



Editorial Message

Dear Reader,

Oil and Gas (O&G) comprising crude oil, petroleum products and refineries is one of the core sectors of the India economy. It plays a significant role in the country's economic development as well as in addressing its energy concerns.

The Indian O&G sector is projected to touch US \$ 139,814.7 million by 2015 from US \$ 117,562.9 million in 2012, thereby, providing vast business and investment opportunities in its entire value chain. The growing energy demand presents opportunities like exploration for domestic production growth, development of discovered fields, transportation of crude oil, gas and products, refining to service the petroleum product demand and retailing infrastructure.

To meet India's growing demand for hydrocarbon, it is vital to have in place infrastructure such as import terminals, pipelines, intermediate storage terminals, etc. from source to consumers. The Indian government has earmarked US \$ 5 billion in the Hydrocarbon Vision 2025 to facilitate the growing demand of the pipeline and terminal sectors.

On account of increased activities in exploration, refining and transportation of O&G, safety concerns have become a critical factor. To prevent recurrence of incidences like the fire tragedy at IOCL – Jaipur, the industry is working on M.B. Lal Committee recommendations. Some of its key recommendations pertaining to enhancing automation level, security and surveillance system, emergency shutdown system, remote operation etc. are being implemented.

Further technological advancements make it possible to build huge infrastructure which increases productivity while ensuring the safety and quality .

We at C&A are fully geared to support the Indian O&G sector in its efforts to become a world player in the automation space. Our expertise spans commissioning of more than 25 terminals and over 18000 KM pipelines in India and abroad, coupled with competencies in Drives, Instrumentation, Control System, SCADA, Safety System and MIS.

This issue's cover story highlights the benefits of moving SCADA application to a cloud-based environment which can significantly cut costs while increasing reliability and scalability.

Enhancing productivity and safety, eliminating human errors and repetitive tasks, saving time, etc. are some of the key factors in Terminal Automation. The case study section features just one out of the many successful projects we have handled - Terminal Automation System at HPCL.

Our parent company - Larsen & Toubro is uniquely positioned as a key contributor to the Indian O&G sector's sustainable growth. By continually partnering with oil companies, we develop and provide technology solutions to these companies for growing their business profitably.

Wishing you continued success during 2014 and hoping that our association yields value to India's growth story.

Happy Reading !



Sandeep Bhat



Leveraging the 'cloud' for SCADA

Moving SCADA applications to the cloud can enhance Reliability and Scalability while cutting costs significantly

Cloud computing is becoming more common and most desirable technology in communication environment where computing resources such as hardware or/and software are processed as service over networks. With cloud computing, one can eliminate the pain of managing one's hardware and software.

Businesses are running all kinds of apps in the cloud, like customer relationship management (CRM), HR, accounting, and much more. The Cloud environment provides high scalability with the ability to react to on-demand resource requirements in near real-time, fast and easy deployment of new applications, increased responsiveness and lower overall cost to the business.

As cloud computing grows in popularity, companies are evaluating the applicability of cloud-based solutions for manufacturing and process control systems.

SCADA (supervisory control and data acquisition) implementation within cloud environment is relatively new and drawing attention. By moving SCADA infrastructure to a cloud-based environment, it can save companies money and time by eliminating the need for building and maintaining their own dedicated server rooms, while reducing SCADA administration costs and overall risks. In addition, users can significantly achieve greater reliability and enhanced functionality.

Clients can get full access for customisation of their own SCADA application. All data is housed in a database historian within the cloud. As needs evolve, the system can be fully convertible at any point in the future to a traditionally-hosted solution on a company's dedicated servers.

Cloud computing can support SCADA applications in two ways:

- The SCADA application is run locally, directly connected to the control network and delivers information to the cloud where it can be stored and disseminated, or
- The SCADA application is run entirely in the cloud and remotely connected to the control network.

The first method is by far the most common and is illustrated in Figure 1. The control functions of the SCADA application are entirely isolated to the control network. However, the SCADA application is connected to a service in the cloud that provides

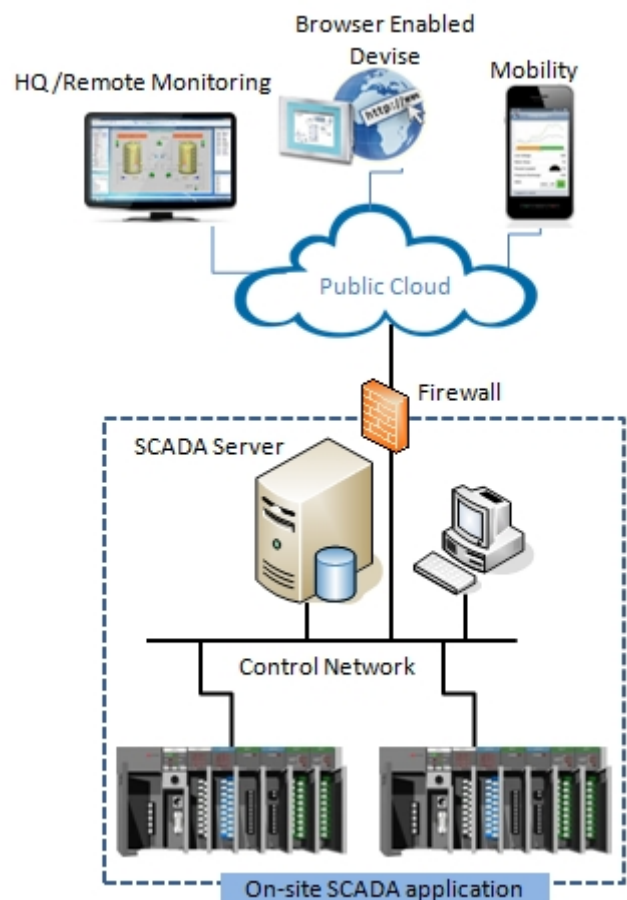


Figure 1

visualization, reporting, and access to remote users. These applications are commonly implemented using public cloud infrastructures.

The implementation illustrated in Figure 2 is common to distributed SCADA applications where a single, local SCADA deployment is not practical. The controllers are connected via WAN links to the SCADA application running entirely in the cloud. These applications are commonly implemented using private or hybrid cloud architectures.

Typical Applications..

- Utility (Electricity , Water & Gas) SCADA
- Automatic Meter Reading

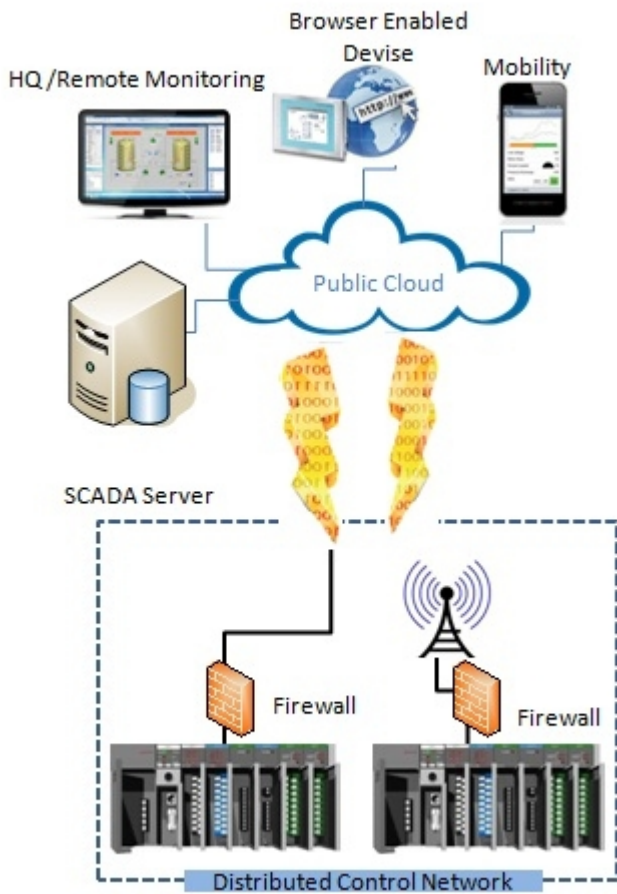


Figure 2

- Building Management System
- Renewable (Solar , Wind , Small Hydro Plant)
- Asset Management / Condition Monitoring

Benefits of cloud computing for SCADA

- High efficiency - Cloud is based on clustering and virtualization, offer high efficiency and high utilization due to the sharing of pooled resources, enabling better workload balancing across multiple applications
- High availability – Another benefit of clustering is that applications can take advantage of a high availability architecture that minimizes or eliminates planned and unplanned downtime, improving user service levels and business continuity
- On-demand resources – Users are able to add resources on demand as and when needed with no downtime
- Fast deployment -- With ready, standard, reusable and shared IT backbone, application deployment is greatly accelerated and new application can be run in a few minutes
- Ease to Maintain – As it centrally managed, it becomes easy to manage updates and patches, and provides testing advantages through the ability to clone machines





Integrated solution for Oil & Gas



Control & Automation (C&A) business of L&T Electrical & Automation offers integrated automation, telecommunication, electrical and instrumentation systems for Oil & Gas (upstream, mid & downstream) encompassing total solutions right from input power supply to the last field instrument. It delivers value from its big bouquet of solutions that are based on different technology platforms and incorporate the benefits of wide ranging experience. The solutions for Oil & Gas portfolio covers:

1. E, C&I Solution for Terminals

C&A undertakes turnkey execution for loading/unloading terminals, along with specific requirements of F&G and ESD operation. Packages are tailored to meet the specific needs of the clients.

The Integrated Terminal Solution delivers value from conception to implementation and operation for distribution and bulk terminals, such as refinery off-sites, fuel storage and distribution sites, petrochemical storage, loading facilities and marine, rail and truck loading.

Our terminal and tank farm experience includes products such as crude oil, refined oil, liquefied natural gas, petroleum gas and chemical tank farms, utilizing loading systems for ships, trains, trucks and pipelines. With data integration as the system's core, **iVision_{max}-I-TAS™** combines automatic control and business management functions

Our offering comprises:

- **iVision_{max}-I-TAS™** - Terminal Automation Software
 - Highly scalable, configurable, reliable with 99.99% of time.
- Terminal Security and Access Control
- Instruments for Tank Measurement including radar level transmitters, pressure / temperature transmitters, Mass flow meters, Gauges, etc.
- Accurate Flow measurement for custody transfer.
- Loading Arms, Batch Controllers, Card Readers, Earthing Relays
- Remote Valve control
- TUV Certified PLC system
- Hydrocarbon Gas detectors (HC, H₂, H₂S) with fire alarm panel.
- Complete Integrated solution by integrating various sub-systems
- Variable Speed Drives for flow control.
- Electrical Power Distribution System including MCCs

- Perimeter Intrusion detection system.
- CCTV system for complete terminal monitoring
- Lifecycle Services including system upgrades and long term AMC contract.

2. Integrated Telecom & Automation solution for Cross Country Pipelines

Cross country pipeline is a complex ecosystem requiring diverse technology solutions and services for different operations. This invariably results in deployment of separate information systems for a given operation. For enhancing the efficiency, one has to take into consideration all this information in real time.

C&A is one of the largest integrators of solutions for pipelines. Having executed over 18,000 Km of pipelines in India and abroad, C&A is one stop solution for Oil and Gas pipelines including Pump and Block valve stations. Our value services range from providing top notch pipeline management solutions comprising electrical, automation equipment and intelligent instrumentation.

Our solutions offer scalability and high availability, from single-node installations to multi-tier systems. Security is at the centre of our solutions with state-of-the-art features along with sophisticated front-end communications, geographical redundant configurations and automatic switchover.

Our Offering Comprises:

- Pipeline SCADA Software **iVision_{max}** SCADA for monitoring of the Pipeline
- Leak Detection System.
- Turnkey Instrumentation
- Safety PLC for ESD/Shutdown Operation
- Entire Pipeline Modelling
- Fire and Gas System including Gas detectors
- Communication system between outstation and control room.
- Management Information System
- Telecom system including EPBAX and PAGA
- Surveillance System
- Perimeter Intrusion detection system.
- Lifecycle Services including system upgrades and long term AMC contracts.



3. Electrical Control System.

Refineries need electrical power which is sourced from utilities, captive power plants and renewable energy systems. The emphasis is on efficient use of all such power sources along with effective management of loads, power quality and assets.

iVision_{max}-PMS™ provides complete Power Management Solution (PMS) for cost effective and efficient energy utilization by maintaining continuous and reliable operation, avoiding penalty in case maximum demand is exceeded, improving power quality, reducing maintenance cost, reducing manpower cost and thus increasing profitability in terms of lower production costs. For some refineries, costs constitute as much as 20-30% of total operating costs and hence even a small improvement in operational efficiency can have a dramatic impact on its bottomline.

iVision_{max}-PMS™ provides comprehensive information on optimization potentials and utilization parameters to be correlated with KPIs viz., energy efficiency, production rates, process efficiency, power quality, asset optimization and further supports the decision-making process with up-to-date information.

Our offering comprises:

- Real time Control & Monitoring
- Synchronization and load Energy accounting involving group energy consumption tracking and saving
- Power Quality Monitoring
- Asset Management
- Load Forecasting
- Economic Dispatch
- Availability Based Tariff
- Renewable Integration and Generation Forecasting.



HPCL deploys Larsen & Toubro's Terminal Automation Solution for largest black oil terminal in Vizag

Background

Hindustan Petroleum Corporation Ltd. (HPCL) is a Government of India enterprise with a 'navratna' status, as well as a Fortune 500 and Forbes 2000 company. Its annual turnover during FY 2012-13 was Rs. 1,90,048 crore. It operates two major refineries producing a wide variety of petroleum fuels and specialties. The capacity of these refineries in Mumbai (West Coast) is 6.5 Million Metric Tonnes Per Annum (MMTPA) and in Vishakapatnam (East Coast) 8.3 MMTPA respectively.

The Need

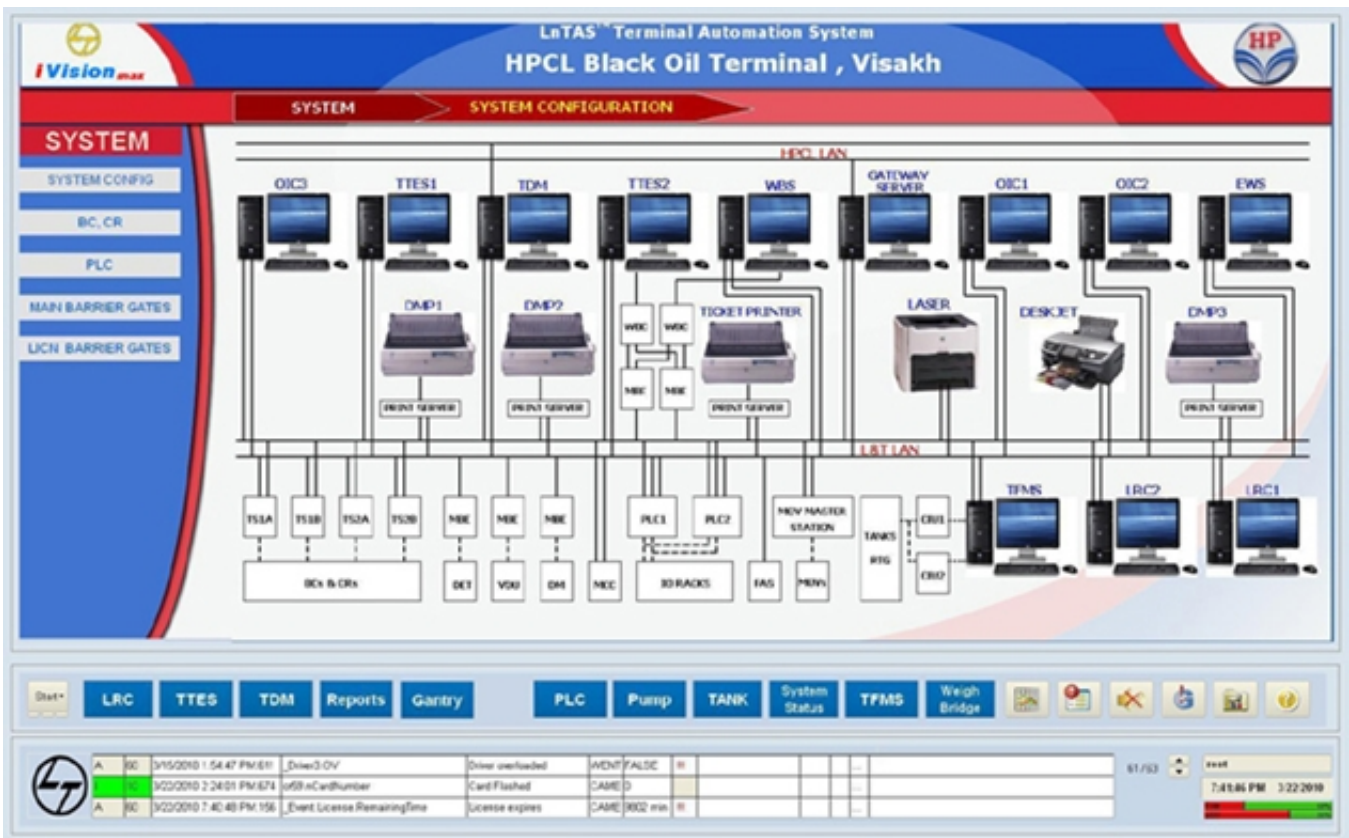
Since the terminals are becoming more strategic than ever before, HPCL decided to develop the modern black oil terminal on a 38-acre plot of land within a record time of 15 months using all advanced project management techniques. The primary focus was on accuracy and availability of operation while maintaining high safety and security standards at the storage terminals.

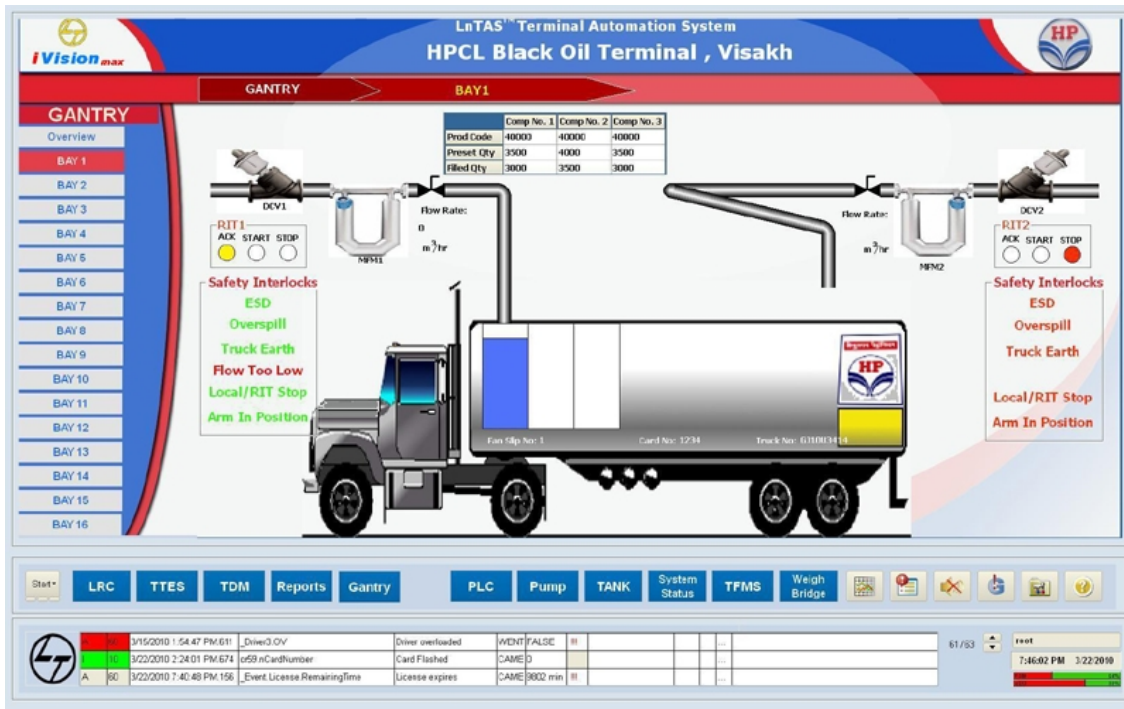
HPCL placed the order to supply and commission the Terminal Automation System for Black oil Terminal at Vizag with Control & Automation (C&A) business unit of L&T Electrical & Automation (EAIC), an independent company of Larsen & Toubro Limited (L&T).

The primary task was to complete design, engineering, supply, installation, testing and commissioning of Terminal Automation Solution in less than eight months to handle 94,000kL products like FO-180/380/500, Bitumen, LVFO, FO Blend, LSHS, HFHSD, LDO, JBO and Lube Oil. This project had strategic importance as it has created space for Visakha Refinery expansion for the production of EURO IV grade fuel (Diesel Hydro Treatment Unit Project).

The Solution

The project goals were safe and efficient operation of the Terminal while at the same time reducing manual intervention and reducing pollution and labour cost. HPCL chose to implement C&A's proven





Terminal Automation solution comprising automation, field instrumentation and safety systems.

Completion of the project in a short period involved delivering C&A's proven solutions – the **iVision_{max}-I-TAS™** – SIL certified software with high level of integrity along with metering instruments like DCV, Thermal Jacketed Mass Flow Meter suitable for black oil application, Fire Alarm System, Weigh Bridge system for Mass Based loading, VFD Interface, Tank Body and Header Line Valve Automation etc.

The system is built around the **iVision_{max}-I-TAS™**, an integrated platform, that automates and controls petroleum terminals for Tank Trucks, Wagons, Tubes for Black Oil. The solution helps to operate and control a total of 29 TLF loading points, 4 TW loading points and 33 product tanks from receiving to storage to distribution of different fuels.

With its user friendly Graphical User Interface, users can generate different reports like tank trucks, product filling and bay idle reports for the terminal operators to monitor terminal's efficiency.

A range of technologies supplied to the BOT terminal comprise:

- the **iVision_{max}-I-TAS™** and terminal management system
- Tank level gauges, Pressure Transmitters, Truck loading metering and control system.
- SIL 3 certified Shutdown System
- Fire & Gas systems
- Industrial security with access control solutions, CCTV and Digital Video Manager
- Access Control System, Fire Alarm System:

Benefits

The **iVision_{max}-I-TAS™** solutions have enhanced HPCL's efficiency

by reducing operational time while maintaining a safe and healthy environment.

All the terminal operations including MOV were fully automated which has helped in improving the terminal's efficiency.

Post HPCL's inauguration of the terminal on 20th September, 2010, it has been used to successfully fill 65000 lorries. On an average, the terminal handles around 60 tank lorries per day.

C&A has so far delivered Terminal Automation Solution at HPCL Black Oil Terminal, LPG Terminal at Vizag, White Oil Terminals at Ajmer and Jaipur which has helped these companies to increase the efficiency of their terminals with zero accidents reported so far.



Certificate of appreciation from HPCL



L&T was selected by Hindustan Petroleum Corporation Limited (HPCL) to provide Terminal Automation Solution for its new Black Oil Terminal at Visakhapatnam. We spoke to Mr. K V Sreenivas Raju, Chief Manager - Projects, to capture their experience on L&T's Terminal Automation solution as well as working with the L&T Team.

Please give us a brief about your company and black oil terminal Operations

Mr. K V Sreenivas Raju - Hindustan Petroleum Corporation Limited (HPCL) is an integrated oil refining and marketing company . In 2010 we setup a new terminal at Visakhapatnam , which is largest exclusive black oil terminal in India with a product handling capacity of about 94,000kL. The terminal has provision for loading product of customized needs of marketing to cater industries from eastern hub.

What are your reasons to adopt an integrated terminal automation system at BOT?

Mr. K V Sreenivas Raju -- Terminals represent an important link in the petroleum supply chain. Black oil Terminal project has strategic importance as it creates space for Visakha Refinery expansion for production of EURO IV grade fuel (Diesel Hydro Treatment Unit Project). To operate this Terminal safely, and effectively we decided to have Terminal Automation System which provides real-time monitoring, control and management of the entire product handling process from receiving to storage

to distribution. Receiving product from refinery and jetty and also pumping product to Jetty and TT loading.

What sort of challenges will the *iVision_{max}-I-TAS™* system help you to overcome? / Kindly tell us in detail of the benefits you seek from Terminal Automation System implemented?

Mr. K V Sreenivas Raju - L&T's *iVision_{max}-I-TAS™* is required to help our various operations like Tanker Truck Loading / Un Loading , Material transfer and tracking, Inventory management, and ERP interface. It is required to improve operational safety, accuracy, system optimization and overall efficiency by reducing manual intervention.

Tell us something about your experience with L&T Automation on this project

Mr. K V Sreenivas Raju - We are satisfied with L&T's team performance and continued support, which helped us in achieving our project milestones. However L&T should continue to excel in providing dedicated team who have application domain knowledge and has mature engineering capability that aid in accomplishing our project objective of building efficient and secured Terminal.