SecNET Access Control System

- Logistic Centre Application Case Study

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1. Background of the System Application

Logistics is a worldwide business in service section, including product packaging, goods shipment and safety management. Logistics service providers mainly provide the services to their local customers, and some of them would be able to serve multinational consumers. As the market competition among Logistics service providers become higher and higher, the overall service should be improved or upgraded from time to time.

The service would be starting from procurement of raw materials to product sales. In order to have good company internal control and goods delivery record, it is needed to have a door access and time attendance management system for supporting this requirement. Access control system would be the major section to link multiple business units together as a complete supply chain service provider. NITRO SecNET network access control system would be the good choice to manage the whole system.

2. Techonology of SecNET Access Control System

NITRO SecNET is a set of intelligent access control and time attendance management system. Single controller unit can be applied for system of two-way single door, two-way double doors, one-way triple doors and one-way quadruple doors. By using TCP/IP network communication, the system can be extended to use multiple controllers for a maximum 256 doors completed staff and door entry management solution. The basic unit of system includes a set of NAC8000N access controller and the SecNET network application software. Each NAC8000N controller four access reader input, user can select to use varies types of readers for suiting the system requirement. When the system would use the reader with keypad, the system can support the card access with the password sign in function. With its internal memory, the NAC8000N controller can store minimum 25,000 transaction record locally.

SecNET access application software supports both fixed IP address and DHCP network for managing multiple NAC8000N controllers via intranet network. The software can program the door access functions and analyzes the result for providing the time attendance report. SecNET software uses Microsoft MSDE or SQL Express Server Manager as its database, this can provide reliable and quick data access platform for the system. When the NAC8000N controller receives the signal from the access reader, controller will firstly give the response to the signal for further actions, and the SecNET software will actively collect the information from the controller. SecNET would also provide the platform to manage door access anti-passback of cardholders, show the door status via the E-map, filter the unnecessary events, receive the fire and invalid door access alarm signal and integrate with other security system.

The interface SecNET access software is user-friendly and simple to use. Users can easily manage the date, time, door, access level and event record via its integrated GUI. There would be three different version of SecNET software for the users to choose.

SecNET Complete – Access control and time attendance software supporting up to 64 sets of controllers and 12,000 cardholder capacity

3 Principles of Project Design

In the logistics access control project, the design of system is based on the consideration of security and the need of effective staff management. There would be some basic requirement or needs in the system.

System Utility

Access control system would have many different functions, some of them would be designed specifically for particular project solution or environment. Users should decide which functions would be needed or required for their actual applications, and the utility of the system is the first principle to be considered. To match the project requirement, it is needed for understanding the features and applications of the access controller and the applications, so as to select the most suitable products for duty usage.

System Stability

The Access control system is a continuous operating system, user would mostly concern the system stability. During the selection of system, it is needed to consider how the system and data would be programmed, backup and restored. The internal storage capacity of the access controller and backup of power source would also be the essential factors for the consideration.

Security of the System

Door access system monitors and controls the access right of the cardholders, this would be important for the system to be intelligent enough for managing the in and out record of the cardholders. The security of the system should be preliminary designed for preventing any invalid users or the functions of the system should be password protected. For example, the controller should be installed in the secure area with built-in temper switch alarm input, this can afford any unauthorized person changing any setting or damaging the system. And the operation software should allow the user to set up multiple access levels for limiting the access right of certain cardholders, so as to prevent them operating some of the software applications.

System Expansibility

During the initial system design of access control system, client may not have all the ideas about their own project requirement, and their actual needs may have some adjustment or improvement after the system specification have been confirmed. Due to this reason, the selected system should have the capacity for further system expansion. Such system expansion

would not only be the software functionality, but also the hardware upgrading. The access controller should have the communication port for any future system upgrading, eg. controller firmware program upgrade via TCP/IP connection. This upgrade capacity would be important when the door access system would support more functions or have more features for the other applications. At last, the system should be able to support card access, time attendance record, patrol, car park management functions into one software platform.

Easy System Maintenance

In normal operation, the card access system should not require heavy duty maintenance work, the system should provide a simple operation platform for the users. For any unexpected events or accidents, the controller should be easy to manage and be quick to start up, and the software would only require the users to do a few steps for maintaining the system operation or system restoration. And during the process of software maintenance, the controller can still work in standalone mode to maintain the door access section in normal operation.

System Integration

In order to have a complete controllable system, the access controller should provide enough input, output and communication interface for linking the other application system. The most common applications would be the linkage with the burglar alarm, fire alarm, lighting and video surveillance system. All these system linking can make the system solution more effective to be used.

With all the above considerations, NITRO SecNET access control system would be able to satisfy the most of the customer's need. And the installation infrastructure would also be good for applying SecNET door access system, logistics company can use this access control system for their management system upgrade purpose.

4. System Application Models

There are different models for the door access applications, each of these choices has its own benefit and security level.

Model 1: One-way Card Access (Reader In + Exit Button + Door Lock)

In this model, the access reader would only be used for door entry, whereas there would be an exit button to control the door exit. This arrangement would only have the record or control for those door entries, but very quick access for door exit. One-way door access monitoring would be used for general security level environment without too much concern on the door exit record, and this would be commonly used for most of the customers.

Model 2: Two-way Card Access (Reader In + Reader Out + Door Lock)

Two-way door access model would require the card access operation for the case of both door entry and exit. The model would have the benefit to monitor and control all the in and out record, and this would be extremely important if the time attendance record would be the essential requirement for the system. This application would be used for high security area with high demand of internal control record or reports. Without the required access card, it would not be possible for the unauthorized person to enter or leave the area.

Model 3: Card Access with Password (Keypad Reader In + Reader Out + Door Lock)

Password protection would be nearly the simplest way for security protection. The password can be the private pin for each individual person or be the public pin for all users. However, password would have a drawback that no access right can be applied to the system. Everyone who knows the password can enter the door without door access record. If the system would include both card access and password to operate, this would greatly increase security level of the system. Or when the cardholder enters the wrong password to the system, there would be an alarm record and alert to notify the user. And the user would know if there is any abnormal cardholder using the access card with the wrong password via the alarm signal. The model would mostly be used for very high security area or for the place storing some confidential information, this would need the cardholder to have the card access and private pin for entering the area.

In most of the cases, three of the above models would be selected in different areas. Model 1 would be the most applied for common entry and exit with the security guard monitoring, whereas model 3 would be used in the managers' office area and warehouse for high security monitoring purpose.

5. Content List of the System

EM ID Access Readers: 125Khz frequency access card reader with specific output signal format for card number and password pin. (Remarks : Optional Mifare Reader or other types of readers)

EM ID cards: 125Khz frequency access card with specific card number. (Remarks : Optional Mifare card or other types of access card)

NAC8000N Access Controller: This is the major hardware to monitor and control the operation of the whole system. All the transaction record would be firstly processed by the controller and then determine the result. All the system operation would depend on the result for further processing. And the transaction record will be transferred to the server PC for storage and time attendance analysis.

Electric Door Lock: The door lock would be used for controlling the door opening, and the signal would be delivered from the NAC8000N controller..

Exit Button: User can press the exit button, and then send the signal to the NAC8000N controller for door opening.

SecNET Access Control Application Server (Complete Version): This is the software platform to setup the rules and regulations of the whole system, and then send the setup information to the NAC8000N. All the other event search, time attendance analysis and reporting, alarm monitoring and acknowledgement would be processed by the server PC.

Power Source: System would have primary and secondary power source. Primary power source would be used for normal operation of the system, and the source is from the transformer. Secondary power source would be from the backup battery. The battery would be normally in charging mode, if the primary source fails to provide the power to the system, the backup battery would take the role to maintain the system running. The operating hour of the backup battery would depend on the capacity of the selected battery. For normal operation, the battery can work for 5 – 6 hours, and the user can have the choice to choose the battery with longer operating duration up to 12 hours.

6. System Functionality Requirement

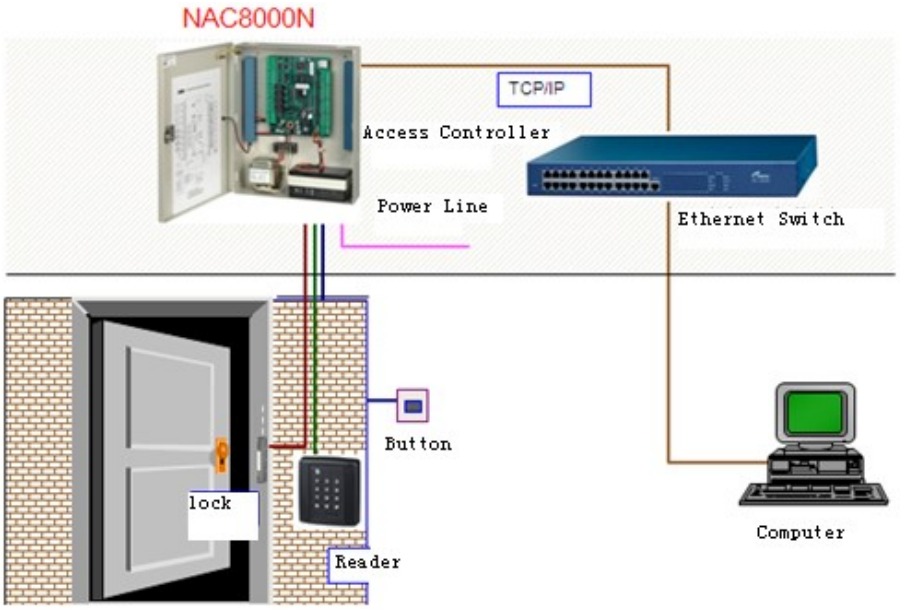
NITRO SecNET Access Control is an advanced system which can provide most of the requested function from the end user. For some of the cases, NITRO Security R&D support team has provided tailored-made service for solving some of the difficulties of the on site installation conditions. The following functions would be the common enquiries from different clients.

- Support fixed IP address for the access controller. Client would allow the security equipment to use a specific range of IP address, and DHCP would not be allowed.
- System should support up to 8 sets of access controllers.
- System should support multiple server PC for managing different group of controllers by different departments. The transaction from the controllers would not affect the record in each set of server PC.
- Time synchronization among the NAC8000N controllers and the server PC.
- Support existing EM ID 26 bit wiegand output readers (As the client's existing EM ID readers would use a specific card and password pin out format, NITRO R&D team has modified the firmware of the NAC8000N for supporting their existing reader format.)
- Support up to 300 cardholders in the first stage, and the system should support up to 2,000 cardholders.
- Access controller should be able to work in standalone mode with internal storage of min. 10,000 transaction capacity. And the data in the access controller should be actively transferred to the server PC.
- Support one-way/ two-way multiple doors management.
- Support time adjustment for the door open and close duration.
- Support department group.
- Support multiple workgroups or working schedule for different staff.
- Support night shift workgroup for some of the staff.
- Support Overtime defined workgroup
- Support sign in/out function for manual input the cardholder record
- Support holiday group
- Support exporting of time attendance report in excel format
- Support event search via cardholder name and card number.
- Support multiple login operators with different access levels.
- Database backup and restore management
- Support the system log search for the operators

7. System Installation and Configuration

7.1 System Application

Based on the client's requirement, the system should use the existing network and computers for installation. The maximum distance for the actual installation environment would be within 150m, therefore, no additional network switch or hub would be required.



7.2 System Installation

For this project, the SecNET access control system is divided into two individual sections, and they would be managed by two departments. As the network between these two departments would be shared, the system should be able to distinguish each other for preventing interruption. SecNET access software and NAC8000N access controller would use the technology of DUK access ID for separating multiple sub-systems in the network. During the installation of the two server PC and the controllers, two sets of DUK access ID have been assigned to them. System would only recognize the other devices with the same DUK access ID. When there is any additional item, input the same DUK access ID can group the devices together. This system feature and configuration would be good for network access control system.

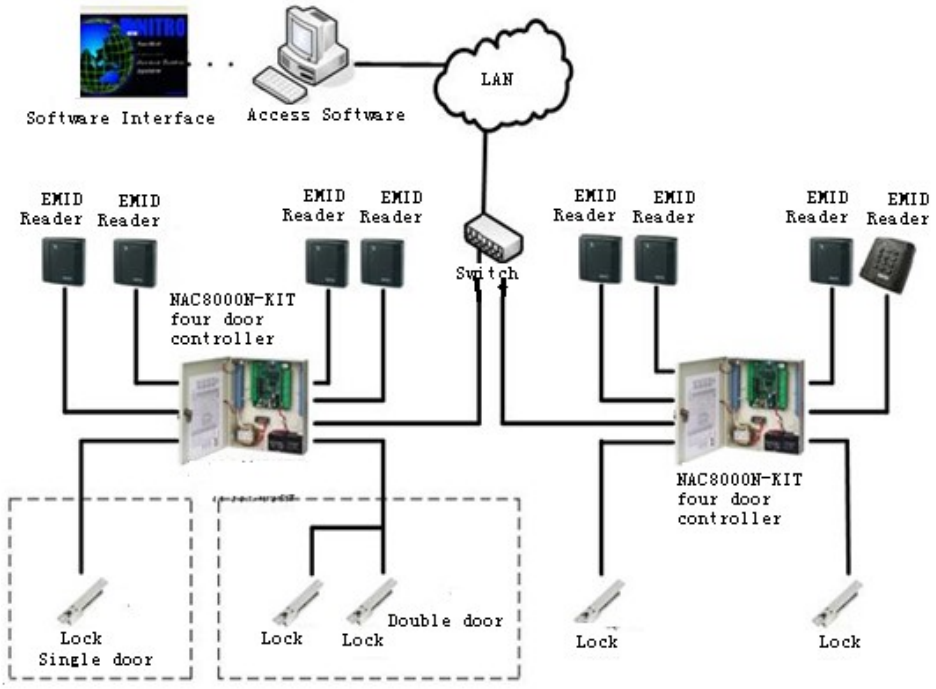
These two individual access control system would include totally three sets of NAC8000N controllers. For the main entry of the office, one set of controller would be used for door access management. The other two sets of controllers would be applied for office internal control and warehouse door access management. The usage of access reader and door lock would depend on

actual application. For those doors controlling the office and warehouse environment, it is needed to use two-way card access model. For certain public area, eg. staff canteen, one-way card access model would be used for convenient duty usage. And for certain restricted areas, card access with password key-in would be required for high security concern. All these considerations would be based on the real installation condition, system application and the client's preference.

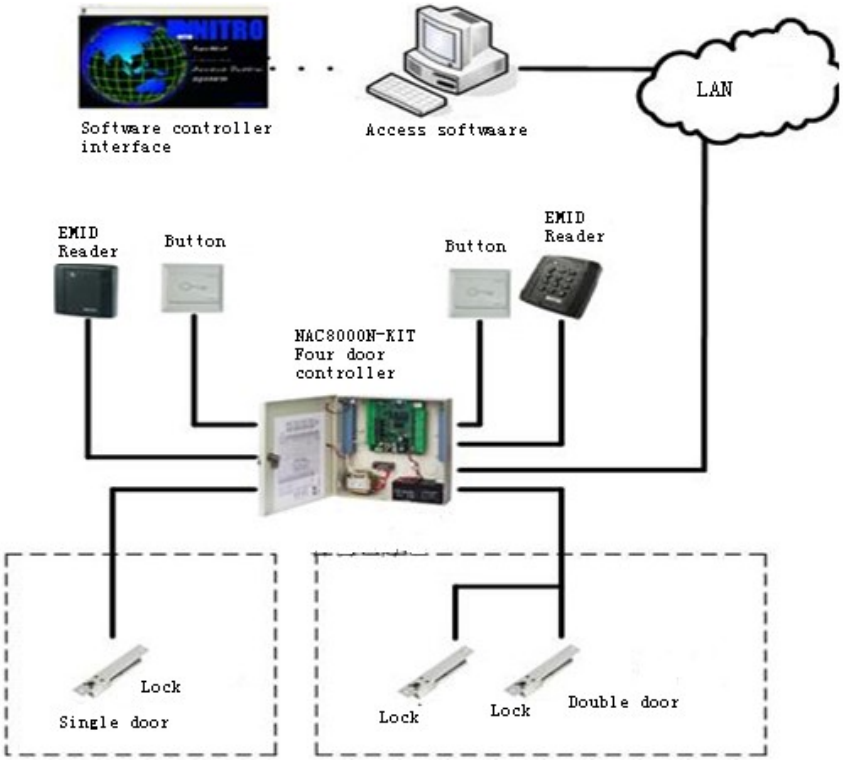
In this project, as the client requested to use their existing access reader and access card which would have specific output signal format, it is needed to have certain modification of the system to suit this requirement. The client has provided two sets of access readers for the factory evaluation. The R&D team from NITRO factory has used their own developed access reader analyzer to study the output formal of the signal. Based on the evaluation result, factory has provided a new firmware for upgrading the system, so as to match with the signal from the existing access reader. The upgrade process would be simple, and the system installer would only need to transfer the new firmware to the controller via the SecNET access software.

The following diagrams would show how the two individual systems would be operating. The LAN network would be shared by the access control system and the other computers.

System 1 -



System 2 -

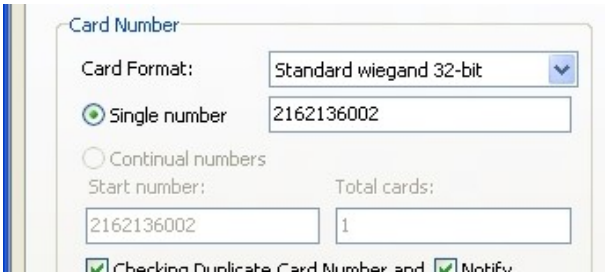

Software controller
interface
Access softwaare
LAN
EMID
Reader
Button
Button
EMID
Reader
NAC8000N-KIT
Four door
controller
Lock
Single door
Lock
Lock
Double door

For the kit set of NAC8000N (NAC8000N-KIT-L), the set would include a tailor-made mounting cabinet and all the required mounting accessories. This can allow the system installer to install the system and prepare the wiring easily. As the access control system should be continuously operating, it is recommended to install the system in the security room with good ventilation and constant temperature. To prevent the case of power failure, the initial design of the system should decide how long the backup battery can last for. In normal case, 6 – 9 hours would be good enough for regular system maintenance or any accidental power failure cases.

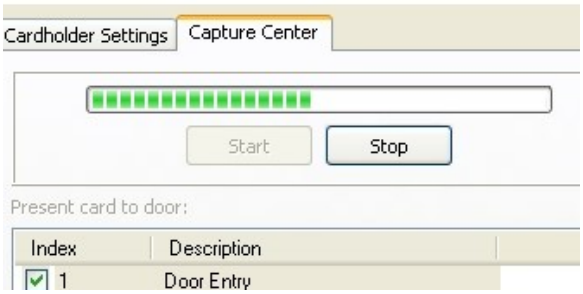
7.3 System Configuration

In the existing configuration and requirement, there should be over hundred of access cards to be added into the SecNET system. To shorten the time of adding cards, there would be two different choices for the users to do.

i) Batch card enrollment – if the card number of those access cards are in sequence, user can choose to add a set of card number at the same time;



ii) Capture new card – if the user does not know too much about the access card, they can scan the access card by the reader, then the card number would be automatically added into the database.

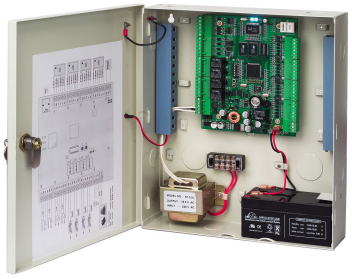


Both of these methods would be good and simple for the users to add the new access card by their own in the future. And this is not needed to have complicated steps for the processing.

When the cardholders' access rights and access level have been set, the time attendance rule and regulation can also be prepared accordingly. In order to have a complete time attendance record of the staff, certain parameters should be firstly inputted into the SecNET access control system. And then the system will evaluate the door access record together with the predefined parameters, the time attendance analyzed report can be exported for further processing. The user uses this report to calculate the time of daily working hour, overtime pay, late or early leave record, absent, etc. This is one of the major purposes for upgrading this system.

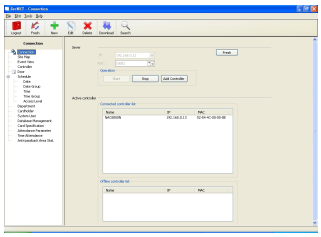
8. System Specification

NAC8000N Access Controller



- 32 bit ARM7 high performance processor
- 4 Wiegand Input
- Support Wiegand 26bit, 32bit, 34bit, 66bit Input
- Internal Memory : 12,000 Transactions
- 4 Magenetic contact Input
- 4 Exit Button Input
- 4 Relay Output
- 10M Base Network Port
- Fire Alarm Input
- Tamper Input
- Backup Battery Connection
- LED Status Indicator
- Support AC or DC Power Supply Input

SecNET Access Control and Time Attendance Software



- Support Windows 7 Pro and Windows Server 2012l
- System support from 4 door to 256 doors
- Support DHCP and Manual IP Address Input
- Support MSDE/ SQL ExpressDatabase Structure
- Time/ Time Group/ Date/ Date Group Setting
- Multiple Cardholder Access Levels
- Multiple System User with Selectable Access Right
- System User Log
- E-Map
- Multiple Input and Output Association
- Anti-passback (Multiple Zone within or across different NAC8000N Controllers)
- Cardholder Management with different access level
- Batch Card Data Input
- Time Attendance Analysis and Reporting
- Time Attendance Record Exporting
- Database Backup and Restore
- Card Format Customization
- Holiday Define
- Department Define
- Workgroup Define
- Event View and Event Search by conditions