

# A VERSATILE SOLUTION FOR YOUR TERMINALS

The LINN logo consists of the letters 'L', 'I', 'N', and 'N' in a bold, dark blue, sans-serif font. The second 'N' is stylized with a blue diagonal stripe running from the top-left to the bottom-right.

LINN Terminal Management System  
Brochure

**ensaco**

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## INTRODUCTION

Terminal automation nowadays is built on modern and distributed principles with the idea to comply to rigorous requirements from both business/administrative and technological/operational world. Thus, a management system in such environment is obliged to support various functionalities.

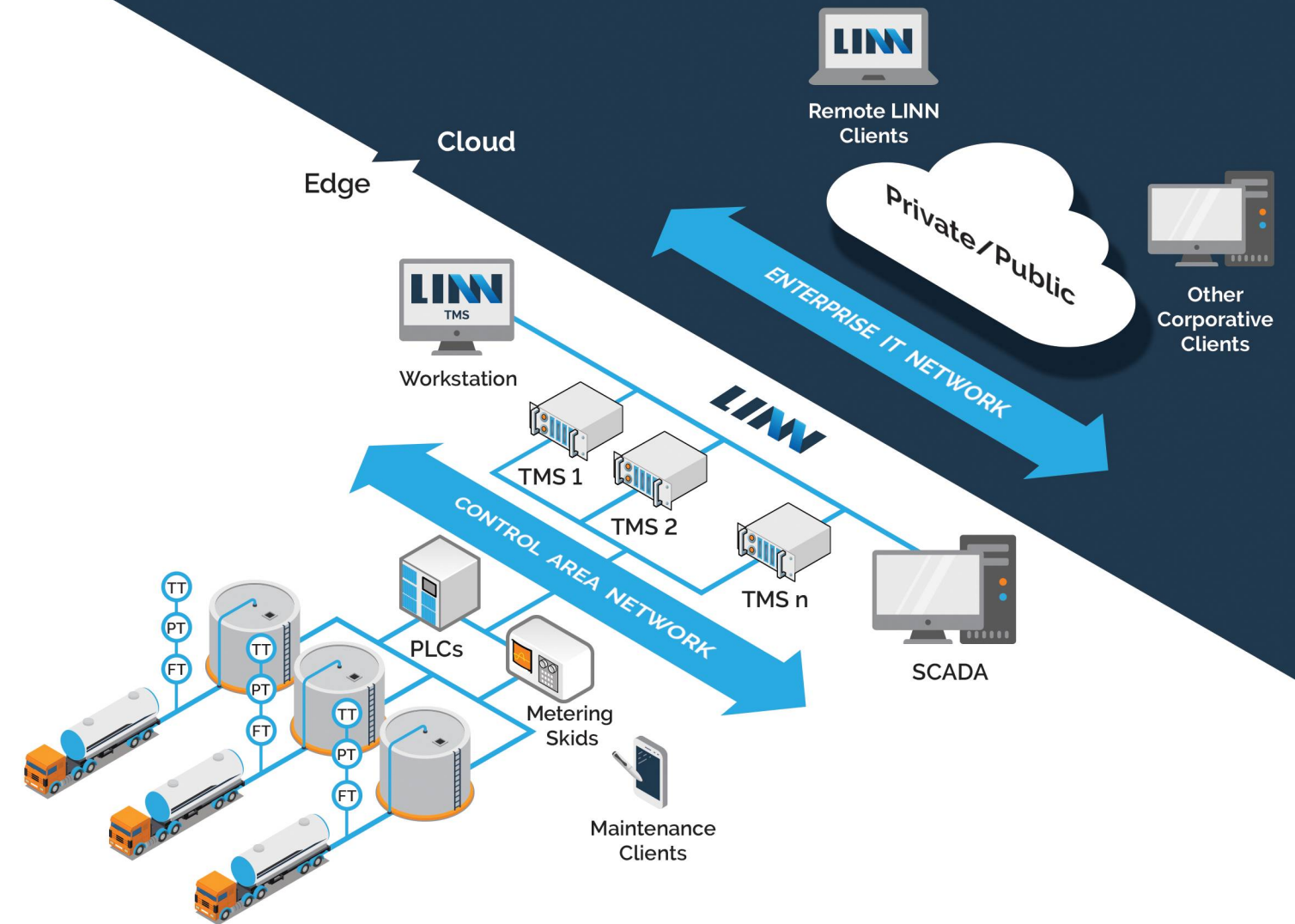
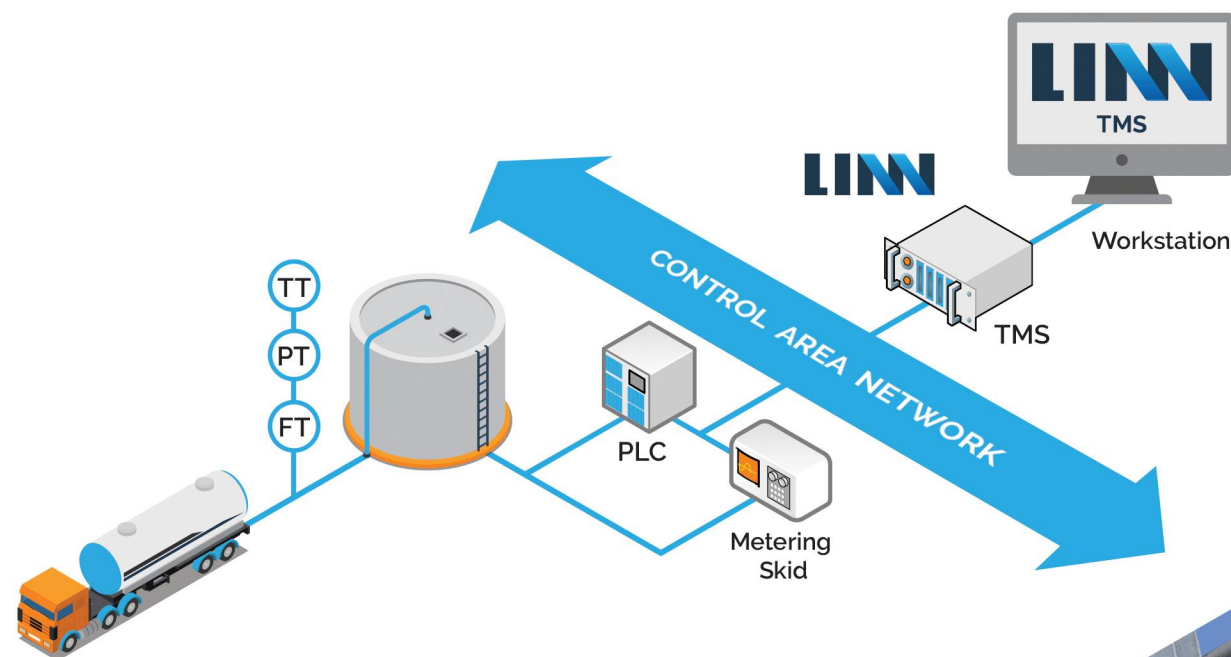
Whether the needed solution is for small, medium or large tank farms with terminals for loading/unloading oil and gas, or there is a requirement to integrate several terminal management systems into a single solution, the LINN TMS can offer an easy-to-handle and highly customizable system.



# SOLUTIONS FOR YOUR BUSINESS

The TMS can be integrated in various ways. Depending on complexity, for a smaller implementation, it can be installed with an additional module related to administrative tasks (receipts and dispatching, external and internal orders), but in larger systems it can be attached to the existing Terminal business software.

The LINN TMS can be used for small scale Terminals. Here, all TMS functionalities can coexist with a small-sized SCADA inside one computer. With an additional administrative module all required tasks can be accomplished from one operator place. This configuration can be easily adapted and scaled if necessary.



On the other hand, the LINN TMS can completely cover most comprehensive Terminal management workflow control.

TMS server units could be distributed in order to satisfy the requirements for covering geographically or logically separate segments (Oil, Derivates, Coke, ...).

The Terminal Management System can be operated either from the TMS Client embedded in the same hardware along with a Terminal System SCADA or as a standalone TMS Client workstation. The TMS supports both directions, control and monitoring thus, it can supply a wide range of data to SCADA for presentation. Integration can be achieved with standard industrial communication protocols (e.g., OPC UA).

The LINN TMS supports different maintenance approaches with providing and information flow to the maintenance crew with the help of an application that can be hosted on tablets or pocket helpers over a Bluetooth or Wi-Fi connection. Maintenance can do additional parametrization of metering units if necessary.

In business domain, a private/public cloud can host a portion of the TMS, e.g., a database (SQL/No-SQL), services and API's connectors needed to supply a business environment with data. The Edge TMS segment is securely connected to its Cloud part. Most importantly, this arrangement provides a separation of business from technology. To be able to communicate with external systems, the LINN TMS can use standard or vendor-specific connectors (e.g., a SAP interface for connecting to the ERP system).



The LINN TMS from its Cloud segment supports services related to:



- accessing logged/archived or real-time data on corporative/administrative workstations



- business intelligence applications hosted on various devices inside an enterprise IT network (laptops, mobiles, tablets etc.)



- remote LINN clients used for reconfiguration or diagnostics over a secure line

For the purpose of an extension or further development of the system, either in the IT or OT segment, encrypted communication is supported for engineers or business application developers.

If necessary, the TMS can be implemented with a redundancy support, thus ensuring a reliable operation.

Various hardware and software options could be introduced in the final solution, depending on users' needs.

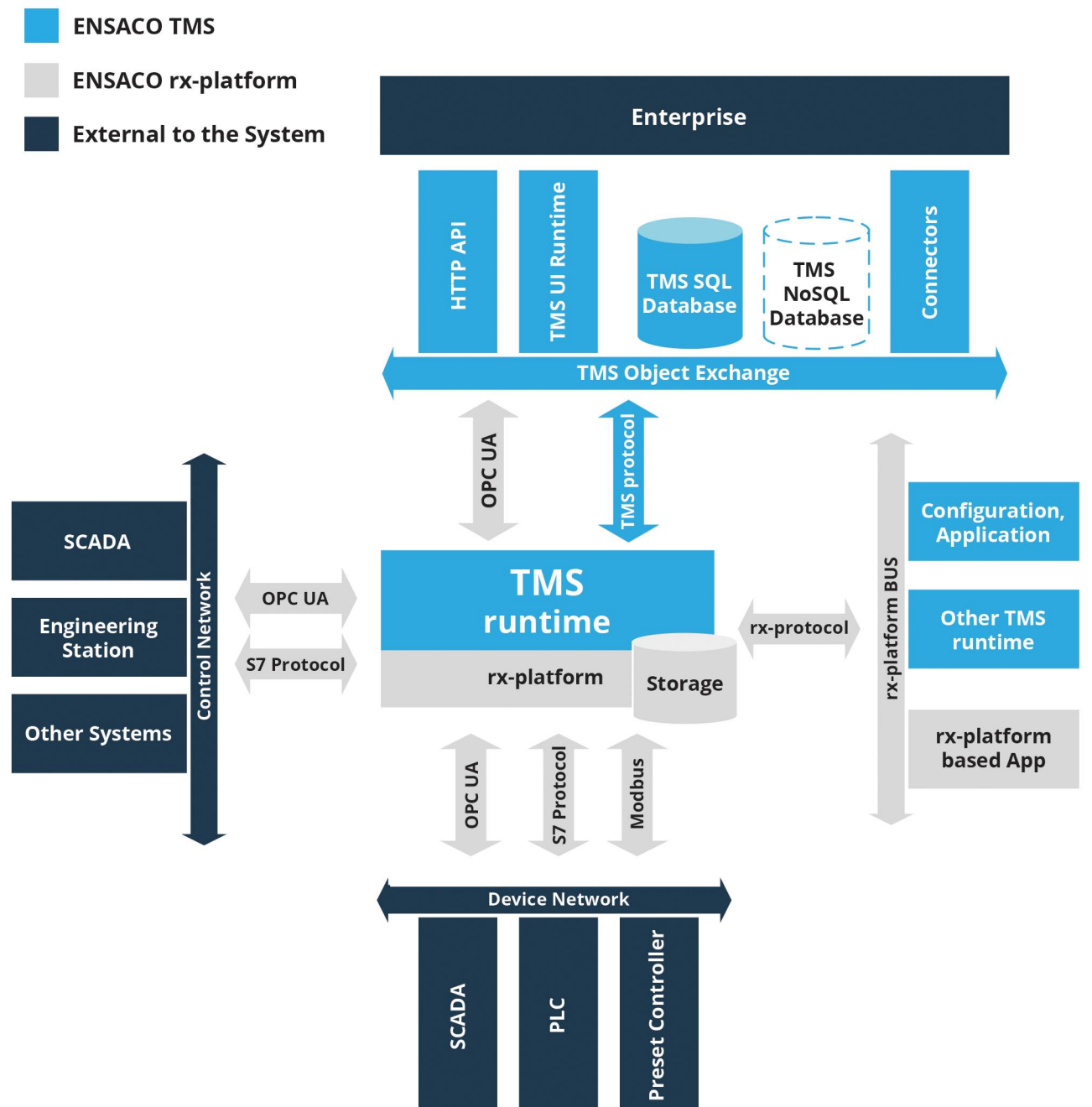
The following table suggests a possible deployment of the LINN TMS (the greyed segments already exist in the Terminal System):

SMALL SIZE TERMINALS (1 - 3)	MEDIUM SIZE TERMINALS (5 - 10)	LARGE SIZE TERMINALS (10 - )
ERP	ERP	ERP
Administrative module	Administrative module or existing Terminal Business	Terminal Business System
LINN TMS Client	LINN TMS Client	LINN TMS Client
LINN TMS server (redundancy option)	LINN TMS server (redundancy option)	Distributed LINN TMS
Engineering Client	Engineering Clients	Engineering Clients Maintenance Clients ...
SCADA	SCADA	SCADA
PLC / Metering Skids	PLC / DCS / Metering Skids	PLC / DCS / Metering Skids

## LINN TMS ARCHITECTURE

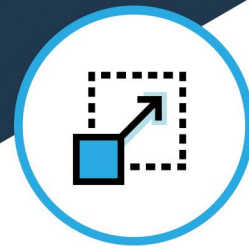
The LINN TMS is, in principle, an Edge Terminal Management System. It is designed to provide a clear split between Informational (Cloud) and Operational (Edge) technologies. Due to different dynamics related to the development and maintenance of the industrial software applications, as compared to the business software applications, providing their independence is a must.

This virtual isolation provides cost-effectiveness and a lower maintenance investment. Some portions of the system can be hosted in the Cloud, but with a clear function to secure Operation technologies from external threats, serving as a demilitarized zone.





# THE LINN TMS PROVIDES:



## SCALABILITY

### Different solutions:

- With one scale without measurement points or
- A complex system with:
  - Measurement points,
  - Scales,
  - Pumps,
  - Reservoirs,
  - Parking lots,
  - Card readers,
  - OCR, etc.



## FLEXIBILITY

- A stand-alone component or
- A component of a larger system – an integrated component (for example, one measurement point of a larger TMS system)

The LINN TMS has a rich library of common Terminal System elements (objects) that are highly customizable. If necessary, a new element can be developed to match the user's requirements. Their interaction can be restricted with policies on different hierarchical levels. Policies are dynamically editable, so operators/engineers can adjust the present Terminal management workflow without the need to request the re-engineering of the system. Policies can be set in the engineering stage, but also could be overridden in real time during the exploitation by the operator or engineer.

With the primary task to serve as an automation system during the process of loading, unloading and other manipulation in the Terminal system, the LINN TMS can also provide valuable data to autonomous automation systems (independent SCADA systems), thus serving as a Gateway.

## LINN TMS CORE

The LINN TMS is based on the ENSACO Solutions platform - **RX-platform**.

The RX-platform is a general-purpose Real-Time Database Management System with a protocol framework and programming tools. It is basically a distributed platform for building applications that exchange Real-Time data.

It implements a hierarchy of Classes. These classes are key enablers for the creation of higher-level applications. The RX-platform enables programmers to directly use it for Edge IoT and Industrial IoT applications, custom applications such as the Warehouse Management System, complex systems that include Operations Technologies such as a Manufacturing Execution System (MES) or any other application that needs to rely on Real-Time data.

The RX-platform is Industry 4.0 ready.

It enables and manages connectivity to devices, databases, file systems etc. It incorporates the OPC UA communication protocol and it is prepared to be extended with additional communication, historian, security and soft plc modules. Consequently, it consists of building blocks for a scalable industry automation solution.

The RX Platform uses standard data formats for exchange. It can be configured and additionally automated by using open development tools and high-level programming languages, thus being easily acceptable and incorporated in the existing projects.

**The benefits of RX-platform deployments are tied to the overall cost of the LINN TMS. The initial costs in building the system are lower than the standard market solution in both the hardware and the software segments.**

**The RX-platform is built to economically deploy hardware resources. Also, it requires a very low processing power. Modularity, scalability and openness to customization are major values of this platform and all of its products.**



# LINN TMS Features



Covers the complete Terminal Management workflow process, including Traffic, Scale, OCR, Metering Skids, etc.



An inbuilt configuration interface for additional customization of the system and equipment (parameters, custody-transfer, pumps, reservoirs...)



A rich library of common Terminal System elements



Policy management supports adaptation to the workflow in real-time



Supports sample data entry and data manipulation retrieved from the Laboratory Informational Management System



Client supports Trending, Alarms and Event Logging, archiving and presentation of both administrative and technologically-related data.



Peer-to-peer communication between multiple LINN TMS systems, while keeping the configuration aspects of the whole system as simple as possible. LIN TMS systems are independent from each other and yet functioning as one.



Supports all market relevant interfaces (Microservices, MQTT, REST, JSON...)



Supports major older generation automation software interfaces (SQL DB, WEB Service...)



Supports the existing OT systems – provision of TMS data to other SCADA systems



Capability to be extended with an Edge AI component for improving work efficiency and security



An easy-to-handle user interface for System supervision and parametrization

# LINN TMS Benefits

01

Easy scalability

02

Complexity control

03

Improved efficiency and security

04

Reliable solutions

05

Complete terminal management workflow process covered



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