



TEMPLATE FOR EXPRESSION OF INTEREST (EOI)

India Open-Source for Mobile Communication Network (IOS MCN) Project

Foundation for Science Innovation and Development IISc, Bengaluru

NOTICE NO.

Dated:

TEMPLATE FOR EXPRESSION OF INTEREST (EOI)

1. INTRODUCTION

The client is implementing an open-source project for communication software called IOS MCN (India Open-source for Mobile Communication Network). This project will have multiple government and non-government contributors. Client wants to set this up as a global standard open-source project with right practices and methodologies.

In line with the best practices followed by globally established Open-Source Forums (Linux Foundation, Open Air Interface etc.), there is a provision to engage third parties to procure software components as well as testing, engineering and open-source governance services to help ruggedise and strengthen the code base and deliveries.

Given the mandate of the IOS-5GN project to provide in a time bound manner, commercially deployable deliveries and support, it is essential that such best practices of engaging the vendors and experts from the ecosystem are adopted. The following 2 step process will be followed by IOS-5GN:



1. STEP 1 – Qualifying vendors for participation in the RFP process for any components or services needed by IOS-5GN. This TOR for EOI is intended for this qualifying process.
2. STEP 2- On identification of specific components or services for which third parties need to be engaged – creation of an RFP to invite the vendors qualified in STEP 1 to provide Commercial bids.

It should be noted that:

1. Not all the items listed in the TOR for EOI will result in RFPs.
2. The pre-qualification of vendors through the EOI process is needed to expedite the RFP process.

This document pertains to STEP1, that is the qualifying of vendors. This is a call for expression of interest (EoI) to contribute to this project in the areas detailed below. There are multiple areas of work which need different set of competency and industry experience, for which the Client is looking for vendors /Service providers who can take these up as time bound projects and deliver the outcomes specified below. Currently, the expression of interest (EoI) is invited for the following broad focus areas. You can apply for any broad areas or specific smaller areas of work.

- i. Engineering:
 - a. Software : Open Source Software Development & Delivery
 - b. Testing : Open Source Test Development & Delivery
 - c. Systems : Open Source Systems Engineering Delivery
- ii. Governance:
 - a. Open-Source Governance Strategy, Framework and Execution

The project has strict timelines, and the vendors/service providers should abide by the same.

2. TECHNICAL REQUIREMENTS

Detailed technical specifications have been provided in the TOR document.

The template in ANNEXURE-1 provides the checklist that needs to be completed to indicate the areas of interest. The template also provides guidelines for additional documentation to be provided to establish the technical competency and capability to participate in the commercial bid for the various line items.

3. SUBMISSION REQUIREMENTS

1. The expression of interest (EOI) should be submitted in the form of The template provided in Annexure 1. indicating the areas on interest
2. Additional documents illustrating the competency and capability of the vendor
3. Presentation and demos to the Evaluation committee

Submission of EOI must be enclosed in a PDF file emailed to **(Vinay Kulkarni vinay@fsid-iisc.in)**

IMPORTANT: Clients must submit their EOI no later than the specified deadline.



4. EVALUATION CRITERIA

- The applicants are expected to have prior experience in the specified areas.
- They need to furnish the details of their competency and credibility to fulfil their requirements of each activity
- The Applicant should additionally illustrate/demonstrate product and service offerings related to the specified areas
- Experience in delivering to and participating in open-source projects/foundations is an important additional consideration
- The applicant can provide EOI for one or more areas specified in this document
- Some of the specific expectations are added for each area separately below. That can be a reference set of competencies. Applicants can add all other relevant information to substantiate their applications.

5. IMPORTANT NOTES

, Vendor's track record in delivering components and services on-time and with quality and reliability is an important consideration. Further, vendor reputation will also be considered.

- The Evaluation Committee reserves the right to reject any or all EOIs on its own evaluation criteria.
- Any clarifications or questions regarding this EOI should be directed to the contact person listed above.
- Following timeline will be followed for the completion of the EOI process:

	Activity	Date
1.	EOI Bid process opened	
2.	Last date for submission of EOI	
3.	Completion of Evaluation Process	
4.	List of Qualified vendors finalised	



ANNEXURE-1

Following table should be completed with relevant information of EOI

Engineering:

Software: Open-Source Software Development

Product Area / Component	Insert Y in each row indicating your interest to participate in the Commercial bid	Provide links to relevant sections in Company's Homepage/Product brochures indicating competency in the Product area
Voice over New Radio (VoNR) enhancements for gNodeB		
VoNR enhancements for 5G Core		
IP Multimedia Subsystem for 5G (IMS)		
Inter-working function across non-3GPP and 3GPP(N3IWF)		
Network Exposure Function (NEF)		
Network Data Analytics Function (NWDAF)		
Service Management and Orchestration (SMO)		
Radio Intelligent Controller (RIC)		
Platform Level Orchestration and Management		
Platform Level Monitoring & Observability		

Testing : Open-Source Test Development & Delivery

Product Area / Component	Insert Y in each row indicating your interest to participate in the Commercial bid	Provide links to relevant sections in Company's Homepage/Product brochures indicating competency in the Product area
Testing: Open-Source Test Development		
Component Test		
System Test		
Pre-Deployment Test		

Systems : Open-Source Systems Engineering Delivery

Product Area / Component	Insert Y in each row indicating your interest to participate in the Commercial bid	Provide links to relevant sections in Company's Homepage/Product brochures indicating competency in the Product area

Systems: Open-Source Systems Engineering		
CI/CD Strategy, Framework and Execution		
Open-source Code Management (GitHub) Framework and Execution		
Release Management		
Platform Security Strategy and Hardening		

Governance:

Open-Source Governance Strategy, Framework and Execution

Product Area / Component	Insert Y in each row indicating your interest to participate in the Commercial bid	Links to Company's Homepage/Products
Open-Source Governance Strategy, Framework and Execution		
Operationalize the Open-Source Framework and Maintain Open-Source Repository		
IOS MCN Website and Management		

Indicate your competency, expertise and experience in the following table:

Engineering

Software: Open-source Software Development

Components	Provide links to relevant sections in Company's Homepage/Product brochures indicating competency in the Product area
Expertise in 5G Development	
<ul style="list-style-type: none"> Working experience of developing or contributing such features or technologies Open-Source contribution experience Working knowledge with Open-Source IMS (eg. Kamailio) Signalling and protocols <ul style="list-style-type: none"> Expertise with SIP Signalling and SDP parameters Experience with RTP and RTCP packet format Understanding of P-CSCF, I-CSCF, S-SCSF Experience with HTTP 2.0 and SSL library integration Working knowledge PCF and HSS integration to support Voice/Video in Packet Core Knowledge of 5G Core, N5 and AF Working Experience with User Plane Performance Optimization and making Scalable Systems Programming and Containerization 	



<ul style="list-style-type: none"> ▪ Experience with containerization of components and Kubernetes ▪ Proficiency with C, Java, Golang, Python for development of features in IMS and 5G Core 	
<p>Expertise in Platform Level Orchestration and Management</p>	
<ul style="list-style-type: none"> ● Experience and expertise in container-based application development and orchestration ● Expertise in any one COE like Kubernetes (Kubernetes preferred) ● Experience building and deploying applications on any COE ● Developed new cloud native components within COE (like Kubernetes native components within COE to manage applications) ● Expertise in COE APIs, Operators and features (need to show case example projects developed) ● Experience building Orchestration and O&M solution for project with multiple components ● Expertise in automated deployment of applications ● Expertise in automated installation methods like helm, ansible (or similar) 	
<p>Platform Level Monitoring & Observability</p>	
<ul style="list-style-type: none"> ● Experience and expertise in container-based application development and orchestration ● Expertise in any one COE like Kubernetes (Kubernetes preferred) ● Expertise in COE APIs, Operators and features (need to show case example projects developed) ● Experience building monitoring/observability project for infrastructure management ● Expertise in application monitoring ● Experience in OpenAPI, Open Telemetry etc (standards in containerized application domain) ● Kubernetes API level work experience, especially for runtime, CNI or CSI ● Expertise in building any monitoring or observability products or open-source projects with customer trials ● Capability in infrastructure monitoring ● Monitoring projects with GUI/Visualization, Exporters and plugins ● Capability in Kubernetes monitoring and related native tools like Prometheus and Grafana 	

Testing: Open-Source Test Development & Delivery

<p>Expertise in UT</p>	
<ul style="list-style-type: none"> ● Expertise and competency in integration of Unit Testing Framework (eg., Jmeter, Junit, Cunit, GoTest) for the 5G Core, RAN and SMO into the CI pipeline 	

<ul style="list-style-type: none"> • Working knowledge of 5G Core Network Functions, 5G RAN components and Management Functions • Experience and proficiency with scripts for adding new test cases and maintaining to the Unit Test Framework • Experience in writing test cases based on the relevant 3GPP technical specification documents. • Experience in preparing test data, defect logging, test execution, and test result analysis 	
<p>Expertise in Component Test</p>	
<ul style="list-style-type: none"> • Expertise and competency in integration of Selenium, Appium Testing Frameworks for 5G Core, RAN and SMO into the CI Pipeline • Experience in Core or RAN or SMO testing for 3GPP Release 15 or Release 16 • Working knowledge of 3GPP Compliance testing of 5G Core, RAN or SMO • Experience with 3rd party testing tools or open-source framework for 5G Core Network Functions • Experience with 3rd party testing tools or open-source framework for 5G CU, DU • Experience with 3rd party testing tools or open-source framework SMO • Experience in Citrus (API Level Testing and Microservice Integration Testing) into the CI pipeline. • Experience and proficiency with scripts for adding new test cases and maintaining to the Component Test Framework • Experience in writing test cases based on the relevant 3GPP technical specification documents. • Experience in preparing test data, defect logging, test execution, and test result analysis. 	
<p>Expertise in System Test</p>	
<ul style="list-style-type: none"> • Experience of Selenium, Appium for automation of SMO configuration and monitoring • Experience of Robotium (BlackBox Testing for Android) for automation of UE clicks • Experience in Core or RAN or SMO testing for 3GPP Release 15 or Release 16 • Working knowledge of end-to-end system testing with 5G Core, RAN and SMO • Experience with 3rd Party Testing Tool or Source Test Framework for end-to-end automation of 5G Core, RAN and SMO testing • Experience and proficiency with scripts for adding new test cases and maintaining to the System Test Framework • Experience with scalability and performance testing using 3rd Party tools. • Experience in writing test cases based on the relevant 3GPP technical specification documents. • Experience in preparing test data, defect logging, test execution, and test result analysis. 	
<p>Expertise in Pre-Deployment Test</p>	
<ul style="list-style-type: none"> • Experience working with customer to understand customer requirement for 5G use cases • Experience of creation of 5G Solution Architecture for the use cases and its deployment 	

<ul style="list-style-type: none"> • Experience of deployment of Private 5G with multiple customers for various use cases • Working knowledge and experience of integrating 3rd party use cases to a Private 5G Network (Fleet Management, Video surveillance, Robotics, Drone Survey, IoT Monitoring, Mission Critical Communication etc.) • Experience of setting the connectivity within Private Network and its reachability to Internet. • Experience of configuration of the 5G SIMs, 5G Core, RAN, Application Servers to setup the Private 5G Network and Private Cloud and its monitoring. • Ability to optimize or find work-around to ensure customer requirement for Private 5G is deployable with existing feature or resources 	
<p>Expertise in Execution Strategy</p>	
<ul style="list-style-type: none"> • Pre-build Phase (Source Code): Expertise in Integration of all unit level checking frameworks into the Continuous Integration pipeline for automated code checking once pipeline is triggered. • Post-build Phase (Binary): Expertise in Functionality testing like APIs between Network Functions once code is successfully built into binary. • Post-Containerization (Docker Image): Expertise in integration level testing like microservice reachability and network exposures. • System Testing (Manual Testing or semi-automated along with Targeted Device): Expertise in End-to-End testing of the full Stack along with Core, RAN, UE Device for validating proper functionality of code and services 	
<p>Expertise in Device Automation</p>	
<ul style="list-style-type: none"> • Experience in Android, iOS device simulation with capability of simulation and mimicking user inputs using automated scripts. (eg. ADB, Termux) • Knowledge of Android and iOS Operating Systems and security protocols. • Experience with in log capturing and debugging from remote devices wirelessly over wireless ADB, Putty and Log Cat 	
<p>Expertise in CI/CD Strategy, Framework and Execution</p>	
<ul style="list-style-type: none"> • Expertise in handling CI/CD Pipeline for multiple repositories and multiple branches in single pipeline. • Skillset in containerization of applications, orchestration and networking (eg. Kubernetes, Container Engine and Registry, Replica-set and Load-balancing). • Multi Team Collaborative feature support and RBAC enabled user management controls. • Experience with Hybrid CI/CD support covering On-Cloud (eg. GitHub Actions) and On-Premise (eg. Jenkins) Build and Deployment Strategy. • Experience in integration of Tools (T-shark) and Plugin (Docker, Maven, Prometheus, Git). • Ability to work with opensource software life cycle and project structure. 	

<ul style="list-style-type: none"> • Experience with handling multi-site CI/CD Infrastructure from different Geo-Locations with minimal latency. • Experience in integration of variety of Testing Frameworks on Unit, Integration, System, Acceptance, A/B testing for languages like C, C++, Go, Java, Python and more. 	
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Systems: Open Source Systems Engineering Delivery

<p>Expertise in Open-source Code Management (GitHub) Framework and Execution</p>	
<ul style="list-style-type: none"> • Experience incubating new open-source projects • Experience leading complete engineering of open-source project or foundation projects • Experience bootstrapping open-source projects and new releases from scratch (GitHub or similar) • Experience maintaining multiple source code repositories for open-source projects (GitHub or similar) • Experience working with upstream and downstream projects and its execution 	
<p>Expertise in Release Management</p>	
<ul style="list-style-type: none"> • Experience leading open-source projects, releases and customer trials • Experience leading open-source releases for multiple projects / foundation (GitHub or similar) • Experience playing key roles in open-source projects / foundations and done good collaboration and understanding of open-source practices • Experience preparing release strategy for multi-project open-source releases 	
<p>Expertise in Platform Security Strategy and Hardening</p>	
<ul style="list-style-type: none"> • Experience and expertise in container-based application development and orchestration • Expertise in any one COE like Kubernetes (Kubernetes preferred) • Experience building and deploying applications on any COE • Developed new cloud-native components within COE (like Kubernetes native components within COE to manage applications) • Expertise in COE APIs, Operators and features (need to showcase example projects developed) • Experience building security solutions for any COE (preferrable – Kubernetes) • Expertise working in hybrid deployments of applications 	

Governance

Open-Source Governance Strategy, Framework and Execution



Components	Documents/Links to Credentials
<p>Expertise in Open-Source Governance</p> <ul style="list-style-type: none"> • Experience in incubating new open-source projects • Experience in incubating new open-source foundations or playing key roles in the same • Experience playing key roles in open-source projects/foundations such as advisory roles, TSC / TOC, Workgroups, Community Management • Experience leading complete engineering of open-source project or foundation projects • Experience in playing key roles in open-source projects/foundations such as advisory roles, TSC / TOC, Workgroups, Community Management • Experience in Open-Source governance structure preparation, charter preparation/review, membership agreement preparation/review and preparing governance artifacts 	
<p>Expertise in Open-Source Membership</p> <ul style="list-style-type: none"> • Experience in incubating new open-source projects / foundations with multiple members or partners globally • Experience in Open-Source membership models and strategy incubation • Experience working on membership management, agreements and onboarding for open-source projects/foundations • Experience working / building community around open-source projects 	
<p>Expertise in Open-Source Licensing</p> <ul style="list-style-type: none"> • Experience in incubating new open-source projects and managing the licenses • Experience in incubating new open-source foundations and contributions to the licensing • Experience in licensing consultancy, international talks/sessions or papers • Understanding of prominent open-source licenses like Apache, MIT, GPL etc • Experience working multi license projects • Experience leading open-source projects, releases and customer trials • Experience building licensing strategy for open-source project(s) 	
<p>Expertise in Open-source Development</p> <ul style="list-style-type: none"> • Experience incubating new open-source projects • Experience leading complete engineering of open-source project or foundation projects • Experience bootstrapping open-source projects and new releases from scratch (GitHub or similar) • Experience maintaining multiple source code repositories for open-source projects (GitHub or similar) • Expertise in upstream and downstream management 	
<p>Expertise in Open-source Releases</p> <ul style="list-style-type: none"> • Experience leading open-source projects, releases and customer trials • Experience leading open-source releases for multiple projects / foundation (GitHub or similar) 	



<ul style="list-style-type: none">• Experience playing key roles in open-source projects / foundations and done good collaboration and understanding of open-source practices• Experience preparing release strategy for multi-project open-source releases	
Expertise in Website Management	
<ul style="list-style-type: none">• Experience Managing Open-source Project / Foundation websites• Experience developing contents and maintaining open-source project / foundation websites• General website design, development and maintenance experience	



ANNEXURE-2

Self-declaration is to be given by the client

RFP Reference No.

Date:

Client's Name & Address:

Person to be contacted:

Designation:

Telephone No:

Fax No:

Email:

To,

Director,

FSID, IISc Bangalore-560012

We, the undersigned Client, having carefully read and examined in detail the Terms and Conditions, specifications, and all documents regarding the TOR and EOI

We also hereby declare that.

1. We have not been blacklisted/debarred by any Government/Undertaking.
2. The rates quoted are not higher than the rates quoted for the same item for any Government/Undertaking.
3. The bid submitted by us is properly sealed and prepared to prevent any subsequent alteration and replacement.

For and on behalf of the firm

(Firms Name & Address)

(Signature of Authorized

Signatory)

RFP No. FSID/IOSMCN/05-01 Dated: 16th May 2024
Foundation for Science Innovation and Development (FSID)



Name:

Date: -----

Designation:

Place: -----

Seal

Phone No:



ANNEXURE – 3

Client Organisation Details Format for RFP No. FSID/IOSMCN/05-01 Dated 16/05/24		
To, Director, FSID, IISc Bangalore-560012		
1	Client Name	
2	Website Address	
3	Email Address	
4	Address for Communication	
5	Telephone Number	
6	Fax/Telefax Number	
7	Authorised Person Name	
8	Designation:	
9	Mobile No.	
10	Email ID	
11	Alternate Person Name	
12	Designation:	
13	Mobile No.	
14	Email ID	
15	PAN Number	
16	GST Regn. No. with Address	
17	Beneficiary's complete Bank Details.	
18	Bank Account No.	
19	IFSC / NEFT Code	
20	Name of the Bank	
21	Turnover of the Client in last 3 years	
22	2023	
23	2022	
24	2021	
25	Are you a MSME Unit. If yes, please furnish. Registration Details, Name of the DIC/State.	
26	If you are MSME, is it owned by SC/ST Entrepreneurs or Women Entrepreneurs? If Yes, please specify the Name of the Owner who is SC or ST or Women Entrepreneur (as applicable)	
27	Following Documents are to be submitted	
28	Certificate of Incorporation	
29	PAN No	
30	GST Registration No.	
31	<p>DECLARATION</p> <p>1) We have read and understood the terms & conditions of the above-mentioned tender and comply to all Terms & Conditions of the Tender. (In case of any deviation, the Client must attach a separate sheet clearly mentioning the Clause No. of the Tender and Deviation thereto)</p>	<p>Signature of Authorised Signatory with Seal</p> <p>(Name)</p>



	2) We certify that the information mentioned above are true and correct to best of our knowledge.	
32	Place	

[Remaining page is left blank]



ANNEXURE-4

Format: Letter of undertaking

(Company letterhead)

To,

Director,

FSID, IISc Bangalore-560012

Sir,

Sub: Undertaking on non-disclosure of contract documents

I/We do hereby undertake that we shall not disclose the contract or any provision, specification, plan, design, pattern, sample, or information to any third party for a period of three years from the termination of the contract.

I/We do hereby undertake that except with the written consent of the Buyer/Seller, the other party shall not disclose the contract or any provision, specification, plan, design, pattern, sample or information to any third party.

I/We do hereby undertake not to copy the AS-IS documentation captured in this tender document in any form Xerox, electronic, or via DMS or any other physical/electronic means for any purpose but for the bidding process.

For and on behalf of the

Client

(Signature)

(Name of the Authorized Signatory)

Date:

END THE DOCUMENT