work flows and providing more efficient services to the residents of Tamil Nadu. In the digital age it is essential to have an application where all residents of Tamil Nadu are able to own their documents digitally and are able to prove the authenticity of said documents. This can be done easily by leveraging the state blockchain backbone infrastructure. We envision creating a digital wallet which citizens can use to keep all government issued documents if they choose to do so. Digilocker can be the repository for all such documents and document signature and metadata can be stored / retrieved from the blockchain layer. These documents can include government issued IDs, educational and employment certificates, pension and savings certificates, birth certificates, land registration documents, licenses and so on.

A digital wallet will essentially act as secure portfolio for all essential documents for the user. When documents are issued by an authority, the user will have an option to save it on their digital wallet. If he chooses to do so, said document will be stored by the system in Digilocker and the recorded digital copy will be signed and recorded by the State Blockchain Backbone. The user should also have an option to add his existing documents in Digilocker to the digital wallet. Authorities will have access to APIs which they can integrate to their legacy platforms to the digital wallet. Using these APIs, the authorities can pull verification data from the wallet after the user's consent. This will simplify several government workflows such as issuing passports, applying for

name changes, applying for a gas, electricity or water connection and so on. The wallet should function as a digital proof for the residents of Tamil Nadu and they should be able to prove their identity and other personal details digitally without submitting physical documents.

The successful bidder will need to develop such a wallet application. Following are the features of such a blockchain application –

1. A secure wallet front end for storing blockchain secured versions of essential government documents.
2. Client facing APIs that can be used by government departments and authorities to push and pull documents to and from the digital wallet with the user's consent
3. A backend layer which secures issued documents using the blockchain backbone. This middle ware layer should use a robust, resilient, secure and collision free cryptographic process for the same
4. The application should carry out routine verification of the documents stored in the digital wallet and flag any discrepancies. A verification check should also be carried out when the document is being shared as part of a work flow to ensure authentic information is being shared
5. Integration of the wallet with Digilocker and NDHM (National Data Health Mission) and other government departments for pushing and pulling documents / licenses / certificates from the existing legacy software/ process will be part of the scope of the development of this application.

#### ***8.1.4.1 Subscription Workflow***

The blockchain platform should be capable enough to provide a transaction or time period access based subscription model for accessing the services of the Blockchain Backbone Infrastructure. Subscription services of the platform will include but not be limited to

- Hosting a node and connecting to use case / organization specific private ledgers on the blockchain
- Accessing the services extended by the API Gateway layer for submitting transactions and verifying data/transactions recorded within the blockchain.
- Accessing the API suite extended by the API Gateway layer for use case specific applications including but not limited to authentication, custom business logic, verification, workflow management, off chain data management and so on.
- Submitting transactions to the blockchain network from peers.
- Subscription services for data published to the shared ledger with the consent of the publisher or parties owning/publishing the data

Digital voucher/credit based model maybe explored for the same. Network participants and users could be assigned fixed amount of digital vouchers or credits periodically (daily or weekly). These have to be spent when accessing the services of the Blockchain Backbone Infrastructure. This will prevent spamming in the network.

#### ***8.1.4.2 Zero-knowledge proof engine***

The business adaptor should include an engine to deploy use case specific smart contracts for a privacy enabling Zero-knowledge proof (ZKPF) workflow process. The ZKPF workflow will be used for consent based sharing of information with authorized stakeholders by users of NI. This information sharing can be used for accessing services such as issuing a SIM, opening a bank account, getting a gas connection, admission in a hospital, etc. It will share only the requisite information in the form of Yes/No responses, thus preserving privacy and protecting individual data. This will protect the user from privacy threats such as misuse of identity or marketing emails and calls. The zero-knowledge workflow should explicitly ask for the user consent before sharing the details. Additionally an audit trail will be maintained by the blockchain for every verification request submitted by the service provider and validated by the identity management system. This audit trail can be referred in case of any disputes or for any legal concerns.

#### ***8.1.4.3 Consent Management***

A consent management system needs to be built as part of the business adaptor layer. The consent management system will capture the citizen's consent for using various services and applications including third party ones. Users consent to access a service or for sharing information will be captured as a transaction on the blockchain ledger and will be used as reference data by applications for extending services to him/her. The user can change the consent for each parameter managed by the system multiple times and each time a new reference transaction will be captured on the blockchain. The system will also allow for limited time consent mechanisms which will enable service providers or external parties only a certain time window in which they can access the citizen's information. The system should have a workflow for revoking consent as well. A dashboard should be implemented as part of this module for administrative tasks, audit and report generation.

#### ***8.1.4.4 SFDB (State Family Database) and PSP (Predicted Services Platform) Integration***

The Blockchain Backbone Infrastructure, Nambikkai Inaiyam should integrate with the State Family Database and Predictive Services Platform projects being built by TNeGA and allow for exchange of data between the platforms. The Blockchain Backbone Infrastructure should integrate to APIs exposed by these platforms, subscribe to Pub/Sub queues published by them and listen for events broadcasted by the platforms if required. It should also expose APIs that can be consumed and publish events that can be accessed by these platforms depending on business requirement. This will allow us to build applications that can rely on the data hosted on SFDB and design workflows that reside on the Blockchain Backbone Infrastructure and predictive services platform.

#### ***8.1.4.5 Integration with India stack, National health stack components and other regulatory or state/central government IT infrastructure including any government / regulatory blockchain***

Based on the requirements of specific use cases or components in the scope of this RFP, blockchain backbone may be needed to be integrated with India stack (Digilocker, UPI, etc.), National health stack (NDHM) and any other regulatory or central/state government IT infrastructure or platform including government or regulatory blockchains.

#### ***8.1.4.6 Off Chain Database***

An off chain database needs to be maintained as part of the business adaptor layer to maintain data that is not published to the blockchain layer but maybe required for implementing specific workflows and enabling certain features. Few examples of types of data that can be stored in the off chain database include transaction logs, access logs, reporting data (for rich queries/querying), metadata for information published to the blockchain, smart contracts index, node directory and so on. This database will supplement information stored on the blockchain.

#### ***8.1.4.7 Keypair Management and Signing Workflow***

A keypair management workflow needs to be added for securely storing and accessing the keypairs generated from this blockchain network for different identities and roles. These keys will be used to sign transactions submitted to the blockchain network. HSM infrastructure should be implemented for management of keys.

#### ***8.1.4.8 Notarizer***

A module needs to be built for securing digital data or documents with Nambikkai Inaiyam as a trust anchor. It should carry out the following tasks

1. It should be able to calculate hashes of data and documents. These hashes should then be submitted as signed transactions to the blockchain.
2. It should also be able to verify the integrity of blockchain secured data or documents on request. This should be done by regenerating the document or data hash and comparing it with the hash captured in the blockchain in step 1. It should notify the requestor if the data or documents are found to be tampered
3. It should be able to do the above two steps recursively and in bulk. The module should support upto 500 concurrent signing requests and 500 verification requests parallely in a second

### **8.1.4.9 Distributed Document Sharing**

A peer-to-peer file sharing system for sharing files across peer nodes. This file system will work in conjunction with the blockchain platform for securely sharing documents across organizations on boarded to the blockchain network

## **8.2 Applications to be developed leveraging Blockchain Backbone Infrastructure**

Below mentioned is high-level detail of the applications and solutions that will be built in Phase 1 of the project. The successful bidder will develop business applications leveraging the aforementioned Blockchain Backbone Infrastructure that will facilitate the below use cases and workflows. The application components will include, but are not limited to, all user interfaces, middle ware layers, business layers, backend layers, databases, services and other technical components essential for desired end goal mentioned below. A detailed use case specific scope of work document will be shared with the successful bidder prior to implementation. For every application the successful bidder needs to get a sign off on the design and workflows before starting the development process. Please note the below list is only indicative. Use cases might be added or removed based on Tamil Nadu government's requirements.

### **8.2.1 Securing and preserving legacy registration documents, encumbrance data and other registration department data**

Registration department has over 35 crores pages of legacy registration documents. This data has been scanned and is available in digital format. Additionally, approximately 50,000 pages are added in digital format every day. Encumbrance data since 1975 is also preserved digitally by the department and issued to citizens as certificates on successful registration. It is desired by the department to securely store these data and documents so these are available unaltered for years to come and can also be used as a truth anchor for all land transactions in the state.

To accomplish the same, it has been proposed to develop a blockchain application that can be used to securely preserve legacy registration documents, encumbrance certificate data and other department data. Blockchain will enable us to protect all such data from tampering or deletion once they are recorded. Additionally it'll act as an immutable and secure truth anchor which can be used for verifying the authenticity of digital copies of these data and documents in the future.

The Tamil Nadu Blockchain Backbone Infrastructure is the underlying blockchain network which will be used to develop the proposed application and secure the documents and data. The business logic of the application should be deployed at the IGR primary infrastructure. The business logic layer will fetch the native or raw document files and data, convert it into a suitable format or signature and submit this formatted data to the blockchain. Transactions will be submitted to the blockchain layer through client APIs exposed by the Tamil Nadu Blockchain Backbone Infrastructure.

The business logic layer should also be able to run scheduled and on-demand verification batches on the secured data to identify and notify authorities in case of any tampering or modifications.

Following are the functionalities of such a blockchain application –

1. **Securing approximately 35 crore legacy documents pages which are digitized and currently stored on the IGR infrastructure.** The project will require the successful bidder to build an application that leverages blockchain technology to secure these documents. This will be done by recording the document signature and metadata in a suitable format on the blockchain layer and running scheduled weekly batches to verify document integrity. Document integrity will be verified by recalculating the document signature and comparing the signature and metadata with the values secured on the blockchain.
2. **Securing encumbrance data from 1975 to present day currently stored on the IGR infrastructure.** The application built by the successful bidder which leverages blockchain technology to secure the legacy encumbrance data from 1975. This will be done by recording the legacy encumbrance data on the blockchain layer. Critical encumbrance data fields might be stored on the blockchain as-is and the complete encumbrance data can be converted to computer hashes and stored. This will allow the application to run content and checksum integrity verifications for the data. Scheduled weekly batches should run to verify data integrity. Data integrity will be verified by checking the non blockchained data with the version secured in the blockchain.
3. **Secure the registration documents, encumbrance data and any other department data generated from citizen transactions on the IGR Portal on a day-to-day basis** These transactions could generate new data and documents or modify existing data and documents. The application built by the successful bidder needs to ensure that documents generated from both these scenarios are secured through blockchain technology. There can be up to 50,000 transactions each day and 5, 00,000 registration document pages added every day (approx 10 pages per document). Only the changes made to the documents by authorized users should be accepted and retained and all other cases should be flagged to authorities. Existing encumbrance data and registration documents being processed by the portal should also be verified with the blockchain. The application also needs to ensure that these data and documents are verified before they are replicated to the DR and NLDR infrastructure.
4. **Providing a blockchain enabled secure digital verification workflow for all data stored to the blockchain.** Citizens and authorities will be given access to a screen which can be used for digitally verifying authenticity of encumbrance data and registration documents by comparing with the values preserved in the blockchain.

### 8.2.2 Blockchain use cases to be implemented for other departments

1. **School Education / Higher Education / Universities / Vocational Education** – Securing education certificates, marksheets, degrees, diplomas, etc.

2. **Revenue Administration Department and other departments** – Income Certificates, Community Certificates, Caste Certificates, Nativity Certificates, Birth certificates, Death certificates, Drug License and other licenses for citizens and businesses/ Generating, securing and verifying certificates, documents and licenses issued as part of e-sevai services
3. **Website, data and document integrity** for government organizations, departments and agencies, public sector enterprises and others
4. **Forest Department** – Securing and verifying tree felling and transit licenses and sawmill licenses. Certifying and tracking Orthodox Nilgiri Tea, ivory products and red sanders and sandalwood products. Tracking captive elephants using blockchain.
5. **Handlooms, Handicrafts, Textiles and Khadi Department** - Certifying handicrafts and handlooms made in Tamil Nadu and identifying counterfeits
6. **Additional Use Cases** – During the implementation there may be other use cases suggested by other departments of Government of Tamil Nadu. These also would need to be implemented by the successful bidder.

The necessary business modules and technical components for these use cases will be an integral part of the Blockchain Backbone Infrastructure being setup. A detailed description of the use cases is provided in the below sections. The details and design of the modules will be finalized during the requirement gathering and design stage of the projects

#### ***8.2.2.1 Securing education/skill certificates, marksheets, degrees, diplomas, etc.***

Tamil Nadu has a number of prestigious academic institutes that issue educational degrees, certificates, marksheets, diplomas etc. These may be issued at the high school level, higher secondary level, graduation level, post graduate level, doctorate level or issued by ITIs and polytechnics. After completing their education the alumni of these institutions might reside in the state or travel to different parts of the country or the world for higher education or employment. Even in a digitized world it is relatively cumbersome for employers and education institutes to validate the authenticity of the degrees or certificates that these students present at the time of admission or employment. Several government organizations of state and central government, foreign embassies, companies, higher educational institutes and universities need to verify these qualifications and certificates.

There is a need to setup a trusted source of truth which can be used to verify the authenticity of any degree or certificate issued by an educational institute in Tamil Nadu. A blockchain backed education degree or certificate will remove any ambiguity in academic credentials issued by Government of Tamil Nadu and various universities and institutions within Tamil Nadu. Government recruitment agencies like teacher recruitment board, uniform services recruitment board, medical services recruitment board, Tamil Nadu Public Service commission need the candidates to physically bring their original academic certificates for verification before offering them a job. Same thing happens during the engineering and medical education counseling before offering admissions to the qualified candidates. Document verification is a cumbersome process and results in heavy unproductive expenditure. By putting the academic credentials on the blockchain the process can be made efficient, transparent and hassle free

A blockchain application needs to be setup that can use the state blockchain for authenticating degrees and certificates issued by our educational institutes. It should follow the below process for securing degrees and certificates

1. It should capture education degrees and certificates for all levels and process it into a suitable format for recording to the blockchain.
2. This data should then be recorded on the blockchain and digitally signed using cryptographic algorithms.
3. For checking integrity, digital copies of these education degrees, certificates and other documents submitted by students for employment, higher education or other services will be converted into the recorded format and compared with the blockchain.
4. Client facing API services and middleware layer needs to be provided so institutes can quickly be on boarded to the Blockchain Backbone Infrastructure and can use the service
5. Additionally a front-end portal should be developed that authorities can use for verification of the certificates
6. The digital wallet should integrate with this system so resident's can view their documents, provide consent for sharing information and carry out other operations
7. **Optional procurement of physical version of blockchain secured certificates (With a passive ID tag or a similar technology)** – TNeGA might ask for generation of physical equivalent of blockchain certificates A verification tag/mark should be put on physical certificates and documents which can be used for digitally verifying the authenticity of the certificate with the Blockchain Backbone Infrastructure. This verification tag can be a passive ID tag which can be read using an easily available electronic device. One example of such a device can be a mobile phone. This verification tag should be secure so that the physical certificates and documents cannot be misused. No one should be able to replicate or copy it and create fake copies of certificates or degrees.

#### ***8.2.2.2 Generating, securing and verifying important certificates, documents and licenses issued on the e-sevai platform.***

The Tamil Nadu Government has implemented e-sevai services with the vision to deliver all services online to the citizens even in the remotest corner of the state through Arasu e-Sevai centers. Arasu e-Sevai centres are functioning with the objective of providing unified access to e-Services of different Government Departments on a common platform across the State. Revenue and other departments of government issue a suite of certificates, documents and licenses such as Income Certificates, Community Certificates, Nativity Certificates, Birth certificates, Death certificates, NOC certificates, Drug Licenses and other licenses and more for citizens and businesses through this platform. In 2019, approximately 1.5 crore such certificates and licenses have been issued. The platform gives citizen's access to more than 200 services. A process needs to exist to secure these documents and verify them independent of the authority generating and publishing these documents. Such a process needs to rely on time tested cryptographic algorithms for verifying and authenticating the documents. We need a fast and replicable process that can be used by any department and can be scaled. Thus we need to setup a trusted source of truth which can be used to verify the authenticity of any certificates issued through e-sevai services in Tamil Nadu.



A blockchain application needs to be setup that can use the state blockchain for authenticating documents, licenses and certificates issued by the Revenue and other government departments using e-sevai platform. It should meet the criteria below.

1. It should be able to capture and convert the certificates, documents and licenses issued by the Revenue and other government departments and agencies and process it into a suitable data format for recording to the blockchain.
2. This data should then be recorded on the blockchain and digitally signed using cryptographic algorithms.
3. For checking integrity, digital copies of these certificates, licenses and documents submitted by citizens to access a service will be converted into the recorded format and compared with the blockchain for checking integrity.
4. Client facing API services and middleware layer need to be provided to the e-Sevai platform to generate these secure certificates and use the capturing and verification service
5. Additionally a front-end portal should exist that authorities can use for verification of the certificates
6. The digital wallet should integrate with this system so resident's can view their documents, provide consent for sharing information and carry out other operations
7. **Optional procurement of physical version of blockchain secured certificates (With a passive ID tag or a similar technology)** – TNeGA might ask for generation of physical equivalent of blockchain certificates A verification tag/mark should be put on physical certificates and documents which can be used for digitally verifying the authenticity of the certificate with the Blockchain Backbone Infrastructure. This verification tag can be a passive ID tag which can be read using an easily available electronic device. One example of such a device can be a mobile phone. This verification tag should be secure so that the physical certificates and documents cannot be misused. No one should be able to replicate or copy it and create fake copies of certificates or degrees.

### ***8.2.2.3 Website, Data and Document Integrity – Cyber security application***

One of the critical business applications to be developed as part of the Blockchain Backbone Infrastructure is the cyber security application. This application will have the features given below.

1. The cyber security app should integrate with Tamil Nadu government hosted applications, websites, web portals and other infrastructure at the State Data Centre and keep a track of all content and components deployed on the web server, app server, database server and other components of the infrastructure in real time for approximately 25 government departments / agencies.
2. It should only allow authorized personnel to modify the hosted components. In case of any unauthorized modification to the data, files, scripts, documents and other components, it should throw a notification in real time to the authorized and relevant personnel through email, SMS and any other identified channels.
3. It should also allow authorities to revert the tampered components to their original state, if they desire to do so, or accept the changes. The original version can be fetched from a data vault. The data vault will be a backup of the website or application maintained on a standalone server which can be a DR (Disaster Recovery) site.
4. This module should also prevent unauthorized deployment of scripts, files, data or documents which were not part of the original website.

5. The proposed implementation model is to generate and record a hash of each individual component within the blockchain. A scheduled job will then keep a track of all the components and check if there is a mismatch in the current hash of the component with respect to the original hash recorded in the blockchain.

The details and design of the module will be finalized during the requirement gathering and design stage of the project

#### ***8.2.2.4 Proof of Concepts (POC) Application for Forest Department - Securing licenses generated by Forest Department, registering and tracking artefact wildlife products, red sanders, sandalwood and orthodox Nilgiri tea and tracking captive elephants***

It is recommended to introduce Blockchain Technology to TN Forest Department modules for devising more secure, efficient, and frictionless workflows. Blockchain will allow the department to establish provenance for high value assets, secure permits and licenses and issue certifications for authentic forest products.

Following are the Blockchain POC applications to be developed for the TN forest department. These applications will be developed leveraging the Tamil Nadu Blockchain Backbone Infrastructure being built by TNeGA.

1. **SandalTrack:** Certifying and verifying the source of Red Sanders and Sandalwood products in TN using Blockchain
2. **SawTrack:** Securely issuing and verifying Sawmill and Wood based industries license permissions using Blockchain
3. **TimberTrack:** Securely issuing and verifying Tree Felling and Transit Permits using Blockchain
4. **GajaTrack:** Tracking and tracing ownership of Captive Elephants in TN using Blockchain technology
5. **VanaTrack:** Registering and tracking artifact(legacy) wildlife products and trophies in TN using Blockchain
6. **TeaTrack-O:** Blockchain based authenticity verification of orthodox tea produced by TANTEA

#### ***8.2.2.5 Certifying and verifying handicrafts and handloom products indigenous to Tamil Nadu***

Tamil Nadu is home to a number of world renowned handicrafts and handloom products -From Chola Bronzes to Kanjeevaram Silks and from the Stone sculptures of Mahabalipuram to the Temple jewellery of Nagercoil. The rich history of the state and cultural evolution of arts and culture has contributed to a wide variety of artifacts that are recognized, appreciated and have a huge demand around the world. Thus it is essential to protect these products from fakes and counterfeits which may tamper their reputation and lead to financial losses for the artisans and craftsmen who make these products. It is desired to protect these handicrafts using blockchain technology. A blockchain application needs to be built for the same that can be used to track handicrafts and handloom products and allow customers to verify the authenticity of the product bought by them. Following would be the features of such an application –

1. Generate a unique identification number for handicrafts/handloom products made in Tamil Nadu. This would be issued either as a certificate with the product and/or etched onto it through a QR code / bar code etc or through any other appropriate method.
2. Details captured in the blockchain would include place of origin, date of packing and shipping, artisan's name or village and other details which would be essential to establish its genuineness
3. As the product is shipped across the handicraft/handloom products supply chain, from the artisan to the wholesaler, to the retailers and exported overseas or shipped to other parts of India, its movement will be tracked. At each point the QR code/ bar code will be scanned and the status, geographic location and other details of the product will be updated.
4. When the customer finally has the product in his hands, he can verify if the item is genuine by scanning the QR code / Bar code / any other tag to view the tracking data from source to its final delivery location. They can also verify the details required to ascertain the handicraft's / handloom product's value such as date of manufacture, artisan's name and village/town etc.

#### **8.2.2.6 Additional use cases**

In addition to the aforementioned applications and implementations TNeGA might request implementation of additional use cases depending on government need. The successful bidder is expected to provide the development cost of any such extra use cases in man-months in the Price Bid document. The timeline and number of resources for implementing any such use cases will be mutually agreed upon by TNeGA and the successful bidder. In such a scenario the bidder will be expected to deliver the solution at the man-month cost quoted in the Price Bid. The man-month cost indicated in the Price Bid should be the average cost of the different categories of resources needed for the additional use cases or enhancements.

### **8.3 Support for third party application developers**

The modules that make up the Business Layer should be reusable and should allow any application to integrate with them. This would include applications built by third party developers (i.e. applications built by government departments and agencies, private sector players, startups and blockchain developers not directly affiliated with TNeGA). An example could be a blockchain wallet used for managing sales, accounts and settlement by a Women's Self Help Group. Another example could be a startup building an app for document preservation that can be downloaded and used by citizens. Banks might want to build new age fintech products leveraging Nambikkai Inaiyam blockchain. In such cases the successful bidder needs to provide relevant documentation, SDKs, technical support and troubleshooting and know-how for building such third party applications and enable them to integrate their applications with the Blockchain Backbone Infrastructure. For technical support, troubleshooting and knowledge transfer, the successful bidder may charge a man-month cost. Please provide the man month cost for implementing any such requests as part of the Price Bid. Please note that SDK's, documentation and any utilities required for connecting to the Blockchain Backbone Infrastructure have to be provided free of cost and no additional cost can be charged for sharing these project artifacts. Additionally these artifacts can be shared with third parties only with TNeGA's concurrence and written approval.

## 9. Project Execution Essentials

### 9.1 Application Study and Analysis of Requirements

The successful bidder would be required to study the existing applications and functioning of the departments in a manner that will enable them to meet all the requirements of this RFP. Find the gaps in the existing process & application and suggest re-engineering (if required).

The successful bidder may gain an understanding of the existing application and requirements of the proposed system by gathering the requirements and ensuring they are complete, accurate, consistent and unambiguous.

### 9.2 Solution Design

Based on the requirements study completed, the design of the solution would be done by the Successful Bidder. An indicative list of documentation to be prepared is as follows -

1. Detailed Design document detailing Technical architecture (application, network, and security)
2. Appropriate load balancing and clustering techniques should be adopted by the Successful Bidder in the Solution design for meeting the requirements of the RFP.
3. UI/UX design with design principles 'keep it simple', 'easy to use', 'bi-lingual', 'intuitive', 'lesser clicks' and such.
4. SRS document shall be prepared and validated with TNeGA and to meet the standards specified in this RFP. The SRS Validated and approved by the TNeGA for all subsequent phases of application development and deployment from an Application requirements perspective.
5. The Successful Bidder is required to keep all such documentation up to date to reflect the latest enhancements/modifications made to the application.
6. Successful bidder would catalogue each tech stack component open source, proprietary and third-party and seek explicit approval from TNeGA.

### 9.3 Open Source Software

Any and all software developed as part of the business solution should be built using license free open source software as far as possible. Open source software refers to technology platforms that allow free installation and use, customization, copyright and re-distribution of products developed using these platforms under the Apache License version 2.0 and / or other applicable associated licenses listed on the webpage (<https://opensource.org/licenses>). The apache license version 2.0 is available on the apache.org website (<https://www.apache.org/licenses/LICENSE-2.0.txt>).

The entire list of libraries and software stack used should be presented along with the solution with their licenses.

## 9.4 Pre-Development Design Stage signoff

The successful bidder needs to get a sign off on the implementation plan, project timelines, the project milestones, high level and low level design, backbone and application architecture, specifications, hardware requirements, business logic and other artefacts generated out of the design stage with TNeGA. This needs to be done before the development stage is started.

## 9.5 Stage wise documentation and submission to TNeGA

All tasks carried out in different project stages should be well documented and submitted to TNeGA before initiating the next stage. Additionally, the end to end business logic, workflows, comprehensive user manuals, code files with appropriate comments and description, architecture diagrams, infrastructure setup, troubleshooting guides, test plans and results and so on will be need to be documented and shared with TNeGA parallel to the development process. Signoff will be required from TNeGA at the end of each stage and it would be compulsory to submit these documents

## 9.6 Application Development

1. The successful bidder would be required to deliver the overall blockchain backbone infrastructure along with hosted applications as defined in the scope of work section and documentation in line with best practices.
2. The Successful Bidder should consider appropriate open source technology stack for the development & production environment
3. Any and all Web Browser based apps should be compatible with standard web browsers such as IE, Mozilla Firefox, Chrome, etc. Mobile apps should be developed for both iOS and Android unless requested otherwise by TNeGA. Support for feature phones should also be built in wherever feasible.
4. All interface/pages performing similar functionality will have consistent look and feel. Appropriate titles will be given to each page. The titles will specify the functionality of the page.
5. Access to the functionality of the application will be controlled based on the user type.
6. Navigation facilities will be provided to navigate from one page to another page with minimum number of clicks for UI screens.
7. Administration modules should be built for all front end interfaces including reporting screens that would enable the system administrator to create users, their roles and, configure the application for the business.

## 9.7 Application Testing & User Acceptance Testing (UAT)

Once the application development has been completed successful bidder will thoroughly test the application at his end. Successful Bidder should carryout unit testing, integration testing, system testing and performance / load testing. The inputs for this activity will be the design documents approved by TNeGA.

### **9.7.1 Unit Testing**

Unit Testing will be done in parallel to the development by successful bidder also the test cases, test matrix and the snapshots of the test results will be submitted to TNeGA.

### **9.7.2 Integration Testing**

The successful bidder shall thoroughly test blockchain backbone infrastructure and hosted applications at the successful bidder's premises for functional testing and integrated testing as per the standards and proven methodologies. A test report of the integration testing with snapshots shall be submitted to TNeGA at the time of submission of UAT Test cases.

### **9.7.3 Performance Testing/Load Testing**

The successful bidder shall conduct performance testing on many parameters per the standard industry practices. At the time of requirement sign off the successful bidder may provide their study results for the number of concurrent users and average transactions per day and per second. Tests will be carried out at the blockchain layer, the business adaptor layer and hosted applications layer. The successful bidder should plan the Performance & Load Testing accordingly.

### **9.7.4 UAT (User Acceptance Testing) environment setup**

The successful bidder shall setup a UAT environment for the Blockchain Backbone infrastructure and hosted applications. This environment should be available to the TNeGA team and user departments for the purpose of UAT.

### **9.7.5 User Acceptance Testing (UAT)**

1. The Successful Bidder will design detailed procedures for User Acceptance and also develop the UAT plan.
2. UAT shall be done at TNeGA and selected end locations/department users/project locations. Module wise bugs report shall be submitted to TNeGA. The bugs shall be resolved and retested by Successful Bidder. The test cases for UAT will be given by the Successful Bidder and validated by TNeGA and approved by TNeGA. The department and/or TNEGA team would inform the defects identified in each round of UAT to the Successful Bidder. The Successful Bidder will be required to troubleshoot or resolve the defects and resubmit the application for evaluation. This process of UAT will continue in an iterative manner till defects are shown by the Successful Bidder for the test cases developed.
3. The Successful Bidder also needs to ensure that errors/ defects detected in previous round of tests do not get repeated in successive tests.

4. The changes if any at this stage shall be made in the software without any additional cost and it shall be updated in SRS. The UAT shall be completed and signoff shall be obtained from TNeGA.

### **9.8 Security Audit as per SDC (State Data Centre) norms**

1. The security audit shall be carried out by the empanelled vendors of TNeGA. The successful bidder should clear the issues (Non-Conformity) reported by the IT security audit agency. After the compliance certificate issues by the IT security audit agency, the software components will be deployed in the SDC cloud environment. The cost of security audit shall be paid by TNeGA.
2. SSL certificates are to be obtained from ELCOT r/c vendor. The generation of CSR and other related activities pertaining to installation & maintenance of SSL certificate belongs to successful bidder. The payment for the procurement of SSL will be made by the TNeGA.

### **9.9 Audit by TNeGA appointed third party blockchain auditor**

The successful bidder for the Blockchain Backbone Infrastructure and applications will need to follow the best practices and protocols for implementation. TNeGA may be engaging an independent third party blockchain audit partner for this project. The project deliverables including design document, implementation plan, project plan and milestones, backbone and application architecture, security planning, scalability, software modules and other essential deliverables will undergo a third party evaluation by the partner selected by TNeGA throughout the project execution stage and beyond. The successful bidder will need to ensure that the partner has access to the project plan, architecture diagram, design documents, business logic, cryptographic algorithms used, software code, delivered modules, the backbone and application infrastructure and any other access required for successful carrying out the audit process. The successful bidder needs to ensure that the blockchain auditor's recommendations are successfully implemented as part of the project before signoff and go live. Third party auditor will be selected separately.

Areas of evaluation and testing will include but not be limited to:

1. Framework configuration
2. System Architecture
3. Cryptography considerations
4. Digital Signature
5. Consensus Protocols
6. Smart Contract Design
7. Hardware considerations
8. Data Privacy
9. Zero-knowledge proof layer
10. Alignment to Business requirement
11. Interoperability
12. Security planning

- 13. Scalability
- 14. Enterprise Integration
- 15. Deployment
- 16. Any artefacts pertaining to the solution on a need basis

## 9.10 Code Management

1. Successful bidder would check-in all the code to the central repository provided by TNeGA every day.
2. Along with the code all automated test scripts of, unit test cases, integration test, performance test, penetration tests (if any) all such would be checked in the same code repository.

## 9.11 Release Management

The successful bidder should maintain the source code and other artefacts in a repository system. Every release the release build along with its release note should be maintained the repository. Anytime, the production environment can be rolled back to any of its previous versions without any difficulty.

## 9.12 Rollout and Deployment

Application(s) and Blockchain Backbone infrastructure rollout and deployment should be carried out as per the following clauses.

### 9.12.1 Data centre and DR installation

1. The successful bidder shall size the hardware and software requirements for hosting & deployment and install the application in the production servers hosted in the State Data Center and DR facility. The successful bidder might also be requested to host applications or blockchain node software in secure cloud and on premise environment as per business requirement
2. The successful bidder shall finalize the architecture and server configuration and submit to TNeGA for validation and approval. The successful bidder shall install the Operating Systems, Databases and Web services, Web, Application, DB servers and other required components and services and support & install the necessary software. The web server/middle ware/backend servers and blockchain node software shall be configured for the parameters standardized during the UAT and pilot. The application shall be replicated from staging server.
3. Any modification or corrections in the blockchain backbone infrastructure or hosted applications should be done in the staging server and pushed into the production server after testing. The application should comply with all the standardized parameters.



### 9.12.2 IT Infrastructure

1. The successful bidder shall do the capacity planning and estimate the HW requirements.
2. The successful bidder shall be responsible for hosting the Blockchain Backbone infrastructure and hosted applications. TNeGA will buy the H/W & licenses and the successful bidder will support the installation, commissioning and other deployment activities with the OEMs and other stakeholders.
  - a) Nodes and application hosting must be done in Tamil Nadu State Data Center, the ELCOT DR Site and any other infrastructure as requested by TNeGA
  - b) The proposed solutions should provide following without compromising in the quality & performance of the services:
    - High Reliability
    - High Availability (24\*7\*365) i.e. >99% Server Uptime
    - High Scalability (2000 TPS at blockchain core level and 500 read/writes parallel in a second) with Load Balancing & Clustering as per the need.
    - High Performance (The proposed solution should work even in low bandwidth like 128 Kbps using dialup connection)
    - It should not take more than 3 seconds for responding to the users
3. The Successful Bidder shall deploy commission and configure the Software, Servers and Networks for the staging and production environment. The environment should be tested before Go-Live by the successful bidder. The bidder shall ensure that the deployment strategy and solution for front end layer is vendor neutral and not specific to any hardware.

### 9.13 Implementation and Support during Development phase

The selected System Integrator's responsibilities during the development phase would include:

1. Implementation and commissioning of the application.
2. Provide technical support to resolve any issues logged by internal and external stakeholders.
3. Engage in patch management, testing and installation of software upgrades issued by the OEM/vendors from time to time.
4. Development phase is valid until the delivery of blockchain backbone and all hosted applications in scope of this RFP. This should be **Month 22(M22)** as per the implementation schedule, not accounting for any delays in project implementation. After the development period, the Free Warranty period will begin and last 12 months. Free Warranty will cover the blockchain backbone infrastructure and all hosted applications in scope of this RFP. If Work Order is issued for O&M, O&M period will start after the end of Free Warranty.
5. Technical support would be needed to be provided for all blockchain backbone components and dependent hosted applications delivered in the development phase before the start of Free Warranty

### **9.14 Capacity Building and Training**

1. Training plan for State, District and Block level officers and staff must be prepared for hosted applications and blockchain backbone infrastructure based on the training needs and objectives. The major components of capacity building and training programs are:-
  - a) Identification training objectives
  - b) Planning and Scheduling
  - c) Preparation of training materials, help files etc.
  - d) Provide the required training materials, manuals, help files in both soft and hard copies during the training session for all trainees.
  - e) Conduct the training programme
  - f) Address the user issues and resolve if required.
  - g) Get feedback and close the feedback loop
2. The successful bidder should work out a training and capacity building plan with proper schedule and submitted as part of the plan for the project.

### **9.15 Software freezing**

After UAT and pilot testing, the software shall be finalized for all the standardized parameters. This means that updated, standardized and properly commented software code should be made available in the code repository as well as compiled and deployed in production and all test environments.

### **9.16 Software Documentation**

An indicative list of documents to be developed and maintained by the successful bidder is mentioned with various activities below. All documentation should be prepared as per latest Government standards and should incorporate necessary version control mechanism.

- 1) Change request logs
- 2) Design documents
- 3) Test documents
- 4) Preparing at-least the following documentation as per industry standards at the implementations stage:
  - a) Software installation guide
  - b) Application release documents
  - c) User manuals & Training manuals
- 5) Detailed documentation of any changes to the application including proposed changes, impact to the system in terms of functional outcomes/additional features added to the system etc.

### **9.17 Non-Functional Requirements**

1. Bug fixes and updates to the asset or the underlying software stack.

2. The bidder is required to provide 99.9% system availability uptime measured over a calendar month based on Service Hours of 24/7/365 for the blockchain backbone infrastructure.
3. The bidder shall provide SLA metrics for private ledger creation, node (transaction ledger and state database) installation, restoration and maintenance.
4. The bidder shall support resolution times for reported incidents as follows: -
  - a) Level 4 Severity - 4 hours
  - b) Level 3 Severity - 8 hours
  - c) Level 2 Severity - 16 hours
  - d) Level 1 Severity - Next release

## 9.18 Operation & Maintenance (O&M)

**This clause is subject to O&M work order being issued.** If applicable, after the successful implementation (Go-Live) of Blockchain Backbone Infrastructure and solutions for the above use cases, O&M phase shall commence from the Go Live date. The Go Live date will be defined as the date at which the successful bidder receives signoff on the production implementation from TNeGA and the blockchain auditor. The sign off will be provided on end-goals and terms and conditions as decided by TNeGA.

Operation & maintenance consists of the comprehensive timely operations, maintenance, change request implementation, H/W and S/W installation & support, commissioning of H/W and S/W components, managing the system alerts & events, SSL implementation and maintenance etc.

Apart from the above the following detailed activities should be performed one or more times based on the requirement:

1. Bug fixes and updates to the asset or the underlying software stack.
2. Addition/Removal/Update of app components, modules or layers including its authoring. Authoring includes but is not limited to capturing, development, testing, processing etc.
3. Server side activities required for proper functioning, but not limited to configuration, fine tuning, optimization, and addition/soft deletion/updating of features for the applicable app components, modules or layers
4. Feedback-based continuous improvement.
5. Identification of preventive and corrective measures with the respect to the changes occurring.
6. Maintain a log for the operations being done which can be used for further action.
7. BCP management
8. Update the blockchain backbone and hosted solutions software in accordance with advancements in cryptography, cybersecurity, computing power (quantum computing) and other technology domains during the project's lifetime. This is important to ensure the platform is scalable and secure for years to come

Please bid O&M cost for 5 years on the basis of the above criteria in the Price Bid for price discovery.

## 9.19 Software Change management

1. Making enhancements / modifications to the blockchain backbone and hosted applications arising from changes in legislation or regulations or change in user requirements or any other factors.
2. The Successful Bidder is expected to adopt the relevant procedures, protocols and standards of a mature Software Development Life Cycle (SDLC) including (but not limited to) the following for any enhancement / amendment done to the application during the course of the Project.
  - a) Feasibility study / Proposal for change
  - b) Requirement study
  - c) Design
  - d) Development
  - e) Unit and Integration testing
  - f) User acceptance testing
  - g) Rollout
3. Before proceeding to the next phase, the Successful Bidder shall ensure that formal approval of TNeGA for deliverables (including documentation) is obtained.
4. Even for enhancements/amendments to the application, the Successful Bidder will be required to prepare all documentation applicable as otherwise done for the Application as per industry standards. This includes but not limited to
  - a) Change request logs
  - b) Design documents
  - c) Test documents
5. Preparing at-least the following documentation as per industry standards at the implementations stage:
  - a) Software installation guide
  - b) Application release documents
  - c) User manuals & Training manuals
  - d) Detailed documentation of any changes to the application including proposed changes, impact to the system in terms of functional outcomes/additional features added to the system etc.
6. All documentation should incorporate necessary version control mechanism.
7. Change Requests, wherever applicable are to be handled by the successful bidder and no additional cost shall be paid for change requests separately. Successful bidder must continuously support these members with necessary technical and domain specific knowledge of the company and enable them to perform their duties as per requirement of this RFP.

## 9.20 Exit Clause

At the time of expiry of contract period, the successful bidder should ensure a complete knowledge transfer to the TNeGA internal team and any partners selected by TNeGA for subsequent development and operation of the Blockchain Backbone Infrastructure and its applications. The successful bidder at the time of exit process will supply the following.

1. All information related to the work rendered
2. Project data and confidential information
3. Training to the officials identified by TNeGA/ User department shall be given by the successful bidder

4. All other information including but not limited to documents, records and agreements relating to the services reasonably necessary to TNeGA/ User department or any other agency identified to carry out due diligence in order to transition the provision of services to TNeGA/ User department or any other agency identified.
5. All properties provided by TNeGA/ User department shall be returned.
6. Before the date of exit, the successful bidder shall deliver to TNeGA/ User department all new and updated deliverables and shall not retain any copy thereof.

## **9.21 Confidentiality and Security Agreement**

All project deliverables and artifacts are property of TNeGA and its internal functions, architecture, methodologies, business logic, algorithms and working must not be revealed to anyone other than TNeGA's authorized members / consultants /employees.

## **10. Intellectual Property Rights (IPR)**

Except as is otherwise expressly provided in writing in the form of a Contract, TNeGA shall be entitled to all intellectual property and other proprietary rights including, but not limited to, patents, copyrights, and trademarks, with regard to products, processes, inventions, ideas, know-how, or documents and other materials which the Bidder has developed for TNeGA pursuant to the performance of services under this RFP and which bear a direct relation to or are produced or prepared or collected in consequence of, or during the course of, the performance of services under this RFP, and the Bidder acknowledges and agrees that such products, documents and other materials constitute works made for hire for the TNeGA.

To the extent that any such intellectual property or other proprietary rights consist of any intellectual property or other proprietary rights of the Bidder: (i) that pre-existed the performance by the Bidder of its obligations under this RFP, or (ii) that the Bidder may develop or acquire, or may have developed or acquired, independently of the performance of its obligations under this RFP, TNeGA does not and shall not claim any ownership interest thereto, and the Bidder grants to TNeGA a perpetual license to use such intellectual property or other proprietary right solely for the purposes of and in accordance with the requirements of this RFP.

At the request of TNeGA, the Bidder shall take all necessary steps, execute all necessary documents and generally assist in securing such proprietary rights and transferring or licensing them to the TNeGA in compliance with the requirements of the applicable law and this RFP.

Subject to the foregoing provisions, all maps, drawings, photographs, mosaics, plans, reports, estimates, recommendations, documents, source code and all other data compiled by or received by the Bidder pursuant to the performance of services under this RFP shall be the property of TNeGA, shall be made available for use or inspection by TNeGA at reasonable times and in reasonable places, shall be treated as confidential, and shall be delivered only to TNeGA authorized officials on completion of work under this RFP.

## 11. SLA Monitoring

Below SLA clauses will be applicable only if work order is issued for O&M.

### 11.1 Service Level agreement for Software

1. The successful bidder shall ensure system uptime more than 99%. The uptime will be monitored on a quarterly basis.
2. The initial contract is for a period of 34 months (22 months of development & deployment, 12 months as free warranty). Work Order might be issued for O&M for blockchain backbone and hosted applications. If applicable, SLA will be monitored during the O&M period post Go-Live. The Successful Bidder shall ensure application uptime, responsiveness and resolution of issues reported are within the acceptable limits as set forth in the following table.
3. The SLA will be monitored quarterly as per the following tables below.
4. The successful bidder will maintain logs for the entire contract period.

Description	Baseline	Severity Level 1 Breach	Severity Level 2 Breach	Severity Level 3 Breach	Severity Level 4 Breach
<b>System Availability for Blockchain Backbone Infrastructure components and all applications after go live</b>  (Any failure due to external factors or scheduled downtime is not part of the SLA but the bidder is required to document these external failures and provide documentary evidence when asked for)	99%	< 99% and >= 98%	< 98% and >= 96%	< 96% and >= 95%	< 95%
<b>Application Performance SLA</b> Average Response Time for any user interaction with hosted applications or API gateway (Excluding the time taken by the external system)	<=3 seconds for 99% of the requests	<=3 seconds for 98% of the requests	<=3 seconds for 96% of the requests	<=3 seconds for 95% of the requests	<=3 seconds for less than 95% of the requests
<b>Transaction per second (TPS) for request/response on Blockchain</b>	2000 TPS	> 1500 TPS to	> 1200 TPS to <= 1500	> 1000 TPS to <= 1200	< 1000 TPS

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<b>Backbone Infrastructure at the blockchain core level</b>		<= 1800 TPS	TPS	TPS	
<b>Number of concurrent read and write requests</b> supported by the Notarizer module in 1 second	500 writes and 500 reads parallelly	> 450 to <= 500	> 400 to <=450	>350 to <=400	>300 to <=350
<b>Support Resolution SLA – P1</b> Time taken to fix a P1 defect once reported  P1: A defect which results in users not being able to complete the service transaction / activity	16 hrs	>16 hrs and <=24 hrs	>24 hrs and <=48 hrs	>48 hrs and <=72 hrs	>72 hrs
<b>Support Resolution SLA – P2</b> Time taken to fix a P2 defect once reported  P2: A defect which impacts the functionality, services/information are delivered at a sub-optimal level or workaround for the identified issue is not possible without significant inconvenience to the users or loss of required functionality	48 hrs	>48 hrs and <=72 hrs	>72 hrs and <=96 hrs	> 96 hrs and <=120 hrs	>120 hrs

**Note:**

- The above SLA parameters and criteria for evaluation apply unless otherwise agreed in writing mutually between TNeGA and the Successful bidder.
- Additional SLAs may be defined by TNeGA and agreed upon mutually, in writing, from time to time, to ensure better user experience.

The penalty for SLA breaches will be calculated based on the severity level of the breach determined in accordance with the table above, and levied as % of the software development cost payable for the quarter during the free warranty period and as % of the O&M cost payable for the quarter during the O&M period as set forth in the table below:

Severity Level	Penalty
4	2.0%
3	1.5%
2	1.0%
1	0.5%

**Note:**

- a. When there are multiple breaches observed in a quarter, the penalties for each individual breach would be added together to determine the final penalty.
- b. When the penalty reaches 10% of the total contract value, TNeGA may terminate the contract due to the non-performance of the Successful Bidder. However, penalty shall not be levied if the SLA breach is not attributable to the Successful Bidder.

## 11.2 Service Level Agreement for Key Personnel

Key Personnel have to be placed on the project with the approval of TNeGA. Successful bidder needs to ensure that key personnel identified for the project during the bidding stage should be available throughout the duration of the project.

Key Personnel belong to the below category –

- 1. Project Manager (T1)
- 2. Business Solution Architect (T2)
- 3. Enterprise Software Architect (T3)

In case of unavailability of resource due to resignation or an unfortunate event such as accident or death, the personnel should be replaced with an equivalent with similar skills and experience, with concurrence of TNeGA. No replacement of key personnel shall be allowed after award of work (LoA) and upto a period of 1 year of contract period for any reason except for due to resignation or an unfortunate event such as accident or death. The successful bidder has to ensure that the candidates proposed for key personnel in this bid shall be deployed to TNeGA for atleast for a period of 1 year from the award of work. Any failure on deployment of key personnel who’s CVs are proposed in the bid upon receipt of LOA shall lead of termination of award of work (LoA) and actions such as forfeiture of EMD, Security deposit/ PBG and blacklisting of the consultancy firm shall be initiated for their breach.

If TNeGA is not happy with the performance of any key personnel, it will issue a notice and would require the successful bidder to replace the person within 7 days, and the replacement must be agreed to by the TNeGA.

The following service levels are expected from the successful bidder throughout the contract period and in case of lapses, penalties as stated below is applicable. The penalty shall be deducted while making payments to the invoices raised by the bidders.

S. No	Parameter	SLA	Penalty
1	Replacement of resources (T1, T2,T3)	Replacement due to the death, incapacity (including medical	No penalty. In case of resignation, CVs



		incapacity) and resignation( subject to furnishing of appropriate relieving certificate )	of potential replacements must to be submitted 2 month in advance. These 2 months should include minimum 1 month of handover time. Replacements should meet the required criteria of RFP and replacement resources should be approved by TNeGA
2	Replacement of resources for T1, T2,T3 at the request of the consultancy firm after 6 months of contract period (or) at the request of TNeGA due to their non-performance	Replacement due to any other reason other than (S.No.1)	Penalty as below: <b>1<sup>st</sup> – 2<sup>nd</sup> replacement:</b> ₹25,000 per replacement <b>3<sup>rd</sup> replacement onwards:</b> ₹50,000 per replacement <b>Beyond 5<sup>th</sup> replacement</b> TNeGA may terminate contract due to non-performance of successful bidder

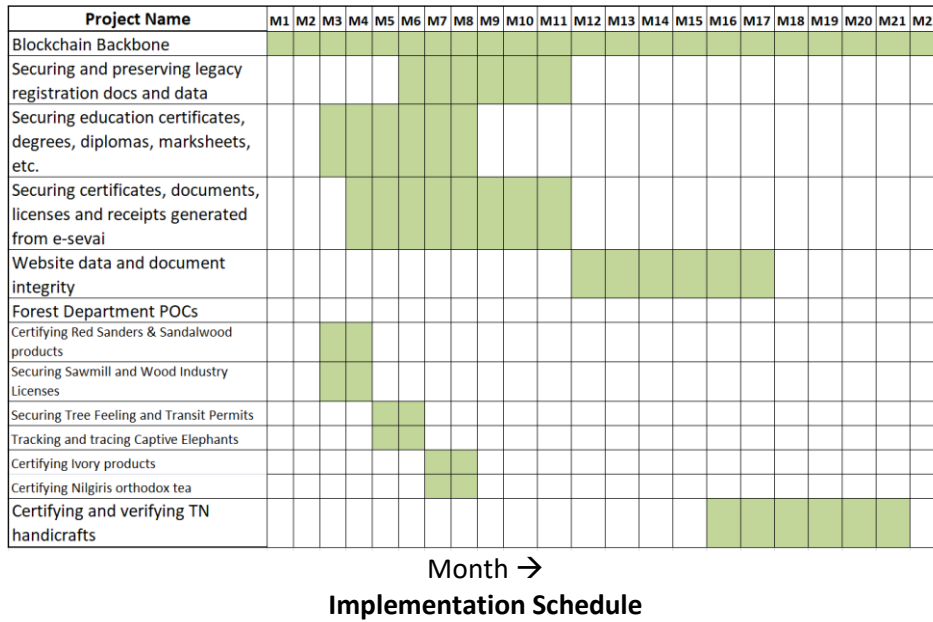
Additionally development team including the key personnel **must be based in Chennai** and should be able to reach **TNeGA office in 2 hours** when called.

## 12. Implementation Plan

The successful bidder needs to implement the Blockchain Backbone Infrastructure and blockchain solutions for various departments as described in section 8. Timelines and delivery schedules for additional use cases will be discussed and mutually agreed upon by TNeGA and the successful bidder.

Free warranty period of 12 months will start after successfully delivery and go live of Blockchain Backbone Infrastructure and all applications. This is at the end of **M22 (Month 22)** in the following schedule. Go Live date will be considered to be the date at which Blockchain Backbone Infrastructure and all applications receive UAT sign off, complete security and third party blockchain audit and are deployed in production environment and are in limited or full production. Applications delivered before **M22** will have to be maintained within the development phase. If work order is issued for O&M, O&M Phase will start for each application and backbone at the end of free warranty period.

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### 13. Payment Terms

Stage-wise payment will be released based on the milestone deliverables completed and approved by TNeGA. The payment will be released in stages on achieving the following milestones. Free Warranty period of 12 months will start after Blockchain Backbone Infrastructure and all applications go live. Applications delivered and milestones cleared before Blockchain Backbone Infrastructure go live will have to be maintained and operated as part of the 22 months development phase for the Blockchain Backbone Infrastructure and hosted applications. Below are the payment terms for the project as per the different line items in the Financial Bid.

#### 13.1 Blockchain Backbone Infrastructure

S.No.	Milestone	% of value of R1 in Work Order that will be paid at end of milestone
1	SRS Signoff	5%
2	Infrastructure provisioning and Blockchain network setup in Production including network configuration, identity service configuration, policies, consensus/ ordering mechanism, validating nodes, etc.	5%

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S.No.	Milestone	% of value of R1 in Work Order that will be paid at end of milestone
3	Development and Production Deployment of first 4 Blockchain Backbone Business Adaptor Modules as per SRS and Project plan	15%
4	Development and Production Deployment Production Deployment of remaining Business Adaptor Modules as per SRS and Project plan	15%
5	Development and Production Deployment of API Gateway and publishing Blockchain Backbone SDK	15%
6	Integration with PSP and SFDB	5%
7	Successfully passing user acceptance, performance, load, security test for Blockchain Backbone Platform with all hosted applications as per RFP scope and SRS.	15%
8	End of Free Warranty period of 12 months	20%
9	Knowledge Transfer, Training & Documentation submissions as per Exit Clause (9.20)	5 %

The successful bidder might have to develop blockchain solutions for additional use cases and provide support for integration of applications by third party developers. These will be procured by TNeGA, if required, as per the man-month and man-day cost stated and submitted in the Financial Bid document.

For point 7, In the preceding table, any bugs and issues identified in this stage by TNeGA/ user departments will have to be fixed by the successful bidder or accepted by them. All the tests have to be conducted again subsequently. These test results have to be passed or accepted by TNeGA to complete this milestone

**13.2 Designing, developing and deploying blockchain app for securing and preserving legacy registration documents, encumbrance data and any other registration department data**

S.No.	Milestone	% of value of R2 in Work Order that will be paid at end of milestone
1	SRS Signoff	5%

S.No.	Milestone	% of value of R2 in Work Order that will be paid at end of milestone
2	Infrastructure provisioning and private ledger setup on blockchain backbone infrastructure in Production for Registration Department use case including creating genesis block, issuing certificates, identities, creating policies, nodes setup, etc.	10%
3	a. Developing smart contracts, off-chain business logic layer, front end screens, backend layer and client API services as per SRS + Integration with IGR Portal b. Signoff on UAT with sample data	40%
4	Production deployment	5%
5	Mapping legacy registration documents, encumbrance data and other registration dept data to Blockchain	15%
6	End of Free Warranty period of 12 months	20%
7	Knowledge Transfer, Training & Documentation submissions as per Exit Clause (9.20)	5%

### 13.3 Designing, developing and deploying blockchain app for securing education certificates and marksheets

S.No.	Milestone	% of value of R3 in Work Order that will be paid at end of milestone
1	SRS Signoff	5%
2	Infrastructure provisioning and private ledger setup on blockchain backbone infrastructure in Production for education certificates use case including creating genesis block, issuing certificates, identities, creating policies, nodes setup, etc.	10%

S.No.	Milestone	% of value of R3 in Work Order that will be paid at end of milestone
3	a. Developing smart contracts and off-chain business logic layer, front end verification and reporting portal, backend services and client API services as per scope b. Signoff on UAT with sample data	40%
4	Production deployment	5%
5	On boarding 10 academic databases and securing legacy certificate data with blockchain layer. On boarding includes integration with the application layer for securing academic certificate data	15%
6	End of Free Warranty Period	20%
7	Knowledge Transfer, Training & Documentation submissions as per Exit Clause (9.20)	5%

The successful bidder might have to provide physical versions of blockchain secured certificates (with a passive ID tag or similar technology for verification). These will be procured by TNeGA, if required, as per the per certificate prices stated and submitted in the Financial Bid document

**13.4 Designing, developing and deploying blockchain app for generating, securing and verifying important revenue and other government department/agencies certificates, documents and licenses issued as part of e-sevai services,**

S.No.	Milestone	% of value of R4 in Work Order that will be paid at end of milestone
1	SRS Signoff	5%
2	Infrastructure provisioning and private ledger setup on blockchain backbone infrastructure in Production for e-sevai certificates use case including creating genesis block, issuing certificates, identities, creating policies, nodes setup, etc.	10%

S.No.	Milestone	% of value of R4 in Work Order that will be paid at end of milestone
3	<ul style="list-style-type: none"> <li>a. Developing smart contracts and off-chain business logic layer, front end verification and reporting portal, backend services and client API services as per SRS</li> <li>b. Integration with e-sevai platform</li> <li>c. Signoff on UAT with sample data</li> </ul>	40%
4	Production deployment	5%
5	Integration with 50 e-sevai services and securing certificate data with blockchain in production	15%
6	End of Free Warranty Period	20%
7	Knowledge Transfer, Training & Documentation submissions as per Exit Clause (9.20)	5%

The successful bidder might have to provide physical versions of blockchain secured certificates (with a passive ID tag or similar technology for verification). These will be procured by TNeGA, if required, as per the per certificate prices stated and submitted in the Financial Bid document.

### 13.5 Designing, developing and deploying blockchain cyber security application for Website Data and Document Integrity at State Data Centre

S.No.	Milestone	% of value of R5 in Work Order that will be paid at end of milestone
1	SRS Signoff	5%
2	Infrastructure provisioning and private ledger setup on blockchain backbone infrastructure in Production for cyber security use case including creating genesis block, issuing certificates, identities, creating policies, nodes setup, etc	10%

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S.No.	Milestone	% of value of R5 in Work Order that will be paid at end of milestone
3	a. Developing and deploying smart contracts and off-chain business logic layer, front end screens, backend layer and client API services as per SRS b. Signoff on UAT with sample data	35%
4	Production Deployment	5%
5	Integration with first 12 websites and securing them	10%
6	Integration with next 13 websites and securing them	10%
7	End of Free Warranty Period	20%
8	Knowledge Transfer, Training & Documentation submissions as per Exit Clause (9.20)	5 %

**13.6 Designing, developing and deploying POC Application for securing and verifying tree felling and transit licenses**

S.No.	Milestone	% of value of R6 in Work Order that will be paid at end of milestone
1	POC scope and SRS signoff	5%
2	Infrastructure provisioning and private ledger setup on blockchain backbone infrastructure for the use case including creating genesis block, issuing certificates, identities, creating policies, nodes setup, etc.	10%
3	a. Developing smart contracts and off-chain business logic layer, front end verification and reporting portal, backend services and client API services as per SRS b. Integration with legacy forest department system	40%
4	Production deployment	5%

S.No.	Milestone	% of value of R6 in Work Order that will be paid at end of milestone
5	On-field pilot with legacy data	15%
6	End of Free Warranty Period	20%
7	Knowledge Transfer, Training & Documentation submissions as per Exit Clause (9.20)	5 %

### 13.7 Designing, developing and deploying POC Application for securing sawmill licenses

S.No.	Milestone	% of value of R7 in Work Order that will be paid at end of milestone
1	POC scope and SRS signoff	5%
2	Infrastructure provisioning and private ledger setup on blockchain backbone infrastructure for the use case including creating genesis block, issuing certificates, identities, creating policies, nodes setup, etc.	10%
3	<ul style="list-style-type: none"> <li>a. Developing smart contracts and off-chain business logic layer, front end verification and reporting portal, backend services and client API services as per SRS</li> <li>b. Integration with legacy forest department system</li> </ul>	40%
4	Production deployment	5%
5	On-field pilot with legacy data	15%
6	End of Free Warranty Period	20%
7	Knowledge Transfer, Training & Documentation submissions as per Exit Clause (9.20)	5 %



### 13.8 Designing, developing and deploying POC Application for certifying and tracking Orthodox Nilgiri Tea

S.No.	Milestone	% of value of R8 in Work Order that will be paid at end of milestone
1	POC scope and SRS signoff	5%
2	Infrastructure provisioning and private ledger setup on blockchain backbone infrastructure for this use case including creating genesis block, issuing certificates, identities, creating policies, nodes setup, etc.	10%
3	c. Developing smart contracts and off-chain business logic layer, front end screens, backend services and client API services as per SRS d. Integration with legacy TANTEA system	40%
4	Production deployment	5%
5	On-field pilot	15%
6	End of Free Warranty Period	20%
7	Knowledge Transfer, Training & Documentation submissions as per Exit Clause (9.20)	5 %

### 13.9 Designing, developing and deploying POC application for tracking artefact(legacy) wildlife products and trophies

S.No.	Milestone	% of value of R9 in Work Order that will be paid at end of milestone
1	POC scope and SRS signoff	5%
2	Infrastructure provisioning and private ledger setup on blockchain backbone infrastructure for the use case including creating genesis block, issuing certificates, identities, creating policies, nodes setup, etc.	10%

S.No.	Milestone	% of value of R9 in Work Order that will be paid at end of milestone
3	Developing smart contracts and off-chain business logic layer, front end screens, integration with off-chain oracles for submitting data and tracking wildlife products, backend services and client API services as per SRS	40%
4	Production deployment	5%
5	On-field pilot	15%
6	End of Free Warranty Period	20%
7	Knowledge Transfer, Training & Documentation submissions as per Exit Clause (9.20)	5 %

### 13.10 Designing, developing and deploying POC application for tracking red sanders and sandalwood products

S.No.	Milestone	% of value of R10 in Work Order that will be paid at end of milestone
1	POC scope and SRS signoff	5%
2	Infrastructure provisioning and private ledger setup on blockchain backbone infrastructure for the use case including creating genesis block, issuing certificates, identities, creating policies, nodes setup, etc.	10%
3	Developing smart contracts and off-chain business logic layer, front end screens, integration with off-chain oracles for submitting data and tracking products, backend services and client API services as per SRS	40%
4	Production deployment	5%
5	On-field pilot	15%

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S.No.	Milestone	% of value of R10 in Work Order that will be paid at end of milestone
6	End of Free Warranty Period	20%
7	Knowledge Transfer, Training & Documentation submissions as per Exit Clause (9.20)	5 %

**13.11 Designing, developing and deploying POC application for tracking domesticated captive elephants**

S.No.	Milestone	% of value of R11 in Work Order that will be paid at end of milestone
1	POC scope and SRS signoff	5%
2	Infrastructure provisioning and private ledger setup on blockchain backbone infrastructure for the use case including creating genesis block, issuing certificates, identities, creating policies, nodes setup, etc.	10%
3	Developing smart contracts and off-chain business logic layer, front end screens, integration with off-chain oracles for submitting data and tracking products, backend services and client API services as per SRS	40%
4	Production deployment	5%
5	On-field pilot	15%
6	End of Free Warranty Period	20%
7	Knowledge Transfer, Training & Documentation submissions as per Exit Clause (9.20)	5 %

**13.12 Designing, developing and deploying blockchain application for Certifying handicrafts and handlooms made in Tamil Nadu and identifying counterfeit handicrafts,**

S.No.	Milestone	% of value of R12 in Work Order that will be paid at end of milestone
1	SRS signoff	5%
2	Infrastructure provisioning and private ledger setup on blockchain backbone infrastructure for the use case including creating genesis block, issuing certificates, identities, creating policies, nodes setup, etc.	10%
3	<ul style="list-style-type: none"> <li>a. Developing smart contracts and off-chain business logic layer, front end screens, backend layer, integration with off chain oracles for submitting data and tracking products and client API services as per SRS</li> <li>b. Signoff on UAT with sample data</li> </ul>	40%
4	Production deployment	5%
5	Onboarding and securing at least 4 handicrafts / handloom supply chain processes with blockchain. On boarding includes integration with existing ERP systems or providing interfaces to stakeholders for entering data manually or through a digitized process such as scanning a barcode	15%
6	End of Free Warranty Period	20%
7	Knowledge Transfer, Training & Documentation submissions as per Exit Clause (9.20)	5%

## 14. APPENDIX – I: Model Form of Contract

(To be executed on a Rs. 100/- Non-Judicial Stamp Paper bought in Tamil Nadu by the Successful Bidder)

**(NO FIGURES IN NUMERALS OR WORDS SHALL BE FILLED UP IN THIS SAMPLE FORM AT THE TIME OF SUBMISSION OF TENDER)**

This CONTRACT is made at Chennai on the..... day of ..... 2021

BETWEEN

**Tamil Nadu e-Governance Agency**, registered under the Tamil Nadu Societies Registration Act 1975 and having its Registered Office at 807, P.T.Lee.Chengalvarayan Naicker Maaligai, Anna Salai, Chennai - 600 002 , being the Service recipient (hereinafter referred to as “TNeGA” which expression shall unless repugnant to the context mean and include its successors and assigns) on Behalf of Government of Tamil Nadu of the FIRST PART.

AND

....., a firm represented herein by ....., aged ....years and having its Registered office at .....(hereinafter referred to as “Successful Bidder” which expression shall unless repugnant to the context mean and include its successors and assigns) of the SECOND PART.

Whereas, TNeGA invited a tender vide Tender Ref: **TNeGA/OT/BlockchainNI/2020-21** for Selection of Implementation Partner for TNeGA to design, develop and deploy Nambikkai Inaiyam (Tamil Nadu Blockchain Backbone Infrastructure) as per the Scope of Work (Clause 8) and Terms & Conditions (Clause 9 to 13) prescribed in the Tender document.

Whereas TNeGA and the Successful Bidder in pursuance thereof have arrived at the following terms and conditions.

NOW THEREFORE

In consideration of the mutual protection of information herein by the parties hereto and such additional promises and understandings as are hereinafter set forth, the parties agree as follows:

### **Purpose**

The purpose of this Agreement is to maintain in confidence the various Confidential Information, which is provided between TNeGA and Successful bidder to perform the considerations (hereinafter called “Purpose”) set forth in below:

### **Definition**

For purposes of this Agreement, "Confidential Information" means the terms and conditions, and with respect to either party, any and all information in written, representational, electronic, verbal or other form relating directly

or indirectly to the Purpose (including, but not limited to, information identified as being proprietary and/or confidential or pertaining to, pricing, marketing plans or strategy, volumes, services rendered, customers and suppliers lists, financial or technical or service matters or data, employee/agent/ consultant/officer/director related personal or sensitive data and any information which might reasonably be presumed to be proprietary or confidential in nature) excluding any such information which (i) is known to the public (through no act or omission of the Successful Bidder in violation of this Agreement)

- a) is lawfully acquired by the Successful Bidder from an independent source having no obligation to maintain the confidentiality of such information
- b) was known to the Successful Bidder prior to its disclosure under this Agreement
- c) was or is independently developed by the Successful Bidder without breach of this Agreement
- d) is required to be disclosed by governmental or judicial order, in which case Successful Bidder shall give the TNeGA prompt written notice, where possible, and use reasonable efforts to ensure that such disclosure is accorded confidential treatment and also to enable the TNeGA to seek a protective order or other appropriate remedy at TNeGA's sole costs.

Confidential Information disclosed orally shall only be considered Confidential Information if: (i) identified as confidential, proprietary or the like at the time of disclosure, and (ii) confirmed in writing within Seven (7) days of disclosure.

#### **No Licenses**

This Agreement does not obligate either party to disclose any particular proprietary information; to purchase, sell, license, transfer, or otherwise dispose of any technology, services, or products; or to enter into any other form of business, contract or arrangement. Furthermore, nothing contained hereunder shall be construed as creating, conveying, transferring, granting or conferring by one party on the other party any rights, license or authority in or to the Confidential Information disclosed under this Agreement.

#### **Disclosure**

Successful Bidder agrees and undertakes that it shall not, without first obtaining the written consent of the TNeGA, disclose or make available to any person, reproduce or transmit in any manner, or use (directly or indirectly) for its own benefit or the benefit of others, any Confidential Information save and except both parties may disclose any Confidential Information to their Affiliates, directors, officers, employees or advisors of their own or of Affiliates on a "need to know" basis to enable them to evaluate such Confidential Information in connection with the negotiation of the possible business relationship; provided that such persons have been informed of, and agree to be bound by obligations which are at least as strict as the recipient's obligations hereunder. For the purpose of this Agreement, Affiliates shall mean, with respect to any party, any other person directly or indirectly Controlling, Controlled by, or under direct or indirect common Control with, such party. "Control", "Controlled" or "Controlling" shall mean, with respect to any person, any circumstance in which such person is controlled by another person by virtue of the latter person controlling the composition of the Board of Directors or owning the largest or controlling percentage of the voting securities of such person or by way of contractual relationship or otherwise.

The Successful Bidder shall use the same degree of care and protection to protect the Confidential Information received by it from the TNeGA as it uses to protect its own Confidential Information of a like nature, and in no event such degree of care and protection shall be of less than a reasonable degree of care.

The TNeGA shall not be in any way responsible for any decisions or commitments made by Successful Bidder in relying on the TNeGA's Confidential Information.

#### **Return or Destruction Of Confidential Information**

The parties agree that upon termination/expiry of this Agreement or at any time during its currency, at the request of the TNeGA, the Successful Bidder shall promptly deliver to the TNeGA the Confidential Information and copies thereof in its possession or under its direct or indirect control, and shall destroy all memoranda, notes and other writings prepared by the Successful Bidder or its Affiliates or Directors, officers, employees or advisors based on the Confidential Information and promptly certify such destruction.

#### **Independent Development and Residuals**

Both parties acknowledge that the Confidential Information coming to the knowledge of the other may relate to and/or have implications regarding the future strategies, plans, business activities, methods, processes and or information of the parties, which afford them certain competitive and strategic advantage. Accordingly, nothing in this Agreement will prohibit the Successful Bidder from developing or having developed for it products, concepts, systems or techniques that are similar to or compete with the products, concepts, systems or techniques contemplated by or embodied in the Confidential Information provided that the Successful Bidder does not violate any of its obligations under this Agreement in connection with such development.

#### **Injunctive Relief**

The parties hereto acknowledge and agree that in the event of a breach or threatened breach by the other of the provisions of this Agreement, the party not in breach will have no adequate remedy in money or damages and accordingly the party not in breach shall be entitled to injunctive relief against such breach or threatened breach by the party in breach.

#### **Non-Waiver**

No failure or delay by either party in exercising or enforcing any right, remedy or power hereunder shall operate as a waiver thereof, nor shall any single or partial exercise or enforcement of any right, remedy or power preclude any further exercise or enforcement thereof or the exercise of enforcement of any other right, remedy or power.

This Contract shall remain in force during the initial contract period of 34 months as per the deliverables and scope of work from the date of signing of this contract. TNeGA may issue an additional work order for Operation and Maintenance of the Blockchain Backbone and hosted applications. This may be agreed to by both the parties after completion of initial contract period.

The Successful Bidder agrees to deliver the services as per the scope indicated in the Tender Scope of Work and terms & conditions of this Tender within the stipulated period prescribed by TNeGA at the cost arrived at in the financial bid. This cost is firm and not subject to enhancement.

The Contract or any part share of interest in it shall not be transferred or assigned by the Successful Bidder directly or indirectly to any person or persons whomsoever without the prior written consent of TNeGA.

Neither TNeGA nor the Successful Bidder shall be liable to the other for any delay or failure in the performance of their respective obligations due to causes, contingencies beyond their reasonable control such as:

Natural phenomena including but not limited to earthquakes, floods and epidemics.

Acts of any Government authority domestic or foreign including but not limited to war declared or undeclared.

Accidents or disruptions including, but not limited to fire and explosions.

The tender (RFP) document in relation with this contract shall be deemed to form and be read and construed as part of this Contract. The Tender enclosures, the offer submitted by the Successful Bidder, the finalized Terms and Conditions and the LoA/Work Order respectively will form part of this contract. Wherever the offer conditions furnished by the Successful Bidder are at variance with conditions of this contract or conditions stipulated in the RFP document, the final negotiated offer conditions shall prevail over the tender conditions furnished by the Successful Bidder.

- Liquidated Damages (LD) – as per cl.7.12 of this RFP
- Service Level Agreement – as per cl. 11 of this RFP, if work order for O&M is issued
- Implementation Timeline– as per cl. 12 of this RFP
- Payment Terms – as per cl.13 of this RFP

The Successful Bidder shall be liable and / or responsible for the compliance of all Statutory Provisions, especially those relating to Labour Laws in respect of this Contract.

Any notice from one party to the other given or required to be given hereunder shall be given by either:

Mailing the same by registered mail, postage prepaid, return receipt requested; or

Having the same delivered by courier with receipt acknowledged at the address set forth above or with other addresses and to the attentions of such other person or persons as may hereafter be designated by like notice hereunder and any such notice shall be deemed to have been served if sent by post on the date when in the ordinary course of post, it would have been delivered at the addresses to which it was sent or if delivered by courier on the date of acknowledgement of receipt.

In case of breach of any of the conditions of the contract by the Successful Bidder during the contract period, TNeGA reserves the right to recover costs/liabilities arising directly due to such breach from the Successful Bidder.

- Termination of Contract – as per cl.7.9 of this RFP.

IN WITNESS WHEREOF the Parties have by duly authorized Representatives set their respective hands and seal on the date first above

Signed by:



Request for Proposal for Selection of Implementation Partner for TNeGA to design, develop and deploy Nambikkai Inaiyam (Tamil Nadu Blockchain Backbone Infrastructure)

(Name and designation) For and on behalf of TNeGA

(FIRST PARTY)

Signed by:

(Name and designation) For and on behalf of Implementation Partner  
(SECOND PARTY)

WITNESSES:

1. (for FIRST PARTY)
2. (for SECOND PARTY)

## 14. APPENDIX – II: Bank Guarantee Format

(To be executed in Rs.100/- Stamp Paper)

To

The Chief Executive Officer,

Tamil Nadu e-Governance Agency,

807,2<sup>nd</sup> floor, PT Lee Chengalvarayan Naicker Building,

Anna Salai,

Chennai – 600002

Bank Guarantee No:

Amount of Guarantee:

Guarantee covers from:

Last date for lodgment of claim:

This Deed of Guarantee executed by ..... (Bankers Name & Address) having our Head Office at .....(address) (hereinafter referred to as “the Bank”) in favor of CEO, TNeGA, registered under Societies Act and wholly owned by Government of Tamil Nadu and having its Registered office at No.807, 2<sup>nd</sup> Floor, PT Lee Chengalvarayan Naicker Building, Anna Salai, Chennai- 600 002 (hereinafter referred to as “the Beneficiary”) for an amount not exceeding Rs.\_\_\_\_\_/ - (Rupees \_\_\_\_\_ Only) as per the request of M/s. \_\_\_\_\_ having its office address at \_\_\_\_\_ (hereinafter referred to as “Successful Bidder”) against Letter of Acceptance reference \_\_\_\_\_ dated \_\_\_/\_\_\_/\_\_\_ of M/s. Tamil Nadu e-Governance Agency for the tender ref: **TNeGA/OT/BlockchainNI/2020-21 - Selection of Implementation Partner for TNeGA to design, develop and deploy Nambikkai Inaiyam (Tamil Nadu Blockchain Backbone Infrastructure)**. This guarantee is issued subject to the condition that the liability of the Bank under this guarantee is limited to a maximum Rs.\_\_\_\_\_/ - (Rupees \_\_\_\_\_ Only) and the guarantee shall remain in full force upto \_\_\_ months from the date of Bank Guarantee and cannot be invoked otherwise by a written demand or claim by the beneficiary under the Guarantee served on the Bank before \_\_\_ months from the date of Bank Guarantee.

AND WHEREAS it has been stipulated by you in the said ORDER that the Successful Bidder shall furnish you with a Bank Guarantee by a Scheduled / Nationalized Bank for the sum specified therein as security for compliance with the Successful Bidder performance obligations for a period in accordance with the contract.

AND WHEREAS we have agreed to give the Successful Bidder a Guarantee.

THEREFORE, we (Bankers address)....., hereby affirm that we are Guarantors and responsible to you on behalf of the Successful Bidder up to a total of Rs.\_\_\_\_\_/ - (Rupees \_\_\_\_\_ Only) and we undertake to pay you, upon your first written demand declaring the Successful Bidder to be in default under the contract and without any demur, cavil or argument, any sum or sums within the limit of Rs.\_\_\_\_\_/ - (Rupees \_\_\_\_\_ Only) as aforesaid, without your needing to prove or show grounds or reasons for your demand or the sum specified therein. We will pay the guaranteed amount notwithstanding any objection or dispute whatsoever raised by the Successful Bidder.

This Guarantee is valid until \_\_ months from the date of Bank Guarantee. Notwithstanding, anything contained herein, our liability under this guarantee shall not exceed Rs.\_\_\_\_\_/ - (Rupees \_\_\_\_\_ Only). This Bank Guarantee shall be valid up to \_\_ months from the date of Bank guarantee and we are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only and only if you serve upon us a written claim or demand on or before\_\_\_\_\_.

In witness whereof the Bank, through its authorized Officer, has set its, hand and stamp on this.....at .....

Witness:

(Signature)

(Name in Block Letters)

## 15. APPENDIX – III: Consortium Declaration

I/We agree to adhere with the schedule of implementation and deliver the items as specified in the tender.

I/We agree to submit the Consortium Agreement duly stating the Primary partner and the Secondary partner

I/We agree to that the Primary partner will be held accountable by TNeGA for all the delivery and tender conditions and will be held responsible for breach of conditions, agreements, SLAs as stated in this tender document

I/We agree that TNeGA would release payment only to the Primary partner

I/We agree to submit any other agreements with the bidding consortium partner that conflict with the terms and conditions of this tender document. I/We agree that our bid might be summarily rejected in case the Tender Evaluation committee finds any such agreement to effect the execution of the terms of this tender.

If there is any prior agreement between Primary and the Secondary partner which conflicts with any of the clauses of this tender document, I/We agree that it is the responsibility of the Primary partner to ensure that the prior agreement is modified so that it is compliant with the tender conditions

Primary Partner Name:

Signature:

Signing Authority Name:

Designation:

Seal of the Primary Partner:

Secondary Partner Name:

Signature:

Signing Authority Name:

Designation:

Seal of the Secondary Partner: