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ANALYSIS OF METHODS OF ACCESS CONTROL MANAGEMENT SYSTEM BASED ON CONTACTLESS ID CARD READING TECHNOLOGY IN THE BANKING SECTOR

Abstract: This article analyzes the methods of the access control system based on contactless ID card reading technology and suggests methods for information security in the banking sector.
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Introduction

Access control systems based on contactless ID card reading technology for banks is an extremely important and necessary part for building an effective security system. The access control system to the bank is a key element of a single integrated security system that allows automatic control of the entry and exit of staff and customers to certain areas of the bank track the location of employees ensure confidentiality of information about the status of accounts, etc.

Access Control and Management System (ACS) based on the technology of contactless ID card reading in banks, as well as any other access control systems, have different architectures, exist in a variety of configurations and serve to solve different tasks. However, regardless of the above, any bank access control system consists of the following mandatory concepts and nodes:

• Identifiers (electronic keys, chips and cards, fingerprints, vehicle registration plates, retina, etc.).
• Means of restricting access (electromagnetic locks and latches, turnstiles, gates, etc.).
• Control devices (controllers, servers).
• Software.

In the case of the organization of ACS in banks, the access control system solves the tasks of personnel identification to ensure the clear functioning of the hierarchy of access to certain premises, documents, software, etc.

Thus, for example, the manager will not be able to overwrite the bank's customer database on a personal digital medium, and the cashier-operator will not inadvertently delete an important financial reporting document.

And, of course, another main task of ACS in banks is the direct execution of security functions.

In most cases, in order to ensure the greatest convenience, efficiency and security, the access control system to the bank is combined with other systems aimed at receiving, processing and storing electronic information, for example, with a data processing center (data center), and, in particular, is integrated into various security subsystems, such as a fire alarm system, security alarm system, video surveillance and other intelligent systems of the facility.

In this case, the functionality of the integrated security system is the following:

• Round-the-clock video surveillance in the bank's office premises, customer premises and adjacent territories reflection of all events on video surveillance monitors in real time.
• Video recording of all events taking place with the possibility of subsequent archiving.
• Processing and frame-by-frame reproduction of recorded data according to certain criteria (data output by date, time of day, etc.) if necessary.

• Notifying the security service about the occurrence of alarming situations, such as fire, smoke, water leakage, etc.

• Implementation of automatic operation of the personnel notification system

• Authorization of employees to implement their access to office premises.

• Accounting of working hours and employee breaks.

• Ensuring safe round-the-clock access of bank card holders to bank premises with ATMs and much more.

ACS based on contactless ID card reading technology is an important factor in ensuring the security of banks and financial institutions. Identification of staff and visitors allows you to organize regulated access to office premises and workplaces, to avoid the penetration of people from the "black" list into the building. The ACS restricts access to vaults with valuables, computer terminals, servers with databases, preventing the theft of funds and confidential information. ACS for banks is developed taking into account the specifics of specific facilities based on hardware and software of its own production and allowing ensuring reliable security of banks from external and internal threats.

Biometric identification – recognition of employees by face, fingerprints, vein pattern on hands, etc. access by passes – reading personal data from a service card or electronic key, access by a one-time PIN code.

In various access zones, technical devices are used to optimally solve the problem of personification of a person. The combination of solutions helps to increase the efficiency of the throughput mode.

One of the possible scenarios for identifying a bank employee:

• Applying the card to the reader on the turnstile of the entrance group;

• Identification via the face recognition terminal;

• Passage to the service area;

• Face scanning at the entrance to the office.

A variety of authentication methods for banking personnel increases the effectiveness of the control system and reduces the risk of unauthorized access.

Each bank employee has individual access to service areas and premises determined by the security service. The ACS database contains information on the access rights of all users, and the system grants access based on this data. Specialists of services and departments can pass only to the premises assigned to them. Increased security measures are observed when accessing the bank vault.

The ACS grants access according to the regulations drawn up by the security service, as a rule, only in the joint presence of two or three authorized persons.

Compliance with the hierarchy of access to the bank's premises and computer terminals allows you to

effectively counteract the intentions of intruders and avoid the negative consequences of accidental errors in the workflow. The integration of ACS with other security systems allows for an intersystem exchange of information for an adequate assessment of the danger and the issuance of the necessary control commands to the actuators.

For example, when a fire is detected by a security and fire alarm system, the ACS controller sends a command to open turnstiles and doors to ensure the safe evacuation of staff and visitors from the building of a financial institution. When the "alarm" button is pressed, the bank employee blocks all premises and exits from the building. Integration with the video surveillance system is necessary to track events in real time and view video clips in case of detection of dangerous incidents.

Unfortunately, little attention is paid to secure access to the company's infrastructure in the public field. This topic remains the domain of narrow professional communities. However, research shows that every year it faces incidents of unauthorized access to its resources. Information leaks, the failure of client services, internal systems and, as a result, the inability to provide financial services to clients, withdrawal of money from accounts.

The infrastructure of large banks is very diverse and includes up to several hundred IT systems. Some of them can be inherited, for example, as a result of mergers and acquisitions. Some resources may be owned by external companies: for example, a bank cooperates with a processing organization, and bank employees need access to the counterparty's external systems. Also, the structure of financial companies includes many different test environments of software developed by the bank itself. Access to such environments should be separated from access to the operated business environment. In fact, there are two circuits of information systems in the infrastructure of any bank:

1. Public access systems-e-mail, internal portal, etc.

2. Restricted access systems containing some specialized information, often confidential.

Users of banking information systems are internal employees of the organization, numerous interns- temporary workers, as well as a large number of outsourcers working with the bank under a contract. At the same time, auditors often come to the financial institution, which also need to be given access to the bank's internal resources to conduct an audit.

First of all, business is interested in improving the efficiency of access control processes, which needs to obtain access rights to the necessary information systems as quickly as possible in order to fulfill the assigned business tasks.

The business units themselves are the owners of various information systems (sales "own" CRM

databases, accounting - 1C: Accounting system, lawyers - 1C: Document Management, etc.).

Accordingly, they, as owners, are interested in the operability of these systems, in their willingness to participate in coherent business processes, so they do not care who and on what grounds has access to these systems.

The second interested party is the IT department, which must provide the business with the necessary access to the requested resources in time, observing the SLA. Due to the overload of routine operations for granting access, the IT department not only does not have time to meet the deadlines for granting rights, but also absolutely cannot allocate resources for infrastructure development, drowning in the execution of the flow of requests for granting / changing access. And finally, the third interested party is the security service, which is responsible for reducing risks. To do this, it is always necessary to provide users with a minimum of sufficient access: to grant it during, cancel it in time and monitor the absence of unnecessary rights. The Information Security Service has to comply with various regulatory requirements imposed on the financial sector, some of which relate to ensuring secure access. Large banks undergo 10-15 audits per year, part of which is confirmation of ensuring secure access to information and information systems.

First of all, this is the differentiation of access by categories of resources - public and restricted access. Depending on this, some chains of access approvals can be implemented automatically, while other systems still need separate access approval by security or internal control services.

For banks, there are specific requirements of regulators, according to which new employees' access to individual systems should be provided no earlier than the first official working day. In manual mode, it is very difficult to organize work in such a way that access to all ten systems available to all newcomers is coordinated exactly by the day they go to work. And financial auditors very strictly check compliance with this requirement: it is impossible to let an employee into restricted banking systems without an official order.

When any new information system appears in the bank, it is necessary that access to it be provided to each employee in accordance with the position that the person occupies. That is, we need a role model for managing access of all employees to all bank systems, which is rare in practice. It often happens like this: The IT department is purchasing a new information system that needs to be put into operation urgently, they don't think about security - if only the system would start working faster, and then we will build a role model from this incident of unauthorized

As a rule, the owner of the resource that needs to be granted access is responsible for creating and updating the role model. After creating a model, it needs to be constantly accompanied, made changes, and kept up to date. It is extremely difficult to do this manually - there are a lot of employees, roles and powers in a large bank.

As a rule, role models in most banks are presented either in paper documents or in computer files, with which IT specialists have to constantly check with each access request. Over time, such a role model invariably becomes obsolete - new programs, new employees and departments appear, positions change, and there is no automatic revision of the role model.

Currently, temporary non-standard rights are a frequent phenomenon in financial companies. There are a lot of outsourcer employees in banks and often there are no documents regulating the provision of access for such temporary staff - when and how to grant and revoke access.

A typical picture for a modern bank: they hired external employees for a temporary project, gave them some kind of access to some systems, the project was completed, and people left, and forgot to close access to them. Since these people are not in the personnel base of the bank, no signal about the end of their work on the project is received by the IT service. The problem remains on the conscience of the project manager who requested access for outsourcers. But the manager could change or just forget that you need to revoke the rights. And in times of widespread "remoteness", when it is not necessary to physically come anywhere at all to enter the systems, such an attitude to access creates a giant gap in the security of a financial organization.

In any organization, and in financial especially, the problem from the point of view of access control is the creation of various project teams. Each such team is assembled as a separate organizational structure from different departments - developers, testers, economists, and business users. Accordingly, they are granted access to new, previously unused systems or systems with uncharacteristic rights for them. For example, a tester should check what a new service will look like for an accountant - he needs access with accounting rights. Such access, on the one hand, is difficult to justify and obtain, and on the other hand, in the absence of access control automation, there is a high probability that they will forget to revoke it.

Finally, a very urgent task for any bank is to work with conflicts of authority (SOD conflicts). First of all, regulators require banks not to have the functions of conducting and controlling financial transactions in the same hands.

Banks traditionally have a large number of employees holding the same positions, especially among low-skilled personnel. These are sometimes tens of thousands of operators who do not stay in one position for a long time - either they go for a promotion or they quit. Each such employee, when

receiving, must promptly create accounts in the necessary information systems so that he can quickly begin customer service. And just as quickly it is necessary to change these rights (when transferring an employee) or block them (when firing). In large banks with a staff of tens of thousands of employees, several hundred accounts are created and blocked daily.

Without specialized access control systems (IGM/IGA), these problems are partially solved with the help of patchwork automation. The simplest thing that all banks start with is writing their own program for blocking the credentials of retired employees in order to quickly fulfill one of the most critical requirements of regulators. It seems to be great - we managed to solve the problem quickly. However, such a program will not be able to cover all users: for example, data of contractors and freelance employees are not in the personnel database, and access is granted to them.

In addition, IT services of large banks are adopting IT Service Management systems so that they can control their own work [1]. A side direction of using such systems is the processing of user requests for access to the bank's resources. However, such a system only allows you to automatically receive an application for access, and the execution of applications is carried out manually in the old-fashioned way.

The revision of access rights in the audit process can also be carried out manually - regulators demand to report, there is no escape. There is even a practice of hiring outsourcers to audit all access rights in a financial organization. However, such a manual check takes a very long time: while it is being implemented and the bank reports to the auditor, the information on access rights becomes outdated, and it's time to start a new recertification.

With the help of IGM/IGA, a role model of access control is formed in the bank - if there is none and the rights are granted spontaneously. In a mature IGM/IGA system, there are Role Mining tools that allow you to analyze all accesses currently available in the bank and decide whether to combine them into roles or leave them individual. Based on the role model, the processes of granting and changing basic rights are automated when certain personnel events occur: hiring, transfer to a new position or dismissal.

IGM/IGA allows you to centrally create access requests and coordinate them through a single interface. Access approval mechanisms change frequently, these changes must be constantly monitored so that there are no delays and failures in access approval. You can do this in a large organization only with the help of automation.

When an IGM/IGA system is implemented in an organization, approval routes are immediately configured, and all assignments of approvals and execution of applications occur automatically. If there is a delay, the system allows you to set a time limit for obtaining access approval and start an escalation to a higher specialist when the limit is exceeded. Or automatically approve/reject the application, depending on the rules set by the system administrator. In this case, there can no longer be any delays in the process of reviewing access requests.

GM/IGA can also launch an automated revision of the access control role model in the bank. The system will automatically unload all current roles, distribute them to the owners of information systems, they will quickly check the relevance of the role model - whether any functionality has changed for them. If necessary, data on changes in access rights and roles will be entered into the system, and the role model will be automatically updated in accordance with the changes.

In addition, the developed automated access control system has effective mechanisms for monitoring compliance with the bank's information security rules. In manual mode, employees of the information security service, in order to understand which of the staff has access to a particular system, need to make a request to the IT department to provide a report on all users of the information system and their rights. Drafting, agreeing on the format and providing such a report may take several weeks, given the workload of IT personnel.

In the case of IGM/IGA, information security specialists have their own tool for controlling access rights and accounts of the organization's personnel. They can independently compile reports, conduct internal audits on information security in terms of access control, initiate user authority reviews, and investigate incidents. For example, if an incident occurred a few months ago, you can always find information in the system about who had access to a particular resource during the time period of interest, when, by whom and on what basis this access was agreed, etc.

Very important from the point of view of the information security of banks is the ability to automatically identify and block orphan and unused accounts. As in any large organizations, many technical accounts are constantly being created in banks, which are used by dozens of administrators in shifts.

If an incident has occurred, it is extremely difficult to figure out who used this account at a particular moment without an IGM/IGA system. A centralized access management solution allows you to assign responsibility for each account, whether it is personal or administrative/technical. If an unattended "account" suddenly appears, the system immediately sends a warning to the information security service. Its owner is determined and secured, and he is further responsible for all actions performed on behalf of this account.

Automated access control technologies allow you to prevent the occurrence of conflicts of authority.

The IGM/IGA system can inform the user that the rights requested by him lead to a conflict of authority, or not allow the person to issue conflicting rights at all.

If an exception to the rules is permissible, the person responsible for coordinating such conflicting rights must be involved in the process. Some kind of compensating procedure should be launched to reduce risks: for example, monitoring employee actions using a leak protection system and analyzing user behavior. In addition, such conflicting rights must be revoked in time, immediately after the completion of the necessary actions. That is, there is no way to do without an automated mechanism that will control all actions and store the history of each step.

It can be said that IGM/IGA systems are needed by banks to build a comprehensive ecosystem of automation and security of access management based on contactless ID card reading technology. To make access convenient, transparent and secure, IGM/IGA must be complemented by multi-factor authentication technology and SSO (Single sign-on technology).

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