<table>
<thead>
<tr>
<th>S. No</th>
<th>Metric</th>
<th>Baseline</th>
<th>Lower Performance</th>
<th>High Performance</th>
<th>Breach</th>
<th>Dependency</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Metric</td>
<td>Score</td>
<td>Metric</td>
<td>Score</td>
<td>Metric</td>
<td>Score</td>
</tr>
<tr>
<td>42</td>
<td>Quarterly SLA Monitoring</td>
<td>Must achieve specified rating in 90% of the inspections carried out by the PMU.</td>
<td>at the end of every quarter</td>
<td>Upto one week beyond the quarter end date</td>
<td>NA</td>
<td>NA</td>
<td>more than a week beyond the quarter end date</td>
</tr>
<tr>
<td></td>
<td>Documentation Management</td>
<td>Maintaining document versioning (FRS, SRS, User, Training Manual etc.), application version control, updates &amp; patches etc.</td>
<td></td>
<td></td>
<td>0.5</td>
<td>NA</td>
<td>-1</td>
</tr>
<tr>
<td>43</td>
<td>CMCPC and INTRAC Upkeep *</td>
<td>The upkeep and cleanliness of CMCPC and INTRAC will be measured by the rating given during inspections carried out by the PMU.</td>
<td>&gt;90%</td>
<td>&lt;90% and &gt;=80%</td>
<td>0.5</td>
<td>&gt;=95%</td>
<td>1.5</td>
</tr>
</tbody>
</table>
Note: *SLAs numbering 1, 2, 16-21, 27, 30-34, 41 would be applicable only during Business hours and working days.

2.10.6.8 Network Installations

[We have provided here customizable templates, to fill in relevant values for developing the SLAs relevant to Networking Installations]

<table>
<thead>
<tr>
<th>S. No.</th>
<th>SLA Terms</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Uptime</td>
<td>‘Uptime’ refers to availability of network across various segments. &quot;% Uptime&quot; means ratio of 'Up Time' (in minutes) in a month to Total time in the month (in minutes) multiplied by 100.</td>
</tr>
<tr>
<td>2.</td>
<td>Prime Business Hours (PBH)</td>
<td>PBH refers to the prime network utilization period, which shall be typically starting from 09:00 hrs till 18:00 hrs on all working days&gt;</td>
</tr>
<tr>
<td>3.</td>
<td>Extended SLA Hours (ESH)</td>
<td>ESH refers to the lean network utilization period, which shall be typically starting from 18:00 hrs till 09:00 hrs on Monday to Saturday and 00:00 hrs to 23:59 hrs on Sunday&gt; or any other period to be defined by the Purchaser.</td>
</tr>
<tr>
<td>4.</td>
<td>Planned Network Outage</td>
<td>‘Planned Network Outage’ refers to unavailability of network services due to infrastructure maintenance activities such as configuration changes, upgradation or changes to any supporting infrastructure. Details related to such planned outage shall be agreed with Purchaser and shall be notified to all the stakeholders in advance (at least forty eight hours).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Service Category</th>
<th>Service Level Title/Objective</th>
<th>Definition</th>
<th>Data Capture</th>
<th>Measurement Interval</th>
<th>Reporting Period</th>
<th>Hours of Support</th>
<th>Target Service Level</th>
<th>Minimum Service Level</th>
<th>Service Level Dependency</th>
<th>Increased Impact</th>
<th>Severity Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prime Business Hours (PBH)</td>
<td>Network Availability Average Network Availability between various defined business</td>
<td>The total number of hours the network was available during the Prime business hours (PBH).</td>
<td>Recording the no. of hours of network outage during PBH.</td>
<td>Monthly</td>
<td>Monthly</td>
<td>24x7</td>
<td>&gt; 99%</td>
<td>&gt; 95%</td>
<td>Telephone Exchange Line, SWAN</td>
<td>To be baseline for first 6 months [Please refer Section 2.8]</td>
<td>INR 100,000</td>
</tr>
<tr>
<td>Service Category</td>
<td>Service Level Title / Objective</td>
<td>Definition</td>
<td>Data Capture</td>
<td>Measurement Interval</td>
<td>Reporting Period</td>
<td>Hours of Support</td>
<td>Target Service Level</td>
<td>Minimum Service Level</td>
<td>Service Level Dependency</td>
<td>Increased Impact</td>
<td>Severity Weight</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------------------</td>
<td>------------</td>
<td>--------------</td>
<td>----------------------</td>
<td>-----------------</td>
<td>------------------</td>
<td>----------------------</td>
<td>----------------------</td>
<td>------------------------</td>
<td>----------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Availability</td>
<td>business locations during ESH</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please note:

- Availability of network for less than 98% during PBH and less than 88% during ESH continuously for a quarter will be considered as the Breach of the Agreement and <PURCHASER> reserves the Right to terminate the agreement.
2.10.6.9 Operation and Maintenance (O&M) Support

[We have provided here customizable templates, to fill in relevant values for developing the SLAs relevant to Operations and Maintenance Support]

<table>
<thead>
<tr>
<th>S. No.</th>
<th>SLA Terms</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1.     | System Uptime                                      | - Time for which user is able to access the applications, website and other components of the IT solution during the working hours. The system can be down due to any of the reasons including failure of hardware, network, system software, application etc.  
- Scheduled downtime for example, backup time, batch processing time, routine maintenance time will not be considered while evaluating the system uptime. However, the selected SI will be required to schedule such downtime with prior approval of <Purchaser>. The selected SI will plan scheduled downtime outside working time. In exceptional circumstances, <Purchaser> may allow the SI to plan scheduled downtime in the working hours. |
| 2.     | Bugs / Issues in the Application Software / Hardware device / Network Equipment | • Critical bugs / issues – Bugs / issues affecting more than one division or more than one user in a division,  
• Non-critical bugs / issues – Bugs / issues affecting at most one user in a division. |
| System Uptime and Performance | System uptime and performance of the system | Time for which user is able to access the applications, website and other components of the IT solution during the working hours. The system can be down due to any of the reasons | No. of recorded hours on server logs of uninterrupted usage of the system by users during working hours | Weekly | Weekly | 24x7 | 99.9% | 99% | • Power Backup  
• Upgrades  
• System Restores | To be baseline for first 6 months [Please refer Section 2.8 of Guidance Notes for filling this part of Guidance Notes for more on filling this part] | INR 300,000 per month for every drop in percentage point of uptime below 99.5% [The non-availability for application |
<table>
<thead>
<tr>
<th>Service Category</th>
<th>Service Level Title / Objective</th>
<th>Definition</th>
<th>Service, website measured on monthly basis and excluding the scheduled maintenance shutdown. Performance of system refers to the proper and timely functioning of the system's functionalities. The applications should be available and performing as per functionalities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Including failure of hardware, network, system software, application etc.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Scheduled downtime for example, backup time, batch processing time, routine maintenance time will not be considered while evaluating the system uptime. However, the selected SI will be required to schedule such downtime</td>
<td></td>
</tr>
</tbody>
</table>
The selected SI vendor will plan scheduled downtime outside working time. In exceptional circumstances, <Purchaser> may allow the SI vendor to plan scheduled downtime in the working hours.

<table>
<thead>
<tr>
<th>Service Category</th>
<th>Service Level Title / Objective</th>
<th>Definition</th>
<th>Data Capture</th>
<th>Measurement Interval</th>
<th>Reporting Period</th>
<th>Hours of Support</th>
<th>Target Service Level</th>
<th>Minimum Service Level</th>
<th>Service Level Dependency</th>
<th>Increased Impact</th>
<th>Severity Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issue Resolution Efficiency</td>
<td>Resolution time for bugs / issues in the applications</td>
<td>Down time in the working hours.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Please note:

- Following conditions will be considered as the Breach of the Agreement in case of O&M Phase and in any of the following conditions
  - <PURCHASER> reserves the Right to terminate the agreement
    - System uptime of less than 97% continuously for a quarter;
    - More than 3 incidents of not resolving the bugs / issues within the defined time limits in a quarter;
    - Average page loading time for application & reports to be more than 20 seconds evaluated for a quarter;
2.10.7.1 Training and Change Management

[We have provided here *customizable templates*, to fill in relevant values for developing the SLAs relevant to Training and Change Management]

<table>
<thead>
<tr>
<th>Service Category</th>
<th>Service Level Title / Objective</th>
<th>Definition</th>
<th>Data Capture</th>
<th>Measurement Interval</th>
<th>Reporting Period</th>
<th>Hours of Support</th>
<th>Target Service Level</th>
<th>Minimum Service Level</th>
<th>Service Level Dependency</th>
<th>Increased Impact</th>
<th>Severity Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training</td>
<td>Satisfaction</td>
<td>The feedback shall be received by the officials of &lt;Purchaser&gt; after each training session. &lt;Purchaser&gt; may decide to use the SLA in case insufficient training sessions are conducted by the SI vendor.</td>
<td>Feedback ratings received from Training participants, no. of participants and no. of Trainings delivered</td>
<td>Monthly</td>
<td>Monthly</td>
<td>No. of Training hours delivered</td>
<td>Feedback ratings &gt; 8</td>
<td>Feedback ratings &gt; 7</td>
<td>- Participant attendance/turnout</td>
<td>&gt; 10 trained participants being able to trained other members of staff in a period of 1 month</td>
<td>20% of the per person cost for that type of training</td>
</tr>
</tbody>
</table>

[Please refer Section 2.8 of Guidance Notes for filling this part of Guidance Notes]
Please Note:

- Feedback rating of less than 6 by 25% of the trainees of a batch will be considered as the Breach of the Agreement and <PURCHASER> reserves the Right to terminate the agreement
- The bidder will be solely responsible for conducting additional training sessions for the staff members providing the rating less than 6.
2.10.8 Calculating Penalties as Service Credits

2.10.8.1 Service Credits and Amount at Risk

Service Credits are calculated as provided below, but the aggregate amount of such Service Credits paid or credited for any given month will not exceed the following limitations (“Amount at Risk”):

- For Service Level Failures and Service Credits within a Service Category, twelve percent (12%) of Fees for Services (excluding pass-through expenses and other expense reimbursements, if any) within that Service Category during the relevant month.
- For Service Level Failures in all Service Categories, ten percent (10%) of Fees for Services (excluding pass-through expenses and other expense reimbursements, if any) within all Service Categories during the relevant month.

Service Credit amounts in excess of the foregoing limitations do not carry forward into subsequent months or measurement periods. Service Credits will be applied to the invoice in the month immediately following the Service Level Failure(s) or paid in cash for the final month when the Agreement expires or terminates.

2.10.8.2 Reporting of Service Levels and Credits

Service Level performance and (if applicable) Service Credits are measured and reported monthly (or at other mutually agreed intervals) in Service Provider’s regular reports. The monthly reports shall also describe all failures to achieve Service Levels for the month, reasons for any excused failures, results of root cause analyses, and corrective action proposed and taken to prevent recurrence of failures to meet Service Levels.

2.10.8.3 Calculation of Service Credits

Service Credits are calculated as follows: the Amount at Risk for the relevant Service Category times the relevant Severity Weight. Service Credits for Increased Impact Failures shall be two hundred percent (200%) of the amount otherwise payable for less severe Failures.

**Example**

Minimum Service Level Failure

Assume that:
• Service Provider misses the Minimum Service Level Application uptime. Failure is unexcused.
• Monthly Fees for the relevant Service Category total INR 100,000 (in case there is a consolidated monthly fee payable to the vendor, then the entire fee has to be broken up into various elements and divided for each SLA, without exceeding 100%) Amount at Risk for Service Category is 12,000. Severity Weight is 30%.

Credit Calculation:

- Service Credit = Amount at Risk times Severity Weight
- $3,600 = 12,000 \times 0.3$

Increased Impact Failure

Same assumptions as above, except

- Performance below “Increased Impact” level.

Credit Calculation:

- Increased Impact Service Credit = Amount at Risk times Severity Weight times 200%
- $7,200 = \left(12,000 \times 0.3\right) \times 2$

2.10.9 Earn-Backs

Service Credits paid for Service Level Failures related to Minimum Service Levels shall be refunded if Service Provider meets or exceeds the relevant Minimum Service Levels for the six (6) consecutive months (or other reporting periods) following the relevant Service Level Failure. Service Credits for Increased Impact Failures are not refundable in any circumstances.

2.10.10 Unacceptable Service

The following Service Level Failures or combinations of Service Level Failures constitute Unacceptable Service, and grounds for termination of the Agreement, in whole or in part, if Service Provider becomes obligated to pay the following amounts of Service Credits (whether or not such Credits are actually collected):

- One Hundred Percent (100%) of the Amount at Risk for any two Service Categories within any rolling period of twelve (12) months or less; or
- Seventy-five percent (75%) of the Amount at Risk for the Agreement as a whole within any rolling period of twelve (12) months or less
Identification of the foregoing circumstances as Unacceptable Service (and subsequent identification of any other circumstances as Unacceptable Service) are without prejudice to contentions that other or different circumstances, individual Service Level Failures, or combinations of Service Level Failures may also, by themselves or in combination with other facts or circumstances, constitute material breach of the Agreement, and grounds for termination.

2.10.11 Continuous Improvement

Minimum Service Levels and Increased Impact Service Levels will be modified at twelve (12) month intervals for each Service Category promptly following the anniversary of the date related Service Levels were first effective. Upon Government entity/department’s request, (i) Minimum Service Levels may be increased to the average figure for the preceding six (6) months; and Increased Impact Service Levels may be increased to the second lowest measurement within the preceding six (6) months, provided that neither increase shall exceed five percent (5%) of the difference between one hundred percent (100%) and the relevant Minimum or Increased Impact Service Level then in effect.

2.10.12 General Provisions

2.10.12.1 Maximum Service Credits

The maximum amount payable as Service Credits for any single month shall not exceed the Amounts at Risk (but this limitation does not limit Government entity/department’s right to recover damages for material breach, or other remedies, subject to the notice, cure periods, limitations of liability and other applicable provisions of the Agreement).

2.10.12.2 Waivers

Government entity/department may waive any Service Level Failure or Service Credit, but no such waiver shall be binding or effective unless given in writing, and no such waiver shall constitute a continuing waiver of similar or other such Service Level Failures or other breaches of the Agreement. Government entity/department may at any time direct future compliance with any waived requirement.

2.10.12.3 Resource Deployment

Time & Material Project: For T&M projects, the resources should work on client working days. Leave policy of the company (Implementing Agency) will apply (earned leave/sick leave etc.)

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however, the Implementing Agency shall ensure minimal disruption to the project, and where required provide a replacement resource to minimize adverse impact to Project.

To address problems faced with attrition of deployed resources of highly specialized resources, the Purchaser may consider providing for fixed annual increments against the fee payable for resources who continue year on year of the project. Further, adopting a cost plus model of payment would address concerns of profitability of the vendor.

**Deliverable-based Projects**: For deliverable based projects, the leave policy (earned leave, sick leave, etc.) of Implementing Agency will apply. However, the Implementing Agency must ensure that the timelines for submitting deliverables are met.

2.11 Payment Terms and Schedules

Payment terms and schedule help define the mechanism of paying the vendor for the successful delivery of services and products during the project.

For Payment terms and schedule, the Government should practice the following:

- Ensure payment value reflects the actual effort to be put by the System Integrators/Implementation Agencies
- Payments must be linked to only one form of delivery – service/ input (hardware / software / manpower availability) or solution/outcome, not both
- Payment milestones must be clearly defined and (if possible) linked to a deliverable or unambiguous payment schedules (like go-live can be defined as application hosted in production server or any transactions starting)
- RFPs shall not mix hardware/ Cloud (IaaS/PaaS/SaaS) and software items together for making delivery payments as the two are independently sourced and ensure that all suppliers are directly bound to the project deliveries to the extent of their technical deliveries.
- Payment for time & material based services should have just time period (man-months/ hours) as measure for approving payments
- All payments for the delivered services, as mandated in the tender document, should be made to vendor within the stipulated time. Please ensure fund approvals and required stakeholder sign offs on this planned and executed in time

- No penalty on payments, that have not been specified on the contract, should be levied
- Engage in Price discovery for all the discrete services, software and hardware for effective administering of the contract during the project
Changes in government taxes after the bid has been approved, should not be imposed on the vendor by making payment adjustments. The payments due to the vendor (excluding taxes) should remain the same as was factored in during the financial estimation of the project.

Payment Terms for Products (include the third-party products) and Services (including third party services) to be delinked.

- For Products on pro-rata basis: 80% on delivery of product/service, 10% on installation and balance 10% on commissioning/Go live.
- For One-time costs like installation/ implementation: Milestone basis such that cash flow is in line with the efforts incurred.
- For Sustenance/Support: Quarterly basis

Commissioning is defined as Successful Configuration, Successful Customisation and Successful Testing of the respective sub-system/package.

Also it is suggested that the Purchaser should plan for a phased go-live (and consequently payment schedules). This will help to address any apprehension that the approval of the software application at a particular time will close out addressing any gaps/new requirements identified thereafter (within the scope of work)

[Payment milestone should be finalized in such a manner in which the Nodal agency is able to garner enough bidders as well as protect the interest of the Government.]

A sample milestone based payment schedule for software development projects has been provided below:

i) Milestone linked payments can be made as under:

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Description</th>
<th>Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Acceptance of High Level Design (HLD) Document &amp; FRS and SRS for Phase I functionalities</td>
<td>&lt;=% of the Contract Value</td>
</tr>
<tr>
<td>II</td>
<td>Go Live of Phase – I functionalities</td>
<td>&lt;=% of the Contract Value</td>
</tr>
<tr>
<td>III</td>
<td>Go Live of Phase – II functionalities</td>
<td>&lt;=% of the Contract Value</td>
</tr>
<tr>
<td>IV</td>
<td>Project Acceptance</td>
<td>&lt;=% of the Contract Value</td>
</tr>
</tbody>
</table>

ii) The milestone linked payments will be made on the basis of Contract Value as determined under section <> and will not be impacted by any changes in the quarterly pay outs.

iii) The payment of 1st milestone linked payment will be made on acceptance of the following deliverables:

- High Level Design (HLD) Document
- FRS and SRS for Phase I functionalities

iv) The payment for the 2nd milestone linked payment will be made on “Go Live” of Phase – I functionality. The MSP shall be paid on submission of proof for procurement (invoice) for hardware / software / OEM support. Payment shall be least of the following as reduced by payment made at 1st milestone:
a) \(<10\%)\) of the contract value; and

b) Invoice value for the procurement of hardware / software / OEM support;

In case the aggregate payment made at milestone I & II referred above is less than \(<10\%)\) of the contract value, the difference in amount shall be considered in the next milestone linked payment.

v) The payment for the 3rd milestone linked payment will be made on “Go Live” of Phase II functionality. The MSP shall be paid on submission of proof for procurement (invoice) for hardware / software / OEM support till date. Payment shall be least of the following as reduced by payment made at 1st & 2nd milestones:

a) \(<15\%)\) of the contract value; and

b) Invoice value for the procurement of hardware / software / OEM support till date;

In case the aggregate payment made at milestone I, II & III referred above is less than \(<15\%)\) of the contract value, the difference in amount shall be considered in the next milestone linked payment.

vi) The payment for the 4th milestone linked payment will be made on “Project Acceptance”. The MSP shall be paid on submission of proof for procurement; installation of hardware / software / OEM support; and other software development cost till date. Payment shall be least of the following as reduced by payment made at 1st, 2nd & 3rd milestones:

a) \(<20\%)\) of the contract value; and

b) Invoice value for the procurement of hardware / software / OEM support; and development cost (supported by relevant man power deployment and cost sheets) till date;

In case the aggregate payment made at all four milestones referred above is less than \(<20\%)\) of the contract value, no further payment will be made in this regard.

The typical deliverables have been provided along with the Scope of work in the previous section.

2.11.1 Timelines

Timelines are dependent on the Scope of work. The timelines should be decided on the practicality in achieving them. Further the timelines should be mentioned for approval of the deliverables – currently they are not budgeted separately.

Once the timelines for approval are budgeted it would help the Purchaser to plan for subsequent activities more proactively. This will also help the System Integrators / Implementation Agencies to plan for their resources.

2.11.2 Success Fee (optional)
Most of the Government tenders have penalty clauses / liquidated damages as a clause in the agreement. But it has been observed that rarely any project has been completed in time.

The penalty clauses are rarely invoked, as it becomes very difficult to establish that the delay happened only due to the fault of the System Integrators/ Implementation Agencies. Hence it may be a worthwhile to consider rewarding the System Integrator/ Implementation Agency for timely completion of the project. This clause should be used cautiously and at places where the System Integrator’s/Implementation Agency’s role is to mobilize and work with several stakeholders and get the necessary inputs / approvals etc. Further it should also be ensured that there is a monetary benefit for the Government in achieving the project before the planned timelines, before including this clause.

The Purchaser may require to take appropriate approvals before inclusion of this clause in the RFP.

This clause is recommended to be introduced for initial period of 2 years and then basis the improvement in the completion rate, this clause may be revised accordingly. On achieving the eligibility for Success Fee, the SI Vendor would inform the <Purchaser > and on confirmation made by the <Purchaser > in writing, will submit the invoice for the Success fee.

2.11.3 Structuring Liquidated Damages & Penalties

If the Supplier fails to supply, install, commission, and achieve Final Acceptance of the System (or Subsystems pursuant to the Agreement Clause 5.4) within the time for achieving Final Acceptance specified in the Implementation Schedule in the Technical Requirement or the Agreed and Finalized Project Plan, or any extension of the time for achieving Final Acceptance previously granted, the Supplier shall pay to the Purchaser Liquidated Damages at the rate specified as a percentage of the Contract Price, or the relevant part of the Contract Price if a Subsystem has not achieved Final Acceptance. The aggregate amount of such Liquidated Damages shall in no event exceed the amount specified in Agreement (“the Maximum”). Once the Maximum is reached, the Purchaser may consider termination of the Contract, pursuant to Agreement Clause 14.

Liquidated damages shall be assessed [state “only with respect to achieving Final Acceptance;” otherwise, indicate: at other milestones, such as Installation].

Note: Establishing more milestones for Liquidated Damages may provide a somewhat greater degree of control and assurances regarding the pace of the implementation of the System. However, this will come at a price of increased complexity of Contract management and increased perceptions of financial risks on the part of Bidders. This most likely will lead to higher bid prices. In most cases, Final Acceptance should be the most appropriate financial control for ensuring the timeliness of implementation, since it captures the impact of earlier delays and is, in the final analysis, the milestone that truly matters. Whatever milestones are selected, it is critical that the Implementation Schedule in the Technical Requirements...
Section precisely specify what Subsystems or other components are covered and when the milestone is set. These, of course, can be refined and revised through the Agreed and Finalized Project Plan.

2.12 Change Control

Any software application may require changes after development and certification stages. It is understandable that the requirements may undergo change post the finalization of FRS document. However, it is advisable that the software is developed keeping the initial requirement specified in the FRS document and the application is made live. Hence it is very important for the Purchaser to make sure that the requirements are captured comprehensively and accurately in the FRS document.

It should also be appreciated that all software developed undergo revision/ upgrades/ enhancements. A mechanism should be devised in order to release changes/ upgrades of software application in a phased manner in the form of version releases. Ideally, there should be a gap of 6-9 months between subsequent releases. This would save effort and recertification cost for both the parties.

It is recommended that adequate budgetary provisions should be made during the planning phase for the change control. Necessary flexibility should be built in the agreement, so that the NA and the SI do not struggle whenever the need for changes in the application arise.

Any change to extant regulation necessitating a modification of the solution, subsequent to bid submission should form the subject matter of a separate change request.

The Bidder shall comply with all applicable security policy/regulations of the Purchaser. Post execution of contract with the successful bidder, any change in such applicable security policy/regulations/standards, including any additional hardware/software/compliance requirements, shall be to the account of the Purchaser, and should be addressed through the Change Control process.

In case of any change or deviation the difference in payment should be calculated in mutually agreeable way. One of the method for identifying additional payments is Function Point Analysis (FPA), described in section 2.10.6 of this document.

Change Control mechanisms help address issues pertaining to:

- what is considered a change
- Need for a change – business case/justification
- what is the nature/type of change
- what is the possible change impact
• what is the effort estimation to execute the change
• what financial impact does the change carry – if the cost of effort is > 10% of contract value then it’s a change

Below is an approach/ framework, which can be followed to better manage Change Requests

2.12.1 What constitutes a Change Request?

<table>
<thead>
<tr>
<th>Scope</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Any stakeholder of &lt;project&gt; can submit the following types of issues to the change control system:</td>
</tr>
<tr>
<td></td>
<td>• requests for requirements changes (additions, deletions, modifications, deferrals) in Scope of work (including software) currently under development</td>
</tr>
<tr>
<td></td>
<td>• reports of problems in current production or beta test systems</td>
</tr>
<tr>
<td></td>
<td>• requests for enhancements in current production systems</td>
</tr>
<tr>
<td></td>
<td>• requests for new development projects</td>
</tr>
<tr>
<td></td>
<td>This change control process applies to baselined work products created or managed by the members of the &lt;project&gt;, including:</td>
</tr>
<tr>
<td></td>
<td>• software that has been released to production or is in beta test</td>
</tr>
<tr>
<td></td>
<td>• requirements specifications for &lt;project&gt;</td>
</tr>
<tr>
<td></td>
<td>• group procedures and processes</td>
</tr>
<tr>
<td></td>
<td>• user and technical documentation</td>
</tr>
</tbody>
</table>

The following work product classes are exempted from this change control process:

<table>
<thead>
<tr>
<th>Role</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change Control Board</td>
<td>Chairperson of the change control board; has final decision-making authority if the Client/Government department/Purchaser does not reach agreement; deputes a member from the Board to be the Evaluator for each change request and asks additional member to be the Modifier for each approved change request</td>
</tr>
</tbody>
</table>
2.12.3 Common communication process for Change Requests

<table>
<thead>
<tr>
<th>Change Request Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status Changes</td>
<td>A requested change will pass through several possible statuses during its life. These statuses, and the criteria for moving from one status to another, are depicted below.</td>
</tr>
<tr>
<td>Notifications</td>
<td>Any time an issue status is changed, the change control tool will send an e-mail notification automatically to the issue Originator, the issue Modifier, and/or the Client/Government department/ Purchaser, as specified below.</td>
</tr>
</tbody>
</table>

Status to be communicated through weekly communications

1. **Approved**: The Client/Government department/Purchaser decided to implement the request and allocated it to a specific future build or product release. The Client/Government department/Purchaser has assigned a Modifier.
2. **Cancelled**: The Originator or someone else decided to cancel an approved change.
3. **Change Made**: The Modifier has completed implementing the requested change.
4. **Closed**: The change made has been verified (if required), the modified work products have been installed, and the request is now completed.
5. **Evaluated**: The Evaluator has performed an impact analysis of the request.
6. **Rejected**: The CLIENT/GOVERNMENT DEPARTMENT/PURCHASER decided not to implement the requested change.
7. **Submitted**: The Originator has submitted a new issue to the change control system.
8. **Verified**: The Verifier has confirmed that the modifications in affected work products were made correctly.
2.12.4 Procedure to affecting the Change Request

**Entry Criteria**

- Change control board is established for the project.
- Baslined work products exist.
- The Originator has submitted a valid issue or change request with all necessary information to the Client/Government department/Purchaser.
- The change control tool sets the issue’s initial status to Submitted.

<table>
<thead>
<tr>
<th>Tasks</th>
<th>1. The Client/Government department/Purchaser assigns an Evaluator.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2. The Evaluator assesses the issue as to feasibility, whether it really pertains to the indicated project, whether a reported problem can be reproduced, an estimate of the labour hours needed to implement the change, and so on. In case the change involves new/additional software, the method of calculating the effort should be indicated upfront and may use Functional Point Analysis, Test Point Analysis, Use Case Analysis etc.</td>
</tr>
<tr>
<td></td>
<td>4. The CLIENT/GOVERNMENT DEPARTMENT/PURCHASER decides whether the requested change should be made (or the reported problem fixed) at this time, at some point in the future, or not at all. Input should be solicited from others potentially affected by the change before making the decision.</td>
</tr>
<tr>
<td></td>
<td>5. If the change was accepted, the CLIENT/GOVERNMENT DEPARTMENT/PURCHASER assigns a Modifier, sets the status to Approved, enters any explanation in the Response attribute, and schedules the work. The Project Manager negotiates any necessary changes in project commitments with affected stakeholders. Tool sends e-mail to the assigned Modifier and the Originator.</td>
</tr>
<tr>
<td></td>
<td>6. If the change was rejected, the CLIENT/GOVERNMENT DEPARTMENT/PURCHASER sets the status to Rejected and enters an explanation of why in the Response attribute. Tool sends e-mail to the Originator and CLIENT/GOVERNMENT DEPARTMENT/PURCHASER.</td>
</tr>
<tr>
<td></td>
<td>7. The CLIENT/GOVERNMENT DEPARTMENT/PURCHASER and the Originator determine whether formal verification of the change will be required, following the procedure in the Verification section. If so, they select the verification method to be used and the CLIENT/GOVERNMENT DEPARTMENT/PURCHASER assigns a Verifier.</td>
</tr>
<tr>
<td></td>
<td>8. The Modifier makes the necessary changes in the affected work products and notifies any other affected parties if corresponding changes need to be made, such as user documentation, help screens, and tests.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>9.</td>
<td>The Project Manager updates the project plans, task lists, and schedules to reflect the impact of the change on project work remaining to be done. The Project Manager revises any task dependencies as necessary.</td>
</tr>
<tr>
<td>10.</td>
<td>If it becomes apparent during the work that the requested change is not feasible after all, the Modifier notifies the CLIENT/GOVERNMENT DEPARTMENT/PURCHASER, who may then set the status to Cancelled. The Modifier backs out of any modifications made, restoring the work products to their previous baseline. Tool sends e-mail to the Originator, CLIENT/GOVERNMENT DEPARTMENT/PURCHASER, Modifier, and Project Manager.</td>
</tr>
<tr>
<td>11.</td>
<td>When the change is completed, the Modifier sets the status to Change Made, updates the issue in the database with appropriate notes in the Response attribute, and enters the hours of effort that were required to make the change in the Actual Hours attribute. Tool sends e-mail to the Originator and CLIENT/GOVERNMENT DEPARTMENT/PURCHASER.</td>
</tr>
<tr>
<td>Verification</td>
<td>1. The Modifier notifies the Originator and Verifier (if one was assigned) that the change has been made and makes all modified work products available to the people responsible for verification.</td>
</tr>
<tr>
<td></td>
<td>2. The Verifier performs the agreed-upon verification steps.</td>
</tr>
<tr>
<td></td>
<td>3. If verification is successful, the Verifier sets the status to Verified. Tool sends e-mail to the Originator and Modifier.</td>
</tr>
<tr>
<td></td>
<td>4. If verification is not successful, the Verifier sets the status back to Approved and describes the problem in the Response attribute. Tool sends e-mail to the Originator and Modifier. The process resumes with Task #8.</td>
</tr>
<tr>
<td></td>
<td>5. For a problem report issue or an enhancement request issue, the Modifier installs the modified work product as appropriate and updates the product baseline. For requirements changes, the Modifier updates version numbers on all modified work products per the project’s version control procedure, checks them back into the version control system, updates requirements traceability information and requirements status attributes as necessary, and updates the requirements baseline.</td>
</tr>
<tr>
<td></td>
<td>6. The Modifier sets the status to Closed. Tool sends e-mail to the Originator and CLIENT/GOVERNMENT DEPARTMENT/PURCHASER.</td>
</tr>
<tr>
<td>Change Control Status Reporting</td>
<td>The CLIENT/GOVERNMENT DEPARTMENT/PURCHASER generates a report at the end of each month summarizing the status of the contents of the change control database. These reports identify all status changes made in the previous month, list the status of all change requests that currently have a status other than Rejected or Closed, and indicate the level of change activity. The project leadership team reviews these reports to determine whether any corrective actions are necessary.</td>
</tr>
</tbody>
</table>
Exit Criteria

- The status of the request is either Rejected or Closed.
- The modified work products have been correctly installed into the appropriate locations.
- The Originator, CLIENT / GOVERNMENT DEPARTMENT / PURCHASER, Project Manager have been notified of the current status.
- Pertinent requirements traceability information has been updated.

### 2.12.5 Reference Data: Attributes Stored for Each Issue

<table>
<thead>
<tr>
<th>Field</th>
<th>How Set</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual Hours</td>
<td>Modifier</td>
<td>Actual labour hours of effort needed to implement the change.</td>
</tr>
<tr>
<td>Financial Impact</td>
<td>Modifier</td>
<td>Whether the change has any financial impact or the vendor has to carry out the activity, as a part of its scope of work</td>
</tr>
<tr>
<td>Description</td>
<td>Originator</td>
<td>Free-form text description of the change being requested. This cannot be changed after it is entered. If reporting a problem, enter the exact error message text observed here.</td>
</tr>
<tr>
<td>Date Submitted</td>
<td>System</td>
<td>Date this issue was submitted to the tool.</td>
</tr>
<tr>
<td>Date Updated</td>
<td>System</td>
<td>Date this issue was most recently updated.</td>
</tr>
<tr>
<td>Estimated Hours</td>
<td>Modifier</td>
<td>Estimated labour hours of effort needed to implement the change.</td>
</tr>
<tr>
<td>Implementation Priority</td>
<td>CLIENT/GOVERNMENT DEPARTMENT/PURCHASER</td>
<td>Relative importance of making the change: Low (default), Medium, High.</td>
</tr>
<tr>
<td>Issue ID</td>
<td>System</td>
<td>Sequence number assigned to the issue.</td>
</tr>
<tr>
<td>Issue Type</td>
<td>Originator</td>
<td>Type of change request being created: Problem, Enhancement, Requirement Change, New Project.</td>
</tr>
<tr>
<td>Modifier</td>
<td>CLIENT/GOVERNMENT DEPARTMENT/PURCHASER</td>
<td>Person who is assigned responsibility for implementing the change.</td>
</tr>
<tr>
<td>Originator</td>
<td>Originator</td>
<td>Originator’s name.</td>
</tr>
<tr>
<td>Originator E-Mail</td>
<td>Originator</td>
<td>Originator’s e-mail address.</td>
</tr>
<tr>
<td>Originator Phone</td>
<td>Originator</td>
<td>Originator’s phone number.</td>
</tr>
<tr>
<td>Field</td>
<td>How Set</td>
<td>Contents</td>
</tr>
<tr>
<td>-----------------------</td>
<td>------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Originator</td>
<td>Originator</td>
<td>Originator’s relative importance of the change: Low, Medium, High.</td>
</tr>
<tr>
<td>Priority</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planned Release</td>
<td>CLIENT/GOVERNMENT DEPARTMENT/PURCH</td>
<td>Product release number for which this approved change is scheduled, determined by CLIENT/GOVERNMENT DEPARTMENT/PURCHASER.</td>
</tr>
<tr>
<td>Field</td>
<td>How Set</td>
<td>Contents</td>
</tr>
<tr>
<td>ASER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product</td>
<td>Originator</td>
<td>Name of the product or project in which a change is being requested or a problem reported.</td>
</tr>
<tr>
<td>Problem Severity</td>
<td>Originator</td>
<td>For a problem report, set severity of the change (see Table 1). Use N/A if this issue is not a problem report.</td>
</tr>
<tr>
<td>Response</td>
<td>CLIENT/GOVERNMENT DEPARTMENT/PURCH ASER, Modifier</td>
<td>Free-form text of responses made to the change request. Multiple responses can be made over time. Do not change existing responses.</td>
</tr>
<tr>
<td>Status</td>
<td>Originator, Modifier</td>
<td>Update current status of the change request as it moves through the states described in the Change Request Status section. Date of status changes and name of user making the update are shown automatically.</td>
</tr>
<tr>
<td>Title</td>
<td>Originator</td>
<td>One-line description of the issue.</td>
</tr>
<tr>
<td>Verifier</td>
<td>CLIENT/GOVERNMENT DEPARTMENT/PURCH ASER</td>
<td>Name of individual who is responsible for verifying that changes were made correctly.</td>
</tr>
</tbody>
</table>

Table 1: Problem Severity Descriptions

<table>
<thead>
<tr>
<th>Severity</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor</td>
<td>Cosmetic problem, usability improvement, unclear error messages; customer can live with the problem (default)</td>
</tr>
<tr>
<td>Major</td>
<td>Problem adversely affects product functioning, but a workaround is available; customer will be annoyed; serious usability impairment; problem blocks some testing</td>
</tr>
<tr>
<td>Critical</td>
<td>Product does not function at all or crashes; the wrong results are generated; further testing of the application is not possible</td>
</tr>
<tr>
<td>Emergency</td>
<td>Anything that requires a change to be made immediately, bypassing the change control process temporarily</td>
</tr>
</tbody>
</table>
2.12.6 How to calculate additional payments in case of Change Request

FPA technique can be used as one of the techniques to calculate additional payments in case of Change Requests.

Introduction to Function Point Analysis:

Function Point Analysis (FPA) is a sizing measure of clear business significance. The FPA technique quantifies the functions contained within software in terms that are meaningful to the software users. The measure relates directly to the business requirements that the software is intended to address. It can therefore be readily applied across a wide range of development environments and throughout the life of a development project, from early requirements definition to full operational use.

In summary, the function point technique provides an objective, comparative measure that assists in the evaluation, planning, management and control of software production. Function Point Counts can be of following types on the basis of kind of project they are applied to:

- **Development Project Function Point Count**
  Function Points can be counted at all phases of a development project from requirements up to and including implementation. This type of count is associated with new development work. Scope creep can be tracked and monitored by understanding the functional size at all phase of a project. Frequently, this type of count is called a baseline function point count.

- **Enhancement Project Function Point Count**
  It is common to enhance software after it has been placed into production. This type of function point count tries to size enhancement projects. All production applications evolve over time. Tracking enhancement size and associated costs can build a historical database for your organization. Additionally, it is important to understand how a Development project has changed over time.

- **Application Function Point Count**
  Application counts are done on existing production applications. This “baseline count” can be used with overall application metrics like total maintenance hours. This metric can be used to track maintenance hours per function point. This is an example of a normalized metric. It is not enough to examine only maintenance, but one must examine the ratio of maintenance hours to size of the application to get a true picture.

The Enhancement Project Function Point Count can be used to calculate difference in payment in case of any change or deviation to project requirements. Function points for
change can be calculated and these function points can be used to identify the effort/cost of enhancement/change.

**Calculation of Productivity using Function Points:**
The definition of productivity is the output-input ratio within a time period with due consideration for quality.

\[
\text{Productivity} = \frac{\text{outputs}}{\text{inputs}} \text{ (within a time period, quality considered)}
\]

The formula indicates that productivity can be improved by:
1) by increasing outputs with the same inputs,
2) by decreasing inputs but maintaining the same outputs, or
3) by increasing outputs and decreasing inputs change the ratio favourably.

\[\text{Software Productivity} = \frac{\text{Function Points}}{\text{Inputs}}\]

**Effectiveness vs. Efficiency:**
Productivity implies effectiveness and efficiency in individual and organizational performance. Effectiveness is the achievement of objectives. Efficiency is the achievement of the ends with least amount of resources.

Software productivity is defined as hours/function points or function points/hours. This is the average cost to develop software or the unit cost of software. One thing to keep in mind is the unit cost of software is not fixed with size. Industry data shows that the unit cost of software goes up with size. Average cost is the total cost of producing a particular quantity of output divided by that quantity. In this case to \(\text{Total Cost}/\text{Function Points}\). Marginal cost is the change in total cost attributable to a one-unit change in output.

There are a variety of reasons why marginal costs for software increase as size increases. The following is a list of some of the reasons
- As size becomes larger complexity increases.
- As size becomes larger a greater number of tasks need to be completed.
- As size becomes larger there is a greater number of staff members and they become more difficult to manage.

**Function Points** are the output of the software development process. Function points are the unit of software. It is very important to understand that **Function Points remain constant regardless who develops the software or what language the software is developed in.** Unit costs need to be examined very closely. To calculate average unit cost all items (units) are combined and divided by the total cost. On the other hand, to accurately estimate the cost of an application each component cost needs to be estimated.
- Determine type of function point count
- Determine the application boundary
- Identify and rate transactional function types to determine their contribution to the unadjusted function point count.
- Identify and rate data function types to determine their contribution to the unadjusted function point count.
- Determine the value adjustment factor (VAF) Calculate the adjusted function point count.

To complete a function point count knowledge of function point rules and application documentation is needed. Access to an application expert can improve the quality of the count. Once the application boundary has been established, FPA can be broken into three major parts
  1. FPA for transactional function types
  2. FPA for data function types
  3. FPA for GSCs (General System Characteristics)

Rating of transactions is dependent on both information contained in the transactions and the number of files referenced, it is recommended that transactions are counted first. At the same time a tally should be kept of all FTR’s (file types referenced) that the transactions reference. Every FTR must have at least one or more transactions. Each transaction must be an elementary process. An elementary process is the smallest unit of activity that is meaningful to the end user in the business. It must be self-contained and leave the business in consistent state.

**Steps for Function Point Measurement**

FP (Function Points) is a functional measurement method that is suitable for quantifying a software application from the user point of view.

The basic steps involved in function point counting include:

I. Determine type of count (can be a new development project, an application/ base count or an enhancement project count).

II. Identify the application scope and boundary (i.e., what transactions and logical files are included in the measurement?)

III. Count the data function types:
   a) Internal Logical Files or ILFs, which are logical data groups maintained within the application boundary, and
   b) External Interface Files or EIFs, which are used only for reference by the application.

IV. Count the transactional function types:
   a) External Inputs or EIs, which are data entry processes,
   b) External Outputs or EOs, for example, reports, and
   c) External Queries or EQs, for example, browse order details.

   Several simple matrices based on data element types - DET (user recognizable, non-recursive data fields), together with record element types - RET (subsets of user recognizable data) or file types referenced – FTR (number of logical data groupings required to complete a process) are used to determine the complexity of each function as Low, Average or High. V. Determine the value adjustment factor (VAF) based on an equation:
a. \( VAF = 0.65 + (\text{Sum of General System Characteristics} \times 0.01) \)

b. The 14 General Systems Characteristics being evaluated on a scale of 1 to 5.

VI. Group the resulting numbers (Unadjusted FP) into Added, Changed, or Deleted functions sets, and combine them with the Value Adjustment Factor (VAF) to obtain the final number of FP. A distinct final formula is used for each count type: Development Project, Enhancement Project or Application:

- \( DFP = (UFP + CFP) \times VAF \)
- \( EFP = [(ADD + CHGA + CFP) \times VAFA] + (DEL \times VAFB) \)
- \( AFP = ADD \times VAF \)
- \( AFP = [(UFPB + ADD + CHGA) - (CHGB + DEL)] \times VAFA \)

Example

As an example of how this works. This involves two small phases of development on one project. On this project, the developers, project managers, users, technology, and application all remained constant. A relatively formal process was followed, beginning with a requirements phase, which led into development, testing, and final delivery of a portion of an application.

First measurement

Consider a project that was already developing. The project was small, but it was a distributed Java Swing application with an embedded database that runs on Windows, Mac, and Linux platforms, so even though the application itself was small, the degree of complexity was very high.

The first thing to do was finish the requirements documentation and initial prototypes for the application. Once this information was available, including a simple, logical view of the database requirements, the function points could be counted for this project. Let’s say, a fairly detailed requirements document was created with a count of 400 FPs.

Skipping a few details here, let’s assume that the next thing to do was development of this project. When development was "complete", the number of FPs actually delivered to the users were counted. This was 440 FPs, or a growth from the requirements stage of 11%.

At this point, the development time information was also available. Two developers worked on this project for a total of 540 man-hours. This comes out to be 0.815 FPs/hour (440 FPs divided by 540 man hours). Had the customer kept a good record of time that users spent testing the application they also could have determined a metric of "Number of testing hours per FP".
Although 540 hours were spent on this project, the real "calendar time" for delivery of the application was 10 weeks. This was because of several periods of down time during the development process. Therefore this project was delivered at the rate of 44 FPs per calendar week.

Depending on cost information is tracked, "Cost per FP" can also be determined.

Second measurement

Because this is an ongoing project, the same steps were repeated on the next phase of project. For summary purposes, here are the steps to be followed:

1. Develop the requirements, including an understanding of the necessary data stores and screens to be developed.
2. Count the FPs.
3. Supplied an estimate of the project cost, assuming another 11% gain in functionality (scope creep) during development.
4. Develop the code.
5. Track the amount of time people spend on the project during development and testing.
6. Count the FPs again.
7. Deliver useful project metrics, including:
   i. Number of developer hours
   ii. Number of testing hours
   iii. Average number of hours per FP
   iv. Elapsed calendar time, which yields something like "Number of calendar days per FP" or the converse of "Number of FPs per calendar day". This occurs when there is down time in a project, or when development resources are not fully dedicated to the project at hand
   v. Development cost per FP
   vi. Testing cost per FP
   vii. Overall cost per FP (including other time for management, documentation, etc.)
   viii. The ratio of Requirements time to Development time, and other similar ratios

Note that Step 3 in this example is "estimate of the project cost". Because we have the same developers, users, and managers working on a different part of the same project, it is assumed that the project velocity for new phase will be the same as earlier phases.

Now, if any of these factors changes, same information can be used for estimates, but the estimates may somewhat vary.
Another factor the Purchaser will be able to measure is the impact of new technology and tools on development costs. It is possible that even if the size (amount) of functionality delivered to the customer is equivalent, the technology used to deliver the applications is different, thus the web applications are much less expensive.

In long term contracts where for example desktop operators etc. or semiskilled manpower is to be provided who are governed by the minimum wages act which is state dependent any escalations beyond 10-15% in the basic cost arising out of such decisions to increase the minimum wages should be reimbursed additionally by the purchaser to the bidder as this cost was unknown to the bidder at the time of bid.

The cost of consumables such as stationery, Diesel, power etc. will be paid by the purchaser vide reimbursements. As there is no way the bidder can estimate the quantity and also there is wide variation of Power, diesel costs over a 5-7 year time period, the same will be paid on actual basis. The reimbursements must be positively paid by the purchaser within 30 working days from the date of issuance of reimbursement request, in case the SI is not reimbursed within the 30 working day time period a delay charge of 0.5% per week will be paid by the purchaser in addition to the reimbursement.

2.13 Deemed Acceptance

Purchaser’s acceptance to the deliverables or SLA and performance reports is extremely important. The Purchaser /Government Department is required to approve and sign off all above mentioned project outputs from the Systems Implementation Agency/ Partner so that other timelines and deliverables/ project outcomes are not adversely affected/ delayed.

It is within the frame of things that the Purchaser / Government Department should approve sign offs within <15 working days> from the submission of those deliverables or SLA and performance reports. The Purchaser should ensure that it provides the following to the vendor:

• Stakeholders/ Approvers involved in deliverable, project output
• Deliverable details and its impact/ strategic outcome
• Deliverable Timeline calendar with alerts to all Stakeholders/ Approver
• Sign off timeline calendar with alerts to all Stakeholders/ Approvers

In case the Purchaser / Government Department fails to respond and provide feedback on above stated submission, the deliverables or SLA and performance reports will be DEEMED ACCEPTED.

The Purchaser / Government Department shall not force the bidder, post the elapse of the <15 days> approval period, to rework on the said project outputs/ outcomes. Such revisions
may be limited to 3 (three) duly completed before the Sign-off of the UAT. Duration of each of these 3 (three) revisions will be capped to 15 days per revision.

Any subsequent rework post acceptance/deemed acceptance would form the subject of a formal “Change Control/Change Request”, which has been detailed in Section 2.12 of this document.

2.14 Dispute Resolution / Arbitration process

The objective of any contract’s dispute resolution mechanism is generally to achieve a workable business solution between the contracting Parties, before resorting to formal procedures, such as arbitration or litigation. The Purchaser and Bidders should attempt to resolve issues prior to getting caught in legal issues.

There are various steps of informal dispute avoidance and resolution procedures. These may be considered for including in the contract agreement.

2.14.1 STEP 1: Internal Escalation

The Parties should attempt to resolve disputes between themselves. If an issue cannot be settled under a more formal structure for the Parties to attempt to resolve their differences.

The major difference between this provision and the Project Management Procedure is that the Project Management Group is in place and holding periodic progress meetings as a forum in the project for avoiding disputes throughout the Contract Period, whereas the people involved in the internal escalation procedure may be brought in to the project to decide a pre-existing issue between the Parties ("Dispute").

The internal escalation procedure works by escalating the Dispute through various levels within the Purchaser, and corresponding levels within the Vendor’s organization, starting with the Parties’ Representatives, then the project team leader and the Vendor’s counterpart, then a member of the Purchaser’s Executive Board (or equivalent) and a director of the Vendor. The intention behind this internal escalation Clause is that if the Dispute cannot be resolved at a lower level, a more senior person will be able to take a strategic view.

The success of such internal escalation can work only when both the parties are represented by people who can take decisions including those of Financial in nature. This may be a challenge for a Purchaser to take financial decision in such a meeting, hence such meetings should involve pre-work, from both the parties which should involve the following:

1. Understanding the key reason for the dispute and the responsibility. The potential reasons should be attributable to the Vendor OR Purchaser OR both depending on
the understanding of the information provided in the RFP document, Proposal and subsequent instruction/ decision.

2. The commitments made by the Purchaser either in the RFP document or in project meetings earlier

3. The commitments and assumptions made by the vendor in their proposal

4. Establishing the deviations made by either of the parties from
   a. the written commitments made by the Vendor or the Purchaser in meetings or letters
   b. the assumptions in the Approach & methodology, Solution, Work Plan of the Vendor & Purchaser
   c. Comparing with other similar projects (if relevant)
   d. any previous communication made by either of the party on the identified deviations and the reasons thereof
   e. any unforeseen

5. Based on the above, the potential resolution should be classified as either Financial OR Non-Financial

6. In case the potential resolution involves financial consideration, the financial impact of such a deviation for either of the party should be computed on the basis of Commercial Proposal or industry standards.

Based on the above, both parties should attempt as a resolution.

If internal escalation does not resolve the Dispute, the Parties can either agree to mediation (see below) or proceed directly to Adjudication/Expert Determination or Arbitration.

The Parties must arbitrate the Dispute if it relates to Changes and Change in Law, Security, Compensation on Termination, unless they agree to resolve the Dispute using Adjudication/Expert Determination.

Arbitration is not used for other types of Dispute as it is generally a more complex, costly and lengthy process than Adjudication/Expert Determination and its additional features are not needed for these other types of Dispute which will be decided by Adjudication/Expert Determination if they are not resolved by internal escalation or mediation.

2.14.2 STEP 2: Mediation

If the Parties cannot reach agreement using the internal escalation provisions within 20 Business Days of any internal escalation meeting, the next step may be for the dispute to be referred to mediation. Mediation is, however, not a binding step in the Dispute Resolution Procedure and can only be undertaken on a consensual basis.
Mediation is a process whereby an independent mediator seeks to facilitate a settlement, but he will not make a decision. Instead, the mediator hears the Parties' arguments and tries to make sure they consider their commercial interests and deal with what is necessary to achieve a settlement. As mediation is (in effect) a form of subtle diplomacy, the co-operation of the Parties to the process is necessary – a mediator cannot compel either Vendor or the Purchaser to do anything they do not wish to do.

If mediation fails, or the Parties do not agree to mediate, the next step to resolve the Dispute is either Adjudication/Expert Determination or Arbitration, depending on the nature of the Dispute.

2.14.3 STEP 3: Adjudication/Expert Determination

Adjudication/Expert Determination is similar to arbitration in that a single person decides the Dispute, but the procedures are less complex than for arbitration and the costs of deciding the Dispute are therefore likely to be lower.

Adjudication/Expert Determination is contractual adjudication, which differs from the statutory adjudication imposed on the Contractor by the Housing Expert determination is a procedure in which a dispute or a difference between the parties is submitted, by agreement of the parties, to one [or more] experts who make a determination on the matter referred to it [them]. The determination is binding, unless the parties agreed otherwise.

Notable features of expert determination are:

i. **Expert determination is consensual:** Expert determination can only take place if both parties have agreed to it. In the case of future disputes/differences arising under a contract, the parties insert an expert determination clause in the relevant contract. An existing dispute/difference can be referred to expert determination by means of a submission agreement between the parties. In contrast to mediation, a party cannot unilaterally withdraw from expert determination.

ii. **The parties choose the expert(s) with relevant expertise:** The parties can select an expert together. If the parties have not agreed on the person of the expert or on a different procedure for appointing the expert, the expert will be appointed by the Centre after consultation with the parties. The Centre has access to experts with specialized knowledge relevant to intellectual property issues in a broad range of technical and business areas. This allows the Centre to propose and appoint the appropriate experts for the matter referred to.
iii. **Expert determination is neutral and flexible:** In addition to their selection of an expert with appropriate qualifications, the parties are able to choose such important elements as the language of the expert determination or the place of any meeting.

iv. **Expert determination is a confidential procedure:** Subject to specifically defined exceptions, the confidentiality of the existence of the expert determination, any disclosures made during that procedure, and the resulting determination.

v. **The determination of an expert is binding, unless the parties agree otherwise:** In principle, the determination of an expert is binding and as such it has contractual effect between the parties. Alternatively, by party agreement, the determination may have effect as a recommendation to the parties.

vi. **Expert determination is a flexible procedure:** Expert determination can operate on a more informal and expeditious manner than broader processes such as arbitration. Expert determination may be used on a stand-alone basis or in connection with an arbitration, mediation or court case.

2.14.4 STEP 4: Arbitration

Dispute Resolution Mechanism

The Bidder and the Purchaser shall endeavour their best to amicably settle all disputes arising out of or in connection with the Contract in the following manner:

a. In case a Party is of the opinion that a dispute has arisen under this agreement, the Party shall notify the other Party of the detailed nature of the dispute, the right or obligation under this Agreement to which the dispute relates, and the relief sought by the Party raising the dispute

b. The Party raising a dispute shall address to the other Party a notice requesting an amicable settlement of the dispute within seven (7) days of receipt of the notice.

c. The matter will be referred for negotiation between <Nodal Officer> of Purchaser/Purchaser and the Authorized Official of the Bidder. The matter shall then be resolved between them and the agreed course of action documented within a further period of 15 days.

d. The Parties shall in the first instance attempt to resolve the dispute in good faith. In case, the Parties are unable to resolve the dispute, the matter shall be referred to the Empowered Committee set up by the Department.

**Empowered Committee for Dispute Resolution:** There shall be an Empowered Committee notified by the Government of Maharashtra, with representatives from...
Service Provider and other State Government Departments as desired by the department procuring the services as per this agreement for dispute resolution purpose.

c. The Empowered Committee shall attempt to resolve the dispute in a meeting specially convened for the purpose. The representatives of all Parties shall be invited to participate in such meetings.

f. The negotiations between the Parties and the proceedings before the Empowered Committee shall be kept confidential unless Parties agree otherwise.

g. Each Party shall bear its own cost in relation to the dispute resolution as aforesaid.

h. In case, the Empowered Committee is Unable to resolve the dispute, the dispute shall be referred to arbitration in accordance with the provisions of the Arbitration and Conciliation Act, 1996. The Arbitration proceedings will be held at Mumbai, India. The arbitration shall be conducted in English and all documents shall, if not already in English, shall be translated into English by the Party relying upon the document.

i. The Principal Secretary, IT, GoM or an Officer of an equivalent rank nominated by the GoM shall be the sole Arbitrator for the purpose of the arbitration proceedings.

j. The provisions of the Arbitration and Conciliation Act, 1996 will be applicable and the award made there under shall be final and binding upon the parties hereto, subject to legal remedies available under the law.

k. The Parties agree that any decision or award of the arbitrator pursuant to this clause shall be a domestic award and final, conclusive and binding upon the parties and any person(s) affected by it. The Parties also agree that any court of competent jurisdiction may enforce any arbitration award rendered pursuant to this clause.

l. During any period of dispute resolution as hereinbefore provided, there shall be no suspension of this agreement.

2.15 Termination

The intention of the parties to the Contract should be that it will run its full course and terminate on the Expiry Date of the contract, but the Contract must deal comprehensively with the consequences of early termination. The Contract should specify precisely what compensation is payable if it is terminated early. The amount of compensation payable will depend on the reason for termination. Early termination can be caused by Purchaser Default or Vendor Default.

2.15.1 Termination for Cause (Optional)
The general rule is that neither party to a contract may avoid performance of its duties to the other unless the other party first materially breaches the contract. For example, a vendor may not refuse to perform its work under a contract unless the Purchaser does something that would constitute a material breach, such as failing to make payments in accordance with the agreed upon payment terms. Similarly, in the absence of a material breach by a vendor, a Purchaser cannot simply terminate and pay the vendor only for the work performed up to the date of cancellation.

The Termination for Cause contract clause is a provision that entitles usually one party to a contract to terminate it at any time without any liability for damages the other party might suffer as a result of the termination. This clause significantly increases the risk perception of bidders and accordingly must be sparingly used.

2.16 Escrow Agreement (Optional)

Escrow is typically requested by a Purchaser, to ensure maintenance of the software. The software source code is released to the Purchaser if the System Integrator files for bankruptcy or otherwise fails to maintain and update the software as per the agreement signed.

This is an optional mechanism. Source code is the sequence of logical statements and operations written in a human-readable computer programming language that controls the processing of data and the functionality of software. The source code itself can be hundreds of thousands of lines of code and is normally designed and written by software programmers in programming languages. When completed, the source code is compiled into "executable code" that can be downloaded, installed and run on a computer. However, with only the executable code, customers have no ability to see how the software is processing data or performing functions and, for the most part, have no ability to change the operation of the software.

Because repairing problems or changing functionality is only possible with the source code, the escrow of source code is common in large software transactions involving custom developed or operationally critical applications. In a source code escrow arrangement, the source code and documentation are held in escrow by a trusted third party, the escrow agent. The source code and related documentation are to be released upon the occurrence of a "release event" such as the software developer filing bankruptcy or failing certain obligations under the license.

Following a release event, the promise of a source code escrow is that the customer can obtain the code to maintain the software without the original developer. This maintenance involves fixing bugs, ensuring compatibility with other system upgrades and adding the functionality required in the customer's changing business.

Software maintenance is essential to enterprise applications. Because the customer has no assurance that the software developer will always be around to perform software
maintenance, and since such maintenance cannot be performed without the source code, escrow is considered a necessary part of certain software deals.

The service provided by the escrow agent – generally a business dedicated to that purpose and independent from either party – consists principally in taking custody of the source code from the licensor and releasing it to the licensee only if the conditions specified in the escrow agreement are met.

Inclusion of a provision for escrow adds to the procurement cost, as the escrow agent is paid an annual fee for maintenance of the Escrow. An Escrow clause must be retained in the Agreement when the continued operation and maintenance of custom software is critical and there is an apprehension of the licensor becoming unable to do so, for reasons such as bankruptcy. The licensor, however, will often be unwilling to agree to this, as the source code will generally represent one of their most closely guarded trade secrets.

2.17 Resale of Network Bandwidth

When Purchaser wants to delegate procurement of network to the System Integrator, then a Tripartite Agreement can be signed between Purchaser, System Integrator and ISP. This would ensure adherence to TRAI guidelines on ‘Resale of Bandwidth’. A template for Tripartite Agreement has been provided in model RFP for System Integrators.

2.18 Intellectual Property Rights

There may be multiple approaches to ensure fair usage of Intellectual Property Rights, as mentioned below:

a) Products and fixes: All products and related solutions and fixes, shall be licensed according to the terms of the license agreement packaged with or otherwise applicable to such product, the ownership of which shall remain with the product owner. Implementation Agency should be responsible for arranging any licenses associated with products. “Product” means any computer code, web-based services, or materials comprising commercially released, pre-release or beta products (whether licensed for a fee or no charge) and any derivatives of the foregoing which are made available to Purchaser for license which is published by product owner or its affiliates, or a third party. “Fixes” means product fixes that are either released generally (such as commercial product service packs) or that are provided to you when performing services (such as workarounds, patches, bug fixes, beta fixes and beta builds) and any derivatives of the foregoing.
b) **Bespoke Development:** The Intellectual Property Rights (IPR) rights for any bespoke development done during the implementation of the project must lie with the Purchaser. The “Policy on Collaborative Application Development by Opening the Source Code of Government Applications”, notified by Ministry of Electronic and Information Technology, Government of India, in the Gazette of India on 6th May 2015, must be adhered.
3 Appendix

3.1 Hardware Specifications

The Hardware Specifications can be given in the following manner:

1. Entry Level Enterprise Desktop
Minimum level unit for Administrative areas which will be using the computer to access several applications at a time, including word processing, spreadsheets, e-mail, WWW browsing, and Web based applications.
- Appropriate memory and processing speed for selected operating system
- Adequate hard disk space for various MS Office applications and file storage
- Video card capable of web conferencing, streaming media, and e-learning applications
- Small form factor desktop case
- USB optical mouse and keyboard
- DVD-RW/CD-RW (Double Layer) Drive
- Media card reader
- selected sizes of Flat panel Display
- Operating system

2. Mid-Level Desktop
Moderate level system in which several applications will be accessed/open at one time, including word processing, spreadsheets, e-mail, WWW browsing, local Web based applications, web conferencing, data manipulation, simulations or in a multiple use Academic Lab environment.
- Appropriate memory and processing speed for selected operating system and MS Office Enterprise
- Adequate hard disk space for numerous academic software applications
- Video card (if required) capable of web conferencing, streaming media, internet-based virtual worlds, and e-learning applications
- Small form factor desktop case
- USB optical mouse and keyboard
- DVD-RW/CD-RW (Double Layer) Drive
- Media card reader
- selected sizes of Flat panel Display

Bringing in more specificity
Specifications should be vendor neutral and should emphasize on the required performance on industry standard benchmarks. For example:

The Desk Top should have latest generation quad core or more core 64-bit processor. The processor should be fully binary compatible to 32-bit applications. A quad core or more core on a single die/socket will be treated as a single processor. The desktop should have at least 4GB RAM.

Power Consumption: System should be Energy Star compliant. Vendor should quote the ideal, and benchmark running condition power consumption.

Chipset: Latest Generation compatible chipset.
3. **High-Level Desktop**

For the power user utilizing applications requiring intensive computational power including Autodesk applications, statistical analysis, game development, and multimedia production

- Autodesk Certified Hardware
- Appropriate memory and processing speed for selected operating system, Autodesk applications, and video editing software
- Adequate hard disk space for numerous academic software applications
- Video card capable of web conferencing, streaming media, internet-based virtual worlds, and Autodesk applications
- Tower case
- USB optical mouse and keyboard
- DVD-RW/CD-RW (Double Layer) Drive
- Media card reader
- Selected sizes of Flat Panel Display
- Operating system
4. Consumer Desktop
Consumer model desktop computer suitable for student and employee purchase programs, areas where manageability is not required, or where reducing cost is critical. This model is exempt from the 10 month lifecycle requirement, 24x7 support accessibility, and extended warranty requirements.

Bringing in more specificity

Blade Servers
Processor: The server should have two numbers of quad or more core 64-bit processor. The processor should be fully binary compatible to 32-bit applications.
Chipset: Latest Generation compatible chipset
Memory: RAM should be at least 4 GB DDRIII 1600 MHz or higher SDRAM Memory with ECC expandable up to <xx> GB.
Power Consumption: Vendor must quote the max power consumption for the server.

Database Servers
Processor: Minimum x no of latest generation 64-bit multicore processors. The server should be capable to achieve a performance of estimated tpmc/OLTPM of X.XX M (million). The estimated tpmc/OLTPM should be certified by the OEM Vendor through linear correlation to public benchmark. The performance should be either on Oracle/DB2/SQL.

Scalability: Server should be expandable to “y” no of processors.
Chipset: Latest Generation compatible chipset
Memory: xx GB DDRIII xxxx MHz or higher SDRAM Memory with ECC expandable up to xx GB.

5. Lightweight/Portable Notebook
A lightweight wireless notebook to be used for conferences, field studies, telecommuting or for multimedia classroom presentations.

- Appropriate memory and processing speed for selected operating system and general consumer applications
- Adequate hard disk space for various applications and file storage
- Integrated video capable of supporting consumer applications
- USB optical mouse and keyboard
- DVD-RW/CD-RW (Double Layer) Drive
- Selected cases
- selected sizes of Flat panel Display
- Operating system

- Appropriate memory and processing speed for selected operating system and MS Office Enterprise
- Adequate hard disk space for various Office applications and file storage
- Video card capable of web conferencing, streaming media, and e-learning applications
– Touchpad
– DVD-RW/CD-RW (Double Layer) Drive
– Media card reader
– Range of Active Matrix Display sizes
– Trusted Platform Module
– 8-Cell Lithium Ion battery w/ 1 Yr. limited battery warranty
– Integrated Ethernet Adapter - Integrated 802.11a/b/g wireless networking

6. **Ultra-lightweight portable:**
   – Appropriate memory and processing speed for selected operating system and MS Office Enterprise
   – Under three pounds with battery
   – Range of display sizes
   – Integrated Ethernet 802.11a/b/g wireless
   – Adequate hard disk space for MS Office applications and file storage
   – Multi-media care reader
7. Convertible/Tablet
A convertible tablet notebook for instructors wanting the option to take handwritten notes directly to the screen without losing the functionality of the conventional notebook
- Appropriate memory and processing speed for selected operating system and MS Office Enterprise
- Adequate hard disk space for various MS Office applications and file storage Video card capable of web conferencing, streaming media, internet-based virtual worlds, and e-learning applications
- Touchpad
- DVD-RW/CD-RW (Double Layer) Drive
- Media card reader
- Range of Active Matrix Display sizes
- Trusted Platform Module
- 8-Cell Lithium Ion battery w/ 1 Yr. limited battery warranty
- Additional Executive Stylus Pen
- Integrated Ethernet Adapter
- Integrated 802.11a/b/g wireless networking

8. Desktop Replacement
Notebook computer to be used as primary computer in place of a mid- to high- level desktop/tower unit, Convertible tablet optional
- Appropriate memory and processing speed for proposed operating system and MS Office Enterprise
- Adequate hard disk space for various MS Office applications and file storage
- Video card capable of web conferencing, second monitor support, streaming media, internet based virtual worlds, and Autodesk applications
- Touchpad
- DVD-RW/CD-RW (Double Layer) Drive
- Media card reader
- range of Active Matrix Display sizes
- Trusted Platform Module
- 8-Cell Lithium Ion battery w/ 1 Yr. limited battery warranty
- Additional Executive Stylus Pen

Contd.

Licensing Requirement: Here either you can mention the number of licenses or you can ask OEM to quote the number of license required for your DB application.

Server RAS Features:
Hot Swappable components: disks, power supplies and fans. Server should be able to Recover from Single/double DRAM Device Failure. Max up-time in percentage should be quoted by the OEM.
- Integrated Ethernet Adapter
- Integrated 802.11a/b/g wireless networking

9. **Thin client category hardware of various levels**
- 533 Mhz to 1.2 Ghz or greater processor up to 1 Gb on board memory
- USB Connectivity for peripherals
- Optical keyboard and mouse
- Video splitter (optional)

10. **Enterprise Class Servers**
Rack mount and tower servers used for a wide variety of applications from small applications to high end database servers
- Single to multiple socket systems
- SAS Drive Capabilities
- High Capacity Internal Storage Capabilities
- High End RAID Card Support
- Redundant Power Supplies
- Windows and VMware Certifications
- Optional Extended Warranties with Onsite Support

11. **Enterprise Class Storage Products**
Storage products ranging from directly attached storage to enterprise class storage area networks for a variety of applications.
- Directly attached storage products
- Mid-range SANs
- Enterprise SANs
- Network Attached Storage
- Fiber channel products
- SATA and SAS technology
- Mirroring and Disaster Recovery Capabilities
- Optional Extended Warranties with Onsite Support

Equipment proposed in this category must support the current version of one or more of the following operating systems: Windows desktop, Windows Server, Apple OS, or a Unix/Linux variant.

Equipment proposed in this category must be Energy Star compliant. EPEAT (Electronic Product Environmental Assessment Tool) status should also be readily available.
Insofar as other products operate directly with the equipment proposed, vendors may also respond by offering printers, monitors batteries, cases, docking stations, disk arrays, and other closely related computing equipment.

Although there are cases where other equipment (such as cameras or televisions) may be connected to the proposed computer hardware (typically by a USB connection), we are not generally interested in this sort of device, except where it may supplement an order for more basic computer hardware. This said, recognizing that institutions in the <PURCHASER> region have broad needs we encourage Respondents to include broad product offerings.

Similarly, there may be interest among several of <PURCHASER> members to purchase certain services to augment their hardware purchases. Services would include imaging; staggered delivery; asset tagging; asset recovery among others.

3.2 Initial Training after Implementation of the New Application System

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Training</th>
<th>Purpose</th>
<th>Participants</th>
<th>Minimum Duration</th>
<th>To be Completed by</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sensitization Training</td>
<td>Sensitization towards: e-governance, The initiative underway, Roadmap for the project, The impact and benefits envisaged etc.</td>
<td>All Departmental Employees from Record Keeper and above Maximum strength per batch: 25 Training to be provided at least at the Head Office and in each District Office</td>
<td>At least 1 day per batch</td>
<td>Within 1 month from Date of Signing of Contract with the Selected Bidder (SV)</td>
</tr>
<tr>
<td>2</td>
<td>Project Management Training</td>
<td>This training is suggested for all functionaries of the department who have a major role to play in the effective management of eGovernance initiatives. This training would cover 1. Soft skill development, 2. Preparing action plans, 3. Project monitoring</td>
<td>Top Management: and above Maximum Strength per Batch: 10 Training to be provided at each division</td>
<td>At least 5 days for each batch</td>
<td>Within 1 month from Date of Signing of Contract with the Selected Bidder (SV)</td>
</tr>
</tbody>
</table>
3. Training on new business processes
   - Training to all employees on:
     1. Redesigned processes,
     2. Departmental reengineering,
     3. Organizational changes within the department,
     4. New roles and responsibilities of employees
   - Record Keeper and above.
   - Maximum Strength per Batch: 25
   - Training to be conducted at least at the Head Office and at each division office for the staff of the entire division
   - At least 3 days for each function.
   - Also includes Web-Portal, Helpdesk application etc.
   - At least by the time the proposed system goes live at that location

4. Hands on Training on usage of different modules/
   1. Training on new application
   2. Training to all Field Staff on all modules

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Training Purpose</th>
<th>Participants</th>
<th>Minimum Duration</th>
<th>To be Completed by</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Functions of the Software Application</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td><strong>5. Basic Computer Skills</strong></td>
<td><strong>Extensive hands-on training on</strong></td>
<td><strong>Record Keeper and Above</strong></td>
<td><strong>At least 5 days per batch</strong></td>
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<tr>
<td></td>
<td></td>
<td>1. Computer awareness,</td>
<td>Maximum Strength per Batch: 25</td>
<td>Training to be conducted at least at the Head Office and each Division Office for the staff of that division</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Basics of hardware/Networks</td>
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<td></td>
<td></td>
<td>3. Basics of troubleshooting,</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>4. Internet, email and Office</td>
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<td></td>
<td></td>
<td>applications.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th><strong>6. Specialized Technology Training</strong></th>
<th><strong>The key technology resources within the department will have to be trained on specialized technology skill like</strong></th>
<th><strong>Department nominated staff who will handle the technical aspects, IT infrastructure required for the working of the software application.</strong></th>
<th><strong>At least 5 days per batch</strong></th>
<th><strong>Atleast by the time the proposed system goes live at that location</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1. Database management,</td>
<td>Maximum Strength per Batch: 5 Training to be conducted at least at the Head Office</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>2. Network and server management,</td>
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<tr>
<td></td>
<td></td>
<td>3. Troubleshooting etc. There will be an yearly refresher course by the SI</td>
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</tbody>
</table>

**Re-Training to Staff**

a. Every time the Application undergoes a significant change (addition of new module, new process etc.), the vendor will be required to train all staff affected by the change. For all enhancements/amendments made to the application (major / minor), the vendor will be required to provide the updated /revised user manual and online help to all users affected by the change.

b. Such training will have to be conducted at least by the time such a change goes live

c. Such training will have to be conducted at all relevant departmental locations.
3.3 Site Selection & Preparation: For Existing Sites

Site preparation for various locations:

I. Setting up of Local Area Network: Implementation Agency will be required to set up Local Area Network in <Locations>. This would involve, but not limiting to laying down the structured cabling using CAT-6 UTP cable, crimping of cables, creation of patch panels, proper fixing of LAN cables in PVC conduits or raceways along with all the necessary accessories. IA shall be responsible for testing and certifying the structured cabling at each location and finally commissioning the LAN by installing all the network components (active and passive) to fully support the functioning of solution in the location.

II. Electrical Cabling and Earthing Requirements: This includes Point wiring to be done using ISI approved PVC Conduit / Casing Capping, 1.1 KV grade 2.5 square meter FRLS Cu, supply and installation of switch, socket, and all necessary hardware & accessories.

III. Adequate power Points: IA is expected to ensure adequate power points with proper safety in adequate numbers at all the site.

IV. Adequate Furniture and Computer Workstations: In addition to the above Supply and fixing of furniture like computer tables, chairs and other item shall be carried out to ensure successful site preparation and installation at every access location. Implementation Agency to provide at the minimum at all locations one computer table and one chair to be supplied against each Desktop computer provisioned and one Storage cum top for Printers/ Multi-functional device

Procurement, Deployment and Commissioning of IT Infrastructure at the client site locations (Sites with up to 10 computers)

The premises for offices will be provided by the department at respective locations. Implementation Agency will be responsible to procure, install and commission the infrastructure required across various stated/agreed locations. At each such location the following shall be carried out:

1. Supply of the hardware, software, networking equipment, UPS, DG set to the location as per the requirements
2. Ensure adequate number of power points with proper electric-earthing (In case the adequate number is not there, Implementation Agency shall be responsible for undertaking this exercise of providing adequate number of power points with proper electric-earthing)
3. Network Connectivity - Ensuring last mile connectivity and testing. (At some locations SWAN may be available, Implementation Agency may propose to use the existing SWAN connectivity or implement VPN over broadband.)
4 Installation, Testing and Commissioning of UPS, DG-Set13
5 Physical Installation of all the equipment such as Desktops, Printers, Scanners/ MFP, Network devices including Switch- Connecting peripherals, Digital Pen, etc.
6 Operating System Installation and Configuration for desktops and servers at all locations
7 Installation of Antivirus and all other support software/ drivers, if any
8 Configuring the security at the desktops, switch and broadband connection routers
9 Network and browser Configuration
10 Test accessibility and functionality of application from the desktops
11 Ensuring all the systems required are supplied, installed, configured, tested and commissioned and declaring the site to be operational.

In addition to the above, supply and fixing of furniture like computer tables, chairs and other items shall be carried out to ensure successful site preparation and installation at every location

It shall be the responsibility of the Selected Implementation Agency to bring all the installation equipment’s and tools required for the aforementioned all activities. Application will be accessed and used at various access locations.

In terms of procuring, installing and commissioning of the infrastructure required at each of the locations, state wide, following would be the responsibilities of the Implementation Agency:

i. The Selected Implementation Agency shall be responsible for end-to-end implementation and shall quote and provide/supply; any items not included in the bill of materials but required for successful commissioning of the project, <Purchaser> shall not pay for any such items, which have not been quoted by the Selected Implementation Agency in their bid but are required for successful completion of the project.

ii. The selected Implementation Agency would be responsible for delivering the equipment to all the respective locations.

iii. The Selected Implementation Agency shall supply all the installation material/ accessories/ consumables (e.g. screws, clamps, fasteners, ties anchors, supports, grounding strips, wires etc.) necessary for the installation and commissioning of all the systems.

iv. The selected Implementation Agency has to prepare and submit a state wide delivery report including details of components supplied in each office. The delivery report would be validated and sign-off would be provided by the Nodal Officer.

v. Bidder shall be responsible for taking care of any geography specific requirements.

vi. Selected Implementation Agency shall be responsible for providing all the necessary support for undertaking the exercise of acceptance testing for IT Infrastructure provided at all the locations. Any equipment(s) found unaccepted by <Purchaser
>during acceptance testing shall be replaced by new accepted equipment(s) at no
additional cost to <Purchaser>.

vii. Selected Implementation Agency shall be responsible for providing all the
aforementioned infrastructure with a warrantee and AMC.

**Illustrative Scope of Work for Site Preparation**

[An illustrative site preparation work is provided below. It may be noted that the actual may
be different, as per the situation. The point highlighted here is the specificity with which the
site preparation specification should be written. Moreover these specifications are for
locations where typical 5-10 computers are placed without any further complexity. If the site
has some more complexity, the guidelines mentioned above should also be used to define
the Scope of Work]

**UTP & Structured Cabling:**

- The cabling material shall be supplied, laid tested and commissioned in accordance with
  specifications and site requirements.
- All the cabling shall run through PVC conduit / Casing Capping of suitable size of ISI
  standard.
- Separate PVC conduits or Casing Capping shall be used for electrical and data cabling.
- Laying of Cables- Cables shall be laid by skilled and experienced workmen using
  adequate equipment to minimize stretching of the cable.
- All terminations should be carried out according to the manufacturer’s instructions and
guidelines and standards of generic cabling systems. When terminating outlets, care
must be taken to avoid damaging the copper cores when stripping back the outer
sheathing.
- Testing and Documentation: Testing of each node should be done as per manufacturer
  standards and the final report should be submitted.

**UTP COMPONENTS:**

- SI must make sure that the system should Meet or exceed TIA/EIA 568 B-2 specifications
  of Category-6 as a system.
- All performance parameters - Attenuation, Pair -to-Pair and power sum NEXT, Pair And
  Power sum ELFEXT, Return Loss and Delay skew should be tested for 100m Channel
  as well as 90m permanent Link.
- It should be a single OEM solution and should ensure optimum system performance.
- There should not be any Impedance mismatch problems among components of the
cabling system.
- The complete system should be tested up to 600 MHz for all the test parameters to
  ensure the end-to-end system performance.
Specification-cum-Compliance Sheet:
- Type: Unshielded Twisted Pair, Category 6, ANSI/TIA/EIA 568-B.2.1
- Conductors: 24 AWG solid bare copper
- Insulation: Polyethylene/Polyolefin
- Jacket: Flame Retardant PVC
- Approvals: UL Listed and ETL verified to ANSI/TIA/EIA 568-B.2.1 Cat 6
- Operating temperature: -20 Deg. C up to +60 Deg. C
- Frequency tested up to 600 MHz
- Delay Skew 25ns-45ns / 100m MAX.
- Impedance 100 Ohms + / - 6 ohms

CAT – 6-Patch Cord (1-Meter)
- Scope: Scope of 1 meter Patch cord is to get connectivity between patch panels to switch. System
- Integrator has to provide proper connectivity via Cat-6 Patch Cord (1 Meter) and must make sure it
- will be proper dressed in rack and function properly.
- Length: 3 Feet
- Conductor: 24 AWG 7 / 32, stranded copper
- Cable Type: UTP CAT 6 ANSI/TIA/EIA 568-B.2.1
- Plug Protection: Matching coloured boot to maintain bend radius
- Warranty: 20-year component warranty
- Category: Category 6
- Terminals: Phosphor Bronze with gold plating
- Jacket: PVC
- Insulation: Flame Retardant

CAT – 6-Patch Cord (2 Meters Length)
- Scope: Scope of 2 meters Patch cord is to get connectivity between IO to desktop/Printers. System
- Integrator has to provide proper connectivity via Cat-6 Patch Cord (2 Meters) and must make sure it
- will function without any interruption.
- Specification-cum-Compliance Sheet:
- Length: 7 Feet
- Conductor: 24 AWG 7 / 32, stranded copper
- Cable Type: UTP CAT 6 ANSI/TIA/EIA 568-B.2.1
- Plug Protection: Matching coloured boot to maintain bend radius
- Warranty: 20-year component warranty
Specification-cum-Compliance Sheet for Furniture Required

**Computer Table (Size: L <length, mm> x W <Width, mm> x H <Height, mm>)**

1. **Top:** Size L <length, mm> x W <Width> made of <thickness, mm> thick pre-laminated medium density fibre (MDF) board ISI Marked (IS: 14587-1998). The top shall be firmly screwed on <Length X Width X Height mm> square tube frame.

2. Upper side of laminated board shall be in natural teak shade while the bottom side shall be white/cream shade.

3. **Sliding key Board tray:** A sliding key Board tray shall be made of <thickness, mm> pre-laminated medium density fibre board of size <Length X Width> mm. The gap between top and tray shall be <gap, mm>. Key board tray shall slide smoothly on sliding channel duly powder coated having nylon roller arrangement.

4. **The storage shelf for CVT:** A storage shelf made of <mm> particle board shall be provided along with the length of the table at bottom about <mm> above from the ground level. Shelves shall be screwed on frame work of <Length X Width X Height mm> mm square tube. The shelf shall be covered from back side with 18mm pre-laminated medium density fibre board as shown in drawing.

5. **Steel Structure:** The rigid steel structure shall consist of two nos. rectangular base tubes of size <Length X Width X Height mm> mm about <mm> length placed along the width on vertical tubes of size <Length X Width X Height mm> shall be welded for fixing up of side panels. A supporting frame of <Length X Width X Height mm> square tube shall be welded on the top of the tubes for the side panels as shown for supporting the top of the table.

6. The base tube shall be provided with adjustable shoes 2 nos. on each side.

7. **Painting:** Complete frame of tubes shall be powder coated with minimum thickness of <microns> coating.

**Printer Table (Size: L 610 x W 610 x H 660 mm)**

1. **Shelves:** <no.> made of <mm> thick pre-laminated Medium Density Fibre Board (MDF) ISI marked (IS 14587 – 1998)
2. Top shelve size \(<\text{length} \times \text{width} \ \text{mm}\) for placing printing unit.
3. Middle Shelve size \(<\text{length} \times \text{width} \ \text{mm}\) for placing feet on stationary.
4. Bottom shelve size \(<\text{length} \times \text{width} \ \text{mm}\) for collecting print out.
5. The top faces of the shelve shall be natural teak wood shade.
6. The bottom faces shall be in plain white/cream shades.
7. Structure: The structure shall be made from square and rectangular steel tubes duly welded finished and powder coated.
8. The horizontal tube \(<\text{length} \times \text{width} \ \text{mm}\) \(\times 1 \ \text{mm} \ \text{thick} \ <\text{length} \ \text{m}\) long shall be welded over vertical tubes \(<\text{mm}\) off the centre width/depth wise.
9. Panels made of \(<\text{thickness}\) \text{mm} pre laminated particle board shall be screwed rigidly between vertical tubes on both sides.
10. Two nos. bottom support tubes \(<\text{Length} \ \times \ \text{width}> \ \times 1.25\ \text{mm} \ \text{thick}\) shall also be provided with two nos. of adjustment shoes.
11. A rectangular slot of size \(<\text{Length} \ \times \ \text{width}> \ \text{mm}\) shall be provided on top shelve along with length for feeding stationary as shown in figure. A slot shall be covered with PVC insertion for safely of paper.
12. The ends of bottom and top shall be plugged with PVC/plastic caps.
13. Painting: Complete steel structure shall be pre-treated and powder coated with minimum thickness of \(<\text{thickness}> \ \text{microns coating}.\)
3.4 Site Selection & Preparation: For New Sites

When site preparation requirements for a computer/server room are prepared, it is important to understand the infrastructure to be installed and the physical environment in which it will operate. The following information must be sought:

- Weight and dimensions of the computer equipment
- Electrical requirements of the computer equipment
- Total heat dissipation and cooling requirements of the computer equipment
- Types of signal cables
- Equipment footprint with clearance for maintenance and operation.

The followings are to be considered for site selection:

a. The computer room should be located away from the exterior walls of the building to avoid the heat gain from windows and exterior wall surfaces.

b. In case, exterior windows are unavoidable, windows that are double- or triple-glazed and shaded should be used to prevent direct sunlight from entering the computer room.

c. The computer room should be maintained at a positive pressure relative to surrounding spaces.

d. There should be sufficient floor loading capability for computer equipment.

e. A vapour barrier should be installed around the entire computer room envelope to restrain moisture migration. All pipes and cables that penetrate the envelope should be caulked and vapour sealed.

f. Uniform room air distribution system should be maintained in the computer room.

g. To avoid contamination, the site should be located away from heavy industries and areas with corrupted air.

h. The computer room should not be on top floor or ground floor or the basement of the building to avoid solar heat absorption or flooding.

i. The computer room should be away from dangerous goods storage, mechanical shock, excessive vibrations and high fire and water risks areas.

j. To eliminate the effect of electromagnetic interference, the computer room should be located away from generator room, lift plant room, or in some cases, the radar or telecommunication control rooms.

k. There should be minimum access by general public and irrelevant personnel to the computer room.

[An illustrative Site Preparation Scope of Work for design considerations for a new site is provided here for your enhanced understanding. It may be noted that the actual may be different, as per the situation. The point highlighted here is the specificity with which the site preparation specification should be written. Moreover, these specifications are for locations]
where typical 5-10 computers are placed without any further complexity. If the site has some more complexity, the Guidelines mentioned above under this section should also be used to refine and define the Scope of Work]

**A. Fitting out Requirements**

All materials to be used in the computer room should be non-combustible, self-extinguishing or fire retardant and have the properties of smooth surface finishing and non-dust shedding. Any pipes and ducts not serving the computer room should be removed.

**Walls/Partitions** – In the computer room, rigid floor-to-ceiling perimeter walls/partitions having 2-hour fireproof rating should be erected.

**Internal Partitions** - Partitions inside computer room may be built to the headroom height. Consideration for ample air circulation has to be made. Half-glazed partitions are recommended for partitions inside the computer room. Double-glassed partitions for noise reduction may be considered for printer area.

**Wall Finishing** - Internal walls are to be finished smoothly with emulsion paint or vinyl wall papers. Finishing of light colour can enhance the illumination of the computer room.

**Kerb** - Concrete kerb of floor void height is required to be built along perimeter walls of the computer room and around the piping of air-conditioning equipment to prevent water penetration to and from the computer room.

**Thermal Insulator** - Thermal insulator is used on the structural floor and ceiling to prevent heat gain to computer room, especially when bottom discharged type air-conditioners are used. It also helps to save energy and to minimize the running cost of the air-conditioning system. Permanent thermal insulator may be embedded inside the structural floor (sandwich type) during building construction stage or laid on the structural floor (add-on type) for accommodation revised to be computer room. For the latter one, all junctions between the insulator and fixtures are watertight and airtight. Inclinations are required at areas around the floor drains. An alternative is to install the thermal insulator on the structural ceiling of the floor below the computer room.

For thermal insulator not embedded inside the structural floor, the following selection criteria are recommended:

- thermally insulated
- fire and water resistant
- dust-free and lightweights
- strong enough to be trod
- easy to maintain
Raised Floor - Raised floor is recommended to be used in computer room. It provides the following advantages:
- acts as an air podium for conditioned air distribution
- provides spaces for cable running
- enables simple equipment installation and provides flexibility for subsequent layout changes or equipment expansion
- protects the interconnecting cables, plugs and power connectors
- eliminates hazardous cabling underfoot
- maintains a cleaner environment

It is built of individual and interchangeable floor panels sturdily and rigidly above the structural floor. It must be evenly levelled and strong enough to withstand all necessary loads that exert on it. Additional support may be required if the panels are weakened by cut outs. Reference to the loading requirement of the computer equipment should always be made. The floor panel should be made of non-combustible and dust-free material. Its covering material is necessary to be well-bonded, anti-static, thermally insulated and free from scuffing and staining.

Floor Panel Fitting - Cable cut outs and adjustable air grilles are required on designated floor panels for cable connection of computer equipment and air delivery respectively. The cut outs are protected by black extruded vinyl trimmings at the edges and covered by rubber grommet. The air grilles must have smooth edges and corners and be flush-mounted on the surface of the floor panels.

Ramp - To facilitate equipment transportation, a strong ramp with landing areas at both ends is recommended at the server/computer room. The ramp surface should be built with anti-static, non-combustible and non-slippery materials.

False Ceiling - The requirement of finished headroom is different from one vendor to another. In general, the headroom should not be less than 2.4m. False ceiling provides tidiness and aesthetic effect to the computer room. It also serves as a plenum for lighting fixtures. The ceiling plate is preferred to be of easy remove and install type for the access of utilities in the ceiling void. Non-combustible and dust free plates are required. If false ceiling is infeasible, the structural ceiling should be dustproof, waterproof and heat insulated.

Windows and Doors - All windows of the computer room are walled up to avoid direct sunlight and to provide better security and weather protection.

Main Entrance Door - 5-foot wide double-leaf steel door having a 2-hour fireproof rating and secure bolted hinge is recommended. An air lock composed of 2 sets of outward opening and self-closing doors prevents the loss of conditioned air and reduces the influx of dust.
Emergency Exit - The emergency exit requires an outward opening and self-closing steel door. It is also equipped with the same fireproof rating and secure bolted hinge as the main entrance.

Other Doors in the Computer Room - Double-leaf doors are preferred for ancillary machine room and printer room to ease printout movements.

Normal Lighting - Evenly distributed lighting is recommended for the computer room. It is necessary to align the distribution of lights with floor and equipment layouts to avoid shadowy areas caused by tall equipment, cabinets or racks. The lighting, sectional controlled by switches, should be able to switch off when they are not required.

Emergency Lighting - The lighting inside computer room should be connected to essential power supply and 50% of them should be supported by battery. The battery supported lights may be located at the console area, mains control panel areas and passages leading to the main entrance and emergency exit.

Conduit and Trunk - Grounded metal trunks are required to house signal cables from computer room to terminal locations between floors of the same building. Vertical conduit for signal cable of individual terminal equipment is usually connected to the horizontal trunk and ended at skirting level on wall at which termination box is required for cable termination. The termination boxes can be at desk-top level in a terminal room environment. To avoid electromagnetic interference being induced to the signal cables, it is recommended to house the power and signal cables in separate conduits and trunks. If they have to cross each other, they should be crossed in right angle.

Central Control and Monitoring System: The Central Control and Monitoring System is a PC-based integrated system controls and monitors facilities for computer room. With necessary devices to connect various facilities such as air conditioning system, power supply system, fire services system, access control system and CCTV system etc. to the system, real time information on the performance from these facilities can be collected. This system enables central monitoring of computer centre environmental facility systems remotely.

B. Equipment Layout Planning

A properly designed equipment layout has the following benefits:

a. easy equipment installation and maintenance;

b. efficient computer operation;

c. efficient air circulation;
d. tidy environment; and  

e. feasibility and flexibility of future expansion

**Floor Layout inside Computer Room** - A separate room should be provided for comfortable and silent working environment for computer and data entry operators.

**Printer Room** - Printers together with a small stationery store area should be in a separate room inside the computer room to reduce dust contamination and noise disturbances to other areas.

**Air-conditioning Equipment** - There are sufficient spaces for maintenance service for the AHUs. They are, as far as possible, to be located at corners or closed to wall partitions to enable more spaces for computer equipment.

**Emergency Exit** - The emergency exit is always located at the opposite end of the main entrance.

**Technical Manpower Room** – A room is required for IT personnel to perform on-site repairing work and to store spare parts of the equipment. It equips with work bench and storage cabinets and power points on the bench or any convenient point. If space is available, the engineer room may be located inside computer room.

**Store Room** - Store room, preferably on the same floor, provides storage area for computer stationery, consumable, reports and other accessories.

**Locker and Changing Room** - Computer operators are not allowed to bring their personal belongings into the computer room. In addition, eating and drinking are prohibited in the computer room. It is therefore necessary to provide an accommodation outside the room.

**Equipment Layout**

a. Cable limitation, equipment operating requirement and operating convenience should be considered when placements of computer equipment is to be designed.

b. An expansion allowance of about 30% of the required area is suggested.

c. The equipment is preferably arranged in parallel rows to smooth the air-flow of the ventilation.

d. The computer equipment is to be aligned with the floor grid.

**C. Electrical Requirements**

**Power Source** - Computer equipment require a "CLEAN" and dedicated power source in conjunction with the use of electrical noise protection device or power conditioner to
prevent electrical noise disturbance. For maximum reliability, the independent feeder for the computer equipment must not be shared with other electrical devices.

**Basic Power Requirements** The power requirements of different computer equipment may vary. Specifications in the planning manual of the computer equipment should therefore be referred to before the requirements are finalised. The following aspects are to be specified:

- **Capacity** - Sufficient capacity is required for computer loads and future expansions of computer equipment. The capacity of an equipment is expressed in terms of KVA or KW, where
  
  \[ \text{KVA} = \text{Voltage} \times \text{Current in Ampere} \times 1000 \]
  \[ \text{KW} = \text{KVA} \times \text{Power Factor of that equipment} \]

  *Always consult computer vendor(s) for the power factors of computer equipment*

- **Voltage Standard** The nominal voltage for a three-phase and single-phase power supply is 380V and 220V respectively. However, some equipment may require different voltage. Detailed permissible tolerance of the voltage requirement can be referred to the hardware manuals or computer vendors.

- **Phase** - In most computer installations, a three-phase, four wire and five conductor power supply is provided to the computer equipment power panel. Such a supply consists of three phase wires, one neutral wire and one insulated equipment ground conductor.

**Grounding** - For personnel safety and protection of equipment from damages and electromagnetic interference, a separated and insulated ground wire is necessary for the computer equipment. Computer vendors should be consulted for detailed specifications of the ground wire.

**Power Protection Device** - Poor quality of power can seriously affect the performance and reliability of the computer system and may cause damage. Before selecting the power protection device, the load characteristics of the equipment, computer service requirements and reliability must be known.

**Uninterruptible Power Supply (UPS)** - It employs a means for charging a bank of batteries as a backup for the city mains during a short-term power interruption or to allow the computer system to be closed down. Its requirements depend on the computer power loads to be supported, the lead times to start up the backup emergency diesel generator or a tidy close down of the computer system. Using an UPS containing an isolation transformer and a harmonic reduction filter would be the best alternative possible because it may resolve all power line noise problems and provides a continuous power supply during power interruption.
Emergency Power Supply - A generator is to support the UPS in providing emergency power supply to the computer equipment in a prolonged power outage. The need of generator depends on the service requirements of the computer system. However, the generator should also be able to support other essential facilities and equipment such as the air-conditioning system, security and access control system and lighting.

Circuit Breaker - Besides the normal operating current, the circuit breaker of computer equipment handles the in-rush and surge current. Each computer equipment requires a separate circuit and a circuit breaker. Circuit breaker and its related power point/socket should be properly labelled to identify the branch circuit it is controlling.

Power Connector - Power connectors for the computer equipment should conform to the local standard. Their placements are to be planned so that they are always located within about 2m of the machine they supply.

Emergency Power Cut off Switch - It is an emergency power cut off switch to disconnect the power of all computer equipment in the computer room. The switch is reset by key once it is activated and controlled from locations readily accessible to operators, such as console area and main entrance. The emergency switch is to be properly protected from accidental operation by mistake. Same switch is also required for the air-conditioning system.

Service Power Socket - Sufficient numbers of single-phase square prong service power points with ON/OFF switches are required at appropriate locations in computer room for use by maintenance and service personnel. These power points should be installed at skirting level and separated from the computer panel or feeder.

Automatic Transfer Switch (ATS) is a high availability redundant switch that has two input power cords, one for each AC line, providing redundant power supply to connected equipment. It is designed to supply power to the connected load from a primary AC source. If the primary source becomes unavailable, it will automatically switch the power supply to the secondary source.

Cables - Cable trays and steel-wire-armoured cables are recommended for all underfloor power cables. Power cables have to be laid separately from signal cables in order to avoid any interference. If crossing each other is unavoidable, crossing is suggested at right angle.

D. Air-Conditioning System

Computer equipment is operated in an environment of controlled temperature and relative humidity. The air-conditioning system in the computer room must be able to control the temperature and relative humidity within the specific ranges automatically and independently.
Basic Requirements - An independent air-conditioning system with full backup are required. Spare capacity of 50% is recommended for anticipated expansion. Power source of the system should be separated from those for computer equipment and connected to emergency power supply. The system can be either water-cooled or air-cooled depending on the equipment specifications.

Cooling Capacity - Determination of the cooling capacity of a computer room mainly depends on the following factors:

1. total heat dissipation of the equipment (always consult vendor for specifications)
2. volume of the location
3. room and equipment layouts
4. anticipated expansion
5. heat gains and losses through walls, floor and ceiling
6. personnel working inside

Temperature and Relative Humidity Ranges - The operating ranges of temperature and relative humidity for computer equipment are usually 20°C ± 3°C and 50% ± 10% respectively with the maximum rate of changes at 3°C and 6% per hour.

Air Distribution Method - Air distribution in computer room is usually classified into "Raised Floor" and "Non-raised Floor" distributions. Raised Floor Distribution system distributes the conditioned air through the floor void to the computer equipment via air grilles or perforated floor panels. The heat dissipate vents of most computer equipment are designed to suit such distribution as it is efficient in air circulation. In Non-raised Floor Distribution, air is distributed either from ceiling via diffusers or simply across the floor. Since air circulation of such distribution is not efficient, it is only recommended for small setups.

Air Cleanliness and Fresh Air Intake - The intake of adequate amount of filtered and pre-treated fresh air to the computer room is required. The location of the fresh air inlet should be carefully planned so that the intake of polluted air into the computer room can be avoided. Dust contamination inside the computer room can be minimized by using high efficiency filters. Detail requirement on dust level can be referred to vendor's documentation.

Inter Switch-ability - In addition to its capability of simultaneous operation, manual and automatic switching between the normal and standby units of the entire air-conditioning system is preferred.

Water Supply - If the computer room is operated with water-cooled chiller plant, an automatic filled water tank which is not affected by water supply suspension or ration is required.
**Power Supply** - Power supply of air-conditioning units must not be connected to the computer loads.

**Emergency Supply** - It is essential to provide emergency power supply to the air-conditioning system as long as the emergency power supply is provided to computer equipment.

**Emergency Power Cut off** - Power supply of the entire system, including the fresh air intake unit is cut off automatically when fire extinguishing system is actuated. The installation of manual emergency power cut off switch is to shut down the system in case of emergency. It is preferred to be installed near the console area and duplicated at the main entrance.

**System Monitoring** - The audible and visual alarm panels of the air-conditioning system for the computer system and its ancillary machines (i.e. UPS Room) are to be installed in computer room at master console area to report the operating status and faults of all system components. The alarm/indicators include high/low temperature and relative humidity, filter status and chiller plant status.

**Perforated Floor Panel** - Perforated floor panel, equipped with air-flow control feature, is recommended for distribution of conditioned air in raised floor distribution system. It is more advantageous than air grille because it enables free placement for heavy computer equipment and has no frame protrusion.

**Temperature/Humidity Recorder** - Electrical temperature/humidity recorders are required in the computer room to provide 7-day continuous recording of the environmental conditions. They are wall mounted at the locations near the computer equipment or other appropriate spots and must have visual and/or audible alarms.

**Automatic Power Cut off Facility to Computer Equipment** - An adjustable temperature sensing system with audible and visual alarms is required for computer room and power conditioner room. If the threshold limit is exceeded, a facility is required to cut the power supply to the computer equipment automatically. This facility is capable to be operated manually. Reset switch of the automatic power tripped equipment is required to stop the equipment from "un-controlled" power ON/OFF due to changes of temperature.

**Store Room** - A normal office air-conditioning system is required for the store room of computer consumable such as magnetic media, printer ribbons and continuous stationery etc. Acclimatization to the computer store is necessary before they are put into use.

**Power Conditioner Room** - Power conditioner, such as UPS, is a heat generating device and is usually housed in a separate room away from the computer equipment. A reliable air-conditioning system with backup is required.
E. Fire Prevention, Detection, and Suppression

In order to minimize fire damages to computer equipment, the equipment and furniture used inside the computer room should, as far as possible, be made of non-combustible material or at least having minimal fire propagation or smoke generating properties.

**Storage of Stationery** - The storage of bulky volume of continuous stationery must be fire protected and be kept away from computer room. Amount of continuous stationery stored in computer room must not exceed the consumption of a shift.

**Ancillary Equipment** - The accommodation for power conditioner, emergency diesel generator and its fuel storage must be away from computer room.

**Ducts** - The air ducts should be equipped with automatic fusible-link fire dampers.

**Detecting Device and System**

**Detector** - A two-stage detection system, consisting of two sets of detectors and alarm signals in cross zone operation, is required. Detectors should be located at the headroom, inside the ceiling void and floor void of the computer room. Detectors can be smoke detectors or together with heat detectors.

**Detecting System** - First fire alarm will cut power to air-conditioning system and be transmitted to the building management office and the nearest fire station. Second alarm cuts all power supply to the computer room and the fire suppression system will be triggered off after a pre-set time interval. **Fire Suppression System** – Various options include Gas Flooding System & Portable Gas Fire Extinguisher

**Design Criteria:**

a. The system should always be put to ‘AUTO’ mode under normal circumstances to fully protect the computer room against fire hazards and to cope with Fire Authority’s practice. ‘MANUAL’ mode is only switched on when the system is under repair. Manual mode – In case of fire the system will have to be triggered off manually after all operation staff are evacuated. Automatic mode – In case of fire the system will be controlled by the detection system. System will be triggered off after a pre-set time interval when detectors of both zones sense a fire and activate detection system.

b. No matter the system is in manual or automatic mode, an elapse time of at least 30 seconds is required for personnel evacuation before the gas is released. To facilitate evacuation, all emergency exits should be labelled with battery
supported illumination. Furthermore, design of the door should be such that it can only be opened from the inside. The use of “push bar” or similar latch is preferred so that the door can be opened easily. However, to avoid the door from being used at times other than emergency, the door should be fitted with a burglar alarm.

c. All duct work, doors, windows and any other air passages must be sealed off and exhaust air fans should then be installed. This is because if the protected area is not airtight, the pressurized extinguishing gas may dissipate, thus reducing the effectiveness of the system.

d. The system is capable to be operated under all circumstances, including power failure. Regular maintenance and cleaning are necessary for the fire detection system and corresponding accessories.

e. Portable gas fire extinguishers should be installed at various locations. The locations should be clearly marked to enable easy fetching of the extinguishers. All portable fire extinguishers should be periodically inspected and refilled by the supplier. The next inspection date should be clearly marked on the extinguishers.

Monitoring - The master alarm/indicator panel(s) of the system is/are to be installed inside the computer room. Audible and visual alarms are required to indicate the detection of fire. Fire alarms of the building must be provided inside computer room to alert operators of fire on other floors. Diagrams showing the locations of hose reels, fire exits, fire extinguishers and evacuation paths should be posted inside computer room. The fire extinguishing system is required to be accommodated in a separate room or compartment near the computer room.

F. Prevention of Water Leakage

− Concrete kerb is required along the perimeter of the computer room and power conditioner room.
− All unnecessary plumbing is to be removed away from computer room.
− Waterproof power connectors are to be used for underfloor power connections.
− All ducts, trunks and pipes for cables should be water-tight and be able to stop the water being led by them.
− All underfloor fixtures should be away from the floor drains.
− Waterproof treatment is required for internal wall surfaces, concrete ceiling and structural floor.
Water detection system in the floor void with audible and visual alarm panel showing one or more locations of water threats is required in computer room. If the system is not a linear detection type, mimic diagram showing the locations of the water detectors is necessary.

G. Physical Security

Access Control System - Installation of Lock If the main entrance has 2 sets of door, the first set (outer) may be equipped with a cipher lock only. This lock is operated by entering a correct cipher code. The second (inner) set can be controlled by a cipher/cardkey lock. Both locks may be door-mounted or wall mounted but the control circuit units are housed in locked metal cases inside computer room.

Cipher Code Operation - The cipher locks at both entrances must allow operations made by common code and individual codes. Changes of cipher codes are performed locally at the master control units of the locking system. The change of cipher code does not affect the information encoded in the magnetic cardkeys.

Power Supply to the Lock - A 24-hour battery power backup is required for the access control system including the electric door lock(s). The access control system should also be connected to the UPS if it is installed.

Door Lock - Heavy-duty electric lock is recommended for the main entrance doors. With time delay setting, the lock would effect after time is over. The lock must be fail-safe type. Panic bolt is recommended at emergency exits.

Surveillance System:

Closed Circuit Television System (CCTV) - CCTV is used to monitor the security as well as operating environment of the computer room. The monitor unit is capable of programmable switching for selection of pictures for a multi-camera CCTV system. The requirement of the CCTV system depends on the system security level and mode of operation of the computer system.

Digital Video Recording System - It is a triplex (real time, playback and record) video recording system, which allows video monitoring, recording and playback simultaneously over the computer network or other telecommunications channels like phone line or mobile network.

Intercommunication System (INTERCOM) - The master unit of the intercommunication system is placed at console area and the slave units are placed at the outer main entrance and other necessary places to provide a direct and clear communication between all functional areas.
**Burglar Alarm System** - To protect the computer room and other external restricted premises from unauthorized access or break-in, a burglar alarm system may be installed at the main entrances and all exits. The alarm system may also provide "Door-Remains-Open" warnings to operators. 24 hours standby battery supply to the operation of the burglar alarm is necessary to cater for power outage. The system should allow each protected door to have both ACCESS and PROTECT modes. Mode setting should be done on the master panel inside computer room. An alarm and indicating mimic panel showing every protected door is required in computer room. Every break-in of these doors will give audible and visual signals to the master panel inside computer room and the building management office via professional security company.

**Security Review for Computer Room** - Physical security of a computer room is the most vital aspect for the expensive computer hardware and invaluable computer data being stored.

Data communication trunks are trunks for data communication cables and telephone lines of the network. Special care is required to secure the access of the data communication cables and telephone lines in order to prevent malicious damage, interception and attachment of the cables and lines. Escort of computer vendors or telecommunication service provider is required in the course of the installation work.

### 3.5 Cloud Computing Policy Instructions

DIT, Government of Maharashtra has published below GR for Cloud Policy as of now. Please check the Website, Maharashtra.gov.in for the latest.

<table>
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<td>Information Technology Department</td>
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Cloud Computing Policy-Instructions to Departments regarding hosting of IT applications.

Government of Maharashtra
General Administration Department
Government Circular No. मातंसं-060/3/2017
Hutatma Rajguru Chowk, Madam Cama Road, Mantralaya, Mumbai –400 032
Dated 29th January 2018

Introduction:
Considering the growing adoption of online services by citizens of the State & use of IT within Government, there is a constantly increasing demand from Departments for infrastructure for hosting services including disaster recovery and backup for their various IT applications. Para 7.13 of the State's E-governance policy (DIT GR dated 23.09.2011), “The State shall explore the option of cloud computing as a preferred way for implementing all e Governance projects in the State.” The Government had set up a Committee headed by Principal Secretary IT to prepare the Cloud Computing Policy of the State. The said policy has been approved by the Government on 17.1.2018. It is proposed to communicate the salient features of the State's Cloud Computing Policy to all Departments and issue operational instructions regarding the steps to be followed by Departments. The following instructions are issued in supersession of all earlier instructions issued in this regard.

Government Resolution:
1. The following instructions will apply to all Government Departments, sub-ordinate offices, Public Sector Undertakings, Urban and Rural Local Bodies & any body/organization set up under any law of the State Government (henceforth collectively referred to as “Government organizations”)
2. All Government organizations must use cloud infrastructure services instead of using Government owned datacentres or data centres owned by the organization or co-locating their infrastructure in any Government owned/ privately owned data centre. Procurement of new hardware in existing data centres should be strictly avoided. In case of situations of failure of components of existing systems necessitating replacement, concurrence of DIT should be taken.
3. In case of existing applications not hosted in a cloud environment, Government organizations must ensure that the applications are migrated to cloud on or before 30.10.2018. All Departments must review their existing software applications and ensure that the applications are cloud ready in time for the above migration. Government Circular No.: मातंसं-060/3/2017 Page 2 of 3
4. DIT will empanel cloud service providers from whom Departments can avail of cloud services before 30.04.2018. Departments will be free to avail of the services from any of the empanelled cloud service providers as per the rates to be notified by DIT.
5. Options of private cloud, public cloud and hybrid cloud will be made available to the Departments. In each of these options, the facilities of Infrastructure-as-a-Service (IaaS), Platform-as-a-service (PaaS), Software-as-a-Service(SaaS) will be made available for Departments to choose from as per their requirements.
6. DIT will issue guidelines regarding a Cloud Assessment Framework that should be used by Departments for choosing the cloud service that would be suitable for the Department. While doing so, the Department should consider the following, a) Nature of demand, average and peak loads, elasticity and cyclical nature of demand b) Legacy Application Architecture including Database and platforms used by the department c) Nature and sensitivity of the data (in terms of data privacy, confidentiality, data concerning State & National security and requirements under the Right to Information Act) being handled by the application.

7. To ensure that Departments get a hands-on experience, the Departments will be provided an option of free trial for a limited period before issue of formal work order.

8. The billing for cloud services will be based on actual consumption of services (Pay-As-You-Go model) with minimal or zero capital (one-time) cost. The expenditure on the same should be done by the Department from their budgetary resources. It is clarified that DIT will not bear the expenditure for availing cloud services.

9. During the empanelment process, DIT will ensure that safeguards regarding data security, data sovereignty, portability and interoperability & compliance with information security standards regarding cloud computing are complied with. DIT will issue necessary operational guidelines and sample templates for entering into agreements with the empanelled cloud service providers. DIT will also ensure that third party audit of empanelled Cloud service providers (CSP) is carried out at least once a year.

10. If Departments are issuing any RFP for a project which involves system integration, the Departments should ensure that the clauses of the RFP are in line with the cloud policy of the State & that hosting services should be engaged only from the cloud service providers empanelled by DIT.

Cloud Computing Policy-Instructions to Departments regarding hosting of IT applications.

Government of Maharashtra
General Administration Department

Government Circular No. मातसं- 060/3/2017/1 Hutatma Rajguru Chowk, Madam Cama Road, Mantralaya, Mumbai – 400 032
Dated – 16th May, 2018

Introduction-
DIT vide its circular dated 29.1.2018, circulated the salient features of the Cloud Computing policy of the State and the operational instructions regarding the steps to be followed by the Departments.

As per para 4 of the above circular and approval of High Power Committee (IT) in its meeting held on 8.3.2018, DIT carried out a tendering process for empanelment of Cloud Service Providers (CSPs) and discovery of rates for various cloud services. Since this process has been duly completed now, it is necessary to issue detailed instructions regarding CSP empanelment and the action expected from the Government organizations to ensure that all IT applications are migrated to cloud by 30.10.2018. Accordingly, the following instructions are being issued by the Government.

Government Circular:-

1. The following Cloud service providers (CSP) are being hereby empanelled by DIT for a period of 3 years for providing cloud services to the all Government Departments, subordinate offices, Public Sector Undertakings, Urban and Rural Local Bodies & any body/organization set up under any law of the State Government (henceforth collectively referred to as “Government organizations”) from 1.5.2018 till 30.4.2021.

   **Tier-1 empanelment**

   1. Amazon Web Services
   2. Microsoft
   3. Net Magic
   4. Control-S (Conditional Empanelment for Sec-A of Annexure 8.1, 8.2 and 8.3 and not any other section)

   **Tier-2 empanelment**

   1. ESDS

   2. The total cumulative annual order value that can be awarded to CSPs in case of tier-2 empanelment will be subject to an upper cap of Rs 25 crore (inclusive of all Departments). Information regarding cumulative annual order value already awarded
to tier-2 empanelled CSPs will be made available to Government organizations on a regular basis. Tier-1 has no upper or lower limit. Government organizations should ensure adherence to the upper cap limit at the time of selection of the CSP.

Cloud service offerings

3.1 The 3 cloud service offerings being provided by the empanelled CSPs are as follows.

a) Public Cloud
b) Virtual Private Cloud
c) Government Community Cloud

3.2 As part of each of these cloud service offerings, the following cloud services will be available to Government organizations

- Virtual machines
- Storage
- Database
- Media transcoding
- Services like DNS, Active directory, Virtual Private Network (VPN), API management, email/SMS gateway, back-up services, mobile services, developer tools and office productivity tools
- Provision of Bare metal server as a service

Rates for cloud services

4.1 The details of the CSP empanelled for each offering (Public, Virtual Private Cloud and Government Community Cloud) and the services listed above and the applicable rates are provided in Annexure-1. The applicable rates for the offerings and services are different for tier-1 and tier-2 CSPs. These rates will be applicable from 1.5.2018 till 30.4.2020 after which fresh rates will be notified by DIT by following due process.

4.2. Three options—hourly rates, monthly rates if cloud services are taken for a minimum period of 1 year and monthly rates if cloud services are taken for a minimum period of 2 years are being made available to Government organizations.

4.3. If any Government organization has already hosted its IT application on the cloud of any of the CSPs being empanelled by this GR under any existing contract/work order with the CSP and if the rate for the cloud services as per the contract/work order is lower than the rates notified in Annexure-1, the rates specified in the existing work order/contract will apply till the term of that contract. However, if the existing contract/work order rates are higher, the rates notified in Annexure-1 will apply from 1.5.2018. Foreclosure of Contract/work order can be done upto 31st October 2018.

4.4 If any Government organization has already hosted its IT application on the cloud of any other CSP not empanelled under this GR or for an offering/service for which the CSP is not empanelled under this GR, the IT application has to be migrated to a CSP empanelled under this GR before 30.10.2018.
4.5 To ensure that Government organizations get a hands-on experience, the Government organizations will be provided an option of free trial by the CSP for a limited period of 30 days before issue of formal work order.

Disaster Recovery (DR) services

5. Rates have been discovered for Datacenter services (DC only), Disaster Recovery (DR) services (DR only) and Datacenter & Disaster Recovery services (DC + DR). Government organizations may opt for one or more of these as per their requirements. If required, Government organizations may opt for different CSPs for DC and DR services.

Managed Service Providers (MSP)

6.1 A managed services provider (MSP) for this document is the cloud provider cloud services provider that manages and assumes responsibility for providing a defined set of services like Infrastructure as a Service (IaaS), Software as a Service (SaaS) or Platform as a Service (PaaS) as per agreed term and conditions to Government organizations.

6.2 Each CSP may appoint a maximum of 2 Managed Service Providers (MSP). The CSP can function as its own MSP. The MSPs already appointed by the empanelled CSPs are listed in Annexure-1. The MSP will perform the activities listed in Annexure-2. Government organizations may opt for the migration services of MSPs in addition to the regular cloud offerings. If the Government organization decides to engage the migration services of the MSP, additional charges of 5% (on the basic cloud services charges) towards MSP charges will apply for the period for which the services of MSP are engaged.

Selection of CSP

7. The Government organizations may select any of the empanelled CSPs through Departmental PC/PIC. Scope of work may be circulated to all empanelled CSP and presentation be done before PIC. After selection of the CSP, the Department may select any of the MSPs of the CSP, if required. If the Government organization has a system integrator or technical resource who can perform the technical tasks expected of a MSP, the Government organization can engage the system integrator or technical resource for performing the technical tasks instead of MSP.

Guidelines for selection of cloud offering
8.1 The following indicative guidelines should be used by Government organizations to decide the type of cloud offering (public cloud, virtual private cloud and Government community cloud) that they should opt for.

<table>
<thead>
<tr>
<th>Sr.no</th>
<th>Type of IT application</th>
<th>Recommended cloud offering</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Websites with only read access for citizens/users</td>
<td>Public Cloud</td>
</tr>
<tr>
<td>2</td>
<td>IT applications collecting and storing information regarding public infrastructure and public assets like roads, buildings, bridges, water bodies, water conservation structures, water supply and sanitation, telecom and IT networks etc. (including GIS) covered under RTI Act. Finance and Planning Departments regarding payment of taxes, revenue receipts.</td>
<td>Public Cloud</td>
</tr>
<tr>
<td>3</td>
<td>IT applications involving collection of taxes, revenue, user fees and charges for various G2B and G2C services and where personal sensitive information is NOT collected or stored</td>
<td>Virtual Private Cloud</td>
</tr>
<tr>
<td>4</td>
<td>IT applications involving collection and storage of information related to G2B services (Government to Business)</td>
<td>Virtual Private Cloud</td>
</tr>
</tbody>
</table>
| 5     | • IT applications involving collection and storage of information related to surveillance projects and safe and smart city projects in the State  
      • Finance and Planning Departments regarding budget distribution, drawing and disbursement of Government funds | Virtual Private Cloud       |
| 6     | Portals collecting and storing sensitive personal information of citizens like Aadhaar number, demographic data including address, date of birth, ekYc data, PAN number, Voter ID card number, bank account information, driving license information, personal health records (any one or more of the above) | Government Community Cloud  |
Irrespective of the above criteria, Applications of the following Departments
  • Property records of Revenue Department
  • Applications related to urban planning and development control regulations
  • Public Health Department & Medical Education Department—excluding health insurance and hospital management and information systems
  • School Education Department
  • Women and Child Development Department
  • Individual beneficiary schemes of Social Justice, Tribal Development, VJNT and OBC Department, Minorities Development and Skills Development Department
  • Food and Civil Supplies Department

8.2 DIT may update and make necessary changes/additions in cloud guidelines for selection of cloud offerings from time to time.

8.3 It is clarified that the above cloud offering selection guidelines are indicative and Government organizations are free to choose the cloud service offering that would be suitable for them. While doing so, the Department should consider the nature and sensitivity of the data (in terms of data privacy, confidentiality, data concerning State & National security and requirements under the Right to Information Act) being handled by the application.

8.4 Departments to provide Cloud SPOC, Nodal officer and authorized signatory names in Scope of Work circulated to CSPs/MSP for cloud services.

Hosting/ Migration

9.1 If the Department engages a MSP, the MSP will submit a detailed plan regarding cloud deployment and configuration after carrying out a detailed study of the proposed/existing IT application of the Department. On acceptance of the above plan by the user Department, the MSP will assist the Department in deploying/migrating the Departmental application onto the cloud. The MSP must assist the Department in carrying out functional testing and data integrity testing to ensure operational acceptance. If the Department is engaging DR services, the MSP should carry out business continuity testing.

9.2 All Government organizations must ensure that all existing applications are migrated to cloud on or before 30.10.2018.

Payments linked to utilization

10.1 In the case of cloud services provisioned by user Government organizations, the billing for cloud services will be based on actual consumption of services (Pay-As-You-Go model) with zero capital (one-time) cost.
10.2 To incentivize optimal solution design and encourage proper utilization of the assigned computing resources, empanelled CSP in co-ordination with the user Department should ensure that the average monthly utilization of RAM, CPU and storage is not less than 50%. If the average monthly utilization is less than 50% in a particular month, the CSP should immediately notify the user Department. The user Department and the MSP/CSP should undertake a joint assessment within 15 days, analyze the reasons for the utilization being less than 50% and undertake steps to ensure resource utilization of at least 50%. If the average monthly utilization of RAM or CPU or storage is less than 50% for 2 successive months, a penalty of 25% of the monthly bill amount (from the next billing cycle) will apply for those particular months where utilization is below 50%.

However, if the CSP has proposed a resource optimization plan to bring the average utilization above 50% but such plan has not been approved by the user Department authorized Signatory within the above time period of 2 months, the penalty will be waived off by DIT.

10.3 If average monthly utilization exceeds 65%, an additional incentive of 5% of the monthly bill amount will be payable to the CSP for a period not exceeding 6 months. The expenditure towards cloud services will be borne by the user Department from their budgetary resources. It is clarified that DIT will not bear the expenditure centrally for availing cloud services. Empanelled Cloud Service providers will raise quarterly invoices to the respective Department. Payments should ordinarily be made by the respective user Department within 1 month of the raising of the invoice.

Management / Transition-Out Services

11. CSP will provide a comprehensive exit management plan, with focus on sustainability and do Migration of the VMs, data, content and any other assets to the new environment or on alternate Managed Service Provider’s offerings and ensuring successful deployment and running of user Department’s solution on the new infrastructure by suitably retrieving all data, scripts, software, virtual machine images, and so forth to enable mirroring or copying to Agency supplied industry standard media.

12. CSP Ensure that all the documentation required for smooth transition including configuration documents are kept up to date. Once the exit process is completed, remove the data, content and other assets from the cloud environment and destroy the VM, Content and data of user Department.

Performance Bank Guarantee

13. In addition to a one-time performance bank guarantee (PBG) of Rs. 50 lakhs to be submitted by empanelled CSPs to DIT for the entire duration of this empanelment, a PBG of 10% of the contract value should be submitted by MSP/CSP to respective user Department for the period of the work order, if work order value exceeds Rs. 5 lakhs in a financial year. Any penalties as per the Service Level Agreements (SLAs) may be recovered from this PBG.

This Government Circular of Maharashtra Government is available at the website www.maharashtra.gov.in. Reference no. for this is 201805171357566211. This order has been signed digitally. By order and in the name of the Governor of Maharashtra.
Cloud Computing Policy-Instructions to Departments regarding hosting of IT applications.

Government of Maharashtra
General Administration Department
Government Circular No. मातंसं - 060/3/2017/2
Hutatma Rajguru Chowk, Madam Cama Road,
Mantralaya, Mumbai – 400 032
Dated – 19th May 2018

Addendum to Government Circular No. मातंसं - 060/3/2017/1
Cloud Computing Policy-Empanelment of Cloud Service Providers and Guidelines for Government organizations dated 16th May 2018

Ref:
1. Cloud Computing policy Circular dated 29.1.2018
2. Cloud Computing Policy-Empanelment of Cloud Service Providers and Guidelines for Government organizations dated 16th May 2018

Government Circular:-

1. The following Cloud service providers (CSP) are being hereby empanelled by DIT for a period of 3 years for providing cloud services to the all Government Departments, subordinate offices, Public Sector Undertakings, Urban and Rural Local Bodies & any body/organization set up under any law of the State Government (herein collectively referred to as “Government organizations”) from 1.5.2018 till 30.4.2021.

Tier-1 empanelment
1. Amazon Web Services (AISPL)
2. Microsoft
3. Net Magic
4. Control-S (Conditional Empanelment for Sec-A of Annexure 8.1, 8.2 and 8.3 and not any other section)

Tier-2 empanelment
1. ESDS

2. List of empanelled CSP and their MSP

<table>
<thead>
<tr>
<th>Sr #</th>
<th>TIER</th>
<th>CSP</th>
<th>MSP</th>
<th>Public Cloud</th>
<th>Virtual Private Cloud</th>
<th>Govt Community Cloud</th>
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<tr>
<td>1</td>
<td>1</td>
<td>Net Magic</td>
<td>Net Magic</td>
<td>Yes</td>
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Cloud service offerings

3.1 The 3 cloud service offerings being provided by the empanelled CSPs are as follows.

a) Public Cloud
b) Virtual Private Cloud
c) Government Community Cloud

3.2 As part of each of these cloud service offerings, the following cloud services will be available to Government organizations:

- Virtual machines
- Storage
- Database
- Media transcoding
- Services like DNS, Active directory, Virtual Private Network (VPN), API management, email/SMS gateway, back-up services, mobile services, developer tools and office productivity tools
- Provision of Bare metal server as a service

<table>
<thead>
<tr>
<th>Annexure 8.1</th>
<th>PUBLIC CLOUD</th>
<th>CSP /MSP Services</th>
<th>DC-1 YR</th>
<th>DC-2 YRS</th>
<th>DR-1 YR</th>
<th>DR-2 YRS</th>
<th>DC+DR 1 YR</th>
<th>DC+DR 2 YRS</th>
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</table>
4. Contact LIST OF CSP/MSP

Additional information to Annexure 1
As an example for Sizing of Infrastructure of any project:
1. Select the Cloud (Public, Private or Community)
2. Select the Virtual Server configuration (Pack 1 to Pack 20) from Section A
3. Select the Primary or DR or DC+DR as per requirement
4. Then Select additional Storage if required from Section B
5. Then select the database required from Section C
6. This will give the total amount required for the Selected Infrastructure.
7. Additional components can be selected like media transcoding etc. as per project requirement.

Annexure 1 of this Circular supersedes the Annexure 1 of Government Circular No. वर्तमान -
060/3/2017/1 Cloud Computing Policy-Empanelment of Cloud Service Providers and Guidelines for Government organizations dated 16th may 2018
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   Tier-2 empanelment
   1. ESDS

Cloud service offerings

2.1 In addition to the cloud services being provided by the Cloud service providers, below additional services are being included in the list of cloud service offerings to be provided by the empanelled CSPs.

a) Additional Virtual Machine Packs
b) Platform as a service

c) Software as a service

2.2 As part of each of these cloud service offerings, the following cloud services will be available to Government organizations as mentioned in Annexure 1 of this document:

- Virtual machines
- Database as a service

- Data warehouse As a service
- Middle Ware software as a service based on Core, Memory and Storage Type
- Additional Services such as:
  - Data warehouse as a service or equivalent
  - Access control as a service or equivalent
  - Simple Notification Service or equivalent
  - Managed Message Queuing Service or equivalent
  - Cloud HSM or equivalent
  - Big data processing as a service
  - Cache management as a service or equivalent
  - Elastic Search or equivalent
  - Data Streams or equivalent
  - Simple Workflow Service or equivalent
  - Cloud Formation or equivalent
  - Cloud AUDIT Trail or equivalent
  - Device based Data migration services
  - Storage Gateway or equivalent
  - Web App Hosting as a Service
  - API Management as a service
  - Enterprise Mailing Solution as a service
  - Enterprise Open source Mailing Solution as a service
  - Instant Messaging and Online Meetings
  - Online File Storage and Collaboration (Co-Authoring) solution
  - Cloud based Enterprise Office Productivity suit
  - Cloud based open source Office Productivity suit
  - ERP/SAP Basis support - cover 24x7 support via ticket, chat & email
  - ERP/SAP Basis support - cover 24x7 support via ticket, chat & email
  - Dual Factor Authentication (Per User)
  - Dual Factor Authentication Per 5000 Users
  - Dual Factor Authentication Per 50000 Users
- Business Intelligence tools as a Service (BIaaS) using MS SQL server
- Load Balancer as a Service (for each device)
- Interoperability as a service.
• Services like DNS, Active directory, Virtual Private Network (VPN), API management, email/SMS gateway, back-up services, mobile services, developer tools and office productivity tools

Additional information to Annexure 1

Annexure 1 of this Circular supersedes the Annexure 1 Tier 2 empanelment rates of Government Circular No. मातंसं - 060/3/2017/2 Cloud Computing Policy-Empanelment of Cloud Service providers and Guidelines for Government organizations dated 19th may 2018.

This Government Circular of Maharashtra Government is available at the website www.maharashtra.gov.in. Reference no. for this is 201808041826435611. This order has been signed digitally.
Introduction-

Considering the growing adoption of online services by citizens of the State & use of IT within Government, there is a constantly increasing demand from Departments for infrastructure for hosting services including disaster recovery and backup for their various IT applications.

Para 7.13 of the State’s E-governance policy (DIT GR dated 23.09.2011), “The State shall explore the option of cloud computing as a preferred way for implementing all e Governance projects in the State.” The Government had set up a Committee headed by Principal Secretary IT to prepare the Cloud Computing Policy of the State. The said policy has been approved by the Government on 17.1.2018. It is proposed to communicate the salient features of the State’s Cloud Computing Policy to all Departments and issue operational instructions regarding the steps to be followed by Departments.

The following instructions are issued in addendum to earlier instructions issued in this regard.

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1. The following instructions will apply to all Government Departments, sub-ordinate offices, Public Sector Undertakings, Urban and Rural Local Bodies & any body/organization set up under any law of the State Government (henceforth collectively referred to as “Government organizations”)

2. In case of existing applications not hosted in a cloud environment, Government organizations must ensure that the applications are migrated to cloud on or before 31.03.2020. All Departments must review their existing software applications and ensure that the applications are cloud ready in time for the above migration.

3. To Further Expedite the Migration of department applications and websites to Cloud selection of cloud service providers/ do Migration of existing applications to cloud and hosting of new applications, PIC of DIT is hereby authorized for selection of CSP for other department projects in presence of Secretary (or his representative) of departments in DIT PIC.
4. Whenever departments are to avail the cloud services, they may send a detailed note to DIT for a PIC meeting and DIT PIC to be convened by DIT accordingly. Budget and payments for cloud services will continue to be provided by concerned parent department. All the concerned departments to make judicious use of cloud and its offerings appropriately and without delay.

5. Website and Application Security audit is Mandatory for hosting on Cloud. DIT / CERT-IN empanelment of Security audit Agencies be used for this Audit. Submission of Security audit report and Certificate along with Audited source code to DIT is mandatory before going live on internet.

6. As per Supreme Court of India and Bombay High Court Order on GIGW compliances of Websites below Process for hosting of Application on cloud(CSP) is being included but not limited to below:

   1. Website should be in compliance with eGovernance Standards of Government of India
   2. Technical Standards for Interoperability Framework for e-Governance (IFEG) in India Version 1.0 or higher
      1. MDDS- Demographic Standards, Character Encoding, Font Standard, eGov.BIDS
      2. eSAFE-ISF01, eSAFE Framework (and associated documents) or higher
      3. Guidelines for Usage of Digital Signatures in e-Governance
      5. e-Governance policies of Government of Maharashtra
      6. Guidelines of Indian Government Website (GIGW)
      7. WCAG 2.0 or higher standard, W3C
      8. Other e-Governance standards of Government of India (egovstandards.gov.in)

7. Compliance Certificate submission by Department has to be done for showing above compliance to DIT.

8. Details of the website such as Operating System, Database used, Web Servers used, Data Storage required, architecture, functionality, framework used etc. needs to be provided to DIT/SDC for due scrutiny as and when asked for by DIT

9. Chief Information Security Officer (CISO) of DIT/SDC will analyze the documents submitted by department along with security audit certificate, and will submit acceptance or rejection report for hosting on cloud (CSP)

This Government resolution of Maharashtra Government is available at the website www.maharashtra.gov.in. Reference no. for this is 201906191741481211. This order has been signed digitally.
Cloud Computing Policy-Instructions to Departments regarding hosting of IT applications.

Government of Maharashtra
General Administration Department
Addendum to Government Circular No. GAD-IT-060/3/2017
Hutatma Rajguru Chowk, Madam Cama Road,
Mantralaya, Mumbai – 400 032
Dated – 5th July 2019

Introduction

Considering the growing adoption of online services by citizens of the State & use of IT within Government, there is a constantly increasing demand from Departments for infrastructure for hosting services including disaster recovery and backup for their various IT applications.

Para 7.13 of the State’s E-Governance policy (DIT GR dated 23.09.2011), “The State shall explore the option of cloud computing as a preferred way for implementing all e Governance projects in the State.” The Government had set up a Committee headed by Principal Secretary IT to prepare the Cloud Computing Policy of the State. The said policy has been approved by the Government on 17.1.2018.

The following instructions are issued in addendum to earlier instructions issued in this regard.

Government Resolution

1. The following instructions will apply to all Government Departments, sub-ordinate offices, Public Sector Undertakings, Urban and Rural Local Bodies & any body/organization set up under any law of the State Government (henceforth collectively referred to as “Government organizations”)

2. All departments to define and communicate to DIT in writing the Data that needs to be Migrated /Hosted on cloud and the time period it is to be on cloud.

3. Departments to confirm to DIT the data that is to be archived to optimize storage on cloud. One copy of archived data to be given to department by Cloud Service Provider (CSP) and another copy to be sent by CSP to SDC data archival.

4. Departments to verify and confirm to CSP the data sets for automated removal of data from Online to Archival for proper management of data on cloud. CSP to confirm to department in writing on completion of the process and its automation.

5. In case of existing applications not hosted in a cloud environment and in the process of Migration, Government organizations must ensure that before the applications are migrated
to cloud and Go Live from Cloud Departments must review their existing application’s data and define clearly the data to be migrated to cloud and communicate this to CSP and DIT in writing.

6. All departments to review their applications and data on cloud periodically for identification and removal of such applications and data from cloud that may not be needed to keep operations efficient and cost effective.

This Government Circular of Maharashtra Government is available at the website www.maharashtra.gov.in. Reference no. for this is 201907051642210511. This order has been signed digitally. By order and in the name of the Governor of Maharashtra.

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