



रेल पहिया कारखाना
RAIL WHEEL FACTORY
भारतीय रेल
(INDIAN RAILWAYS)

Request for Proposal-Industry
Standard 4.0

व. ई.डी.पी.एम का कार्यालय
Office of the Sr.EDP Manager
यलहंका, बंगलूरु

Yelahanka Bangalore – 560064

No.RWF/MIS/BI&A/I4/565

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Rail Wheel Factory, Yelahanka, Bangalore is in the process of establishing a cyber-physical platform for connecting SCADA, PLC and CNC machines in the shop floor to acquire process and production data to a Central Server in its IT department. Physical network connectivity, Manufacturer's License Activation (wherever necessary) etc., will be taken care of by us.

RWF has a host of machines with various OEM controllers, including Allen Bradley, Siemens, Fanuc etc.

We are hereby seeking your Proposal and Budgetary Quote for providing a single solution for Data Access and Data Capture from all makes of controllers, capable of aggregating machine connectivity and data, providing secure access to Industrial operations data, complying with the following broad specifications:-

Brief Specifications of OPC (Open Platform Communications) Unified Architecture Software Suite:

A) Functional capabilities:-

- i) **Discovery** : shall find all available OPC Servers on local PCs and/or networks spread across the shop-floor.
- ii) **Platform Independence** : shall be capable of working across platforms, from embedded micro-controllers to cloud-based infrastructure.
- iii) **Secure** : shall be capable of encryption, authentication and auditing.
- iv) **Extensible** : shall have ability to add new features without affecting existing applications.
- v) **Comprehensive Information Modeling** : shall be able to define complex information.

B) Platform Independence:-

- i) **Hardware Platforms** : functionality on traditional PC hardware, Cloud-based Servers, PLCs, Micro-controllers etc.

- ii) **Operating Systems** : Microsoft Windows, Android and any distribution of Linux.
- iii) **Interoperability** : shall provide necessary infrastructure for interoperability across the enterprise.

C) Security:-

- i) **Firewall-friendly** : shall be able to pass controls across hardware and software based firewalls.
- ii) **Transport** : shall address protocols such as Ultra-fast OPC-binary transport, SOAP-HTTPS etc.
- iii) **Session Encryption** : messages shall be transmitted securely at 128 or 256 bit encryption levels.
- iv) **Message Signing/Integrity** : messages should be received exactly as they are sent.
- v) **Sequenced Packets** : exposure to message replay attacks shall be eliminated with sequencing.
- vi) **Authentication** : should be capable of identifying each UA client and servers through Kerberos tokens, Open SSL certificates, etc., providing control over which applications and systems are permitted to connect with each other.
- vii) **User Control** : applications shall have the option to impose user authentication (login credentials, certificates etc.) and capable of further restricting or enhancing their capabilities with access rights and address-space "views".
- viii) **Auditing** : shall be capable of providing audit trails for all connections, security related and user related actions. Shall provide easy review of audit logs from multiple devices by linking audit event from the client to the server.
- ix) **Communication Channel** : shall be capable of defining fixed port for communication.

D) Extensible : shall be backward compatible and also provide a "future proof" framework.

E) Information Modeling :-

- i) Shall have complete object-oriented capabilities.
- ii) Shall have capability to model and extend Complex multi-level structures.
- iii) Data types and structures shall be defined in profiles.

F) Database Connectivity : shall be capable of securely connecting, for read/write, to a given SQL database across different domains and/or networks, passing through Gateway and Firewall.

G) Data Access:-

- i) Shall be capable of integrating data of 150 tags, spanning 6 or more workstations/machines.
- ii) Shall be capable of scaling beyond 1500 tags without disrupting already established data acquisition platform.
- iii) Shall provide access to real-time data, historical data and monitoring of alarms and events.

With respect to the above technical specifications, RWF is intending to carry the following work as the first phase of implementation of Industry Standard 4.0.

Scope of Phase – I : Implementation of Industry Standard 4.0.

1. Out of 60 plus machines, 10 machines will be selected for data integration as a harbinger project.
2. As an initial exercise, RWF would like to get information regarding all of the data which can be accessed from each and every machine.
3. From this machine-wise list of data, a selection of necessary parameters will be done by an internal committee in consultation with the implementing firm.
4. Common parameters of interest would include Real time production monitoring for data on cycle time/component time, cutting and spindle load parameters, machine-condition monitoring without addition of extra sensors, fault summary etc.
5. Wherever necessary, licensed copy of updated Operating System will have to be re-installed by the implementing firm. A clone of the existing HDD will be made by the implementing firm, and deposited with RWF. If new Hard Disks are required for this, the same will be provided by RWF.
6. The onus for Network and Security will lie with RWF.
7. Acquired Data shall be populated in SQL Database. Table structures will be created jointly by the firm and RWF.
8. Dashboards and Reports may preferably be developed in 'R' language, which is an integral part of SQL Server 2016 R Services and SQL Server 2017 Machine Learning Services.
9. In house Training to 10 officials of RWF, including fetching process and machine condition parameters using tags.

Your suggestions are also welcome. It is therefore, requested to kindly submit the Proposal and Budgetary Quote on or before **21.06.2019** by reply mail to samuel.j@rwf.railnet.gov.in

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