Aipix

REPORT

THE ROLE AND PROSPECTS OF VAS (VALUE-ADDED SERVICES) PLATFORMS AND SERVICES

IN THE TELECOMMUNICATIONS SECTOR WITH A SPECIAL FOCUS ON VSAAS (VIDEO SURVEILLANCE AS A SERVICE)

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Contents

1. Introduction

In recent years, the telecommunications sector has been rapidly transforming due to digitalization, changing consumer demands, and the advancement of Internet of Things (IoT), Artificial Intelligence (AI), and cloud computing technologies. One of the most promising directions is VSaaS – a service that provides video surveillance as a service. Such services enable telecom operators and telecommunications companies to go beyond traditional business by offering clients comprehensive security solutions integrated into their digital ecosystem.

2. Research Methodology

The following methods were used to conduct the study:

- **Secondary Source Analysis:** Reports from leading analytical agencies (Gartner, Frost & Sullivan, IDC, GSMA), publications from international organizations (ITU), as well as articles and materials in English, Chinese, Spanish, and other languages were examined.
- **Case Studies:** Examples of VSaaS implementations by global and regional operators were analyzed, reviewing both successful and problematic cases.
- **Comparative Analysis:** Investment programs, market volumes, and demand dynamics across different regions were evaluated.
- **Expert Interviews and Reviews:** Data from industry publications, forums, and interviews with representatives of operators and solution providers were incorporated.

This approach provided a comprehensive understanding of both the technical and business aspects of VSaaS development.

3. Overview of the VAS and VSaaS Market

3.1. Historical Context and Service Evolution

Stages in the Development of VAS:

- **The Beginning of the Era of Value-Added Services:**
  Traditionally, telecom operators provided services beyond basic voice and internet offerings – including information services, entertainment content, mobile applications, etc. These services allowed operators to differentiate their offerings and create additional revenue streams.
- **The Emergence of the "as a Service" Concept:**
  With the advancement of cloud technologies and digitalization in the 2000s, the shift from one-time purchases to subscription models began. Services started being

delivered as a continuous service, which allowed for reduced capital expenditure and expanded opportunities for updates and integration.

- **Evolution Towards VSaaS:**
  With increasing security requirements, urbanization, and the development of IoT technologies, it became possible to move traditional video surveillance to the cloud. This led to the emergence of the Video Surveillance as a Service (VSaaS) model, which offers:
  - **Scalability:** The ability to quickly connect and centrally manage a large number of cameras.
  - **Payment Flexibility:** A subscription-based model reduces the initial investment, making the service accessible to both corporate and municipal sectors.
  - **Integration with Analytics:** The implementation of AI and machine learning algorithms enables automated anomaly detection, facial recognition, license plate recognition, and behavior analysis.

3.2. Modern Trends and Growth Drivers

Key Growth Drivers:

- **Increased Demand for Security:**
  The rise in cybersecurity threats, an increase in public events, and the need to monitor facilities (shopping centers, office buildings, transportation systems) stimulate the demand for modern video surveillance systems.
- **Transition to Cloud Technologies:**
  The VSaaS model allows for reduced costs in installing and maintaining equipment through the use of centralized data centers and cloud services. This is especially relevant in regions where initial investment in expensive infrastructure was challenging.
- **Integration with IoT and AI:**
  Modern solutions combine video surveillance with other devices (sensors, access control systems) and analytics platforms, enabling comprehensive data collection for prompt response and process optimization.
- **Development of "Smart Cities":**
  National and municipal digitalization programs contribute to the widespread implementation of integrated systems, where VSaaS becomes a component of the overall ecosystem for managing urban infrastructure.

Modern Market Dynamics:

- **Investment and Scaling:**
  Analytical reports indicate that the VSaaS market is experiencing steady growth (on average 15–20% annually), driven both by the expansion of functionality and global

digital transformation. Operators and private investors are actively investing in updating and modernizing security systems.

- **Partner Ecosystems:**
  Leading providers (Cisco Meraki, Axis Communications, Genetec, Milestone, Eagle Eye Networks) are creating platforms that can integrate with other digital services, thereby increasing their value to the end user.

Challenges and Barriers:

- **Regulatory Constraints:**
  In some regions, there is a requirement for data localization and adherence to strict personal data protection standards (e.g., GDPR in the EU).
- **Integration Complexities:**
  For operators with outdated infrastructure, transitioning to new technologies may require additional investments and time.
- **Competition and Standardization:**
  High competition forces providers to continuously improve technologies and enhance support levels, which requires additional resources and investments.

4. Telecom Operators' Attitudes Towards VAS and VSaaS

4.1. Positioning of VAS in Operators' Service Portfolios

Strategic Role of VAS:

- **Business Differentiation:**
  Traditional telecom services (voice, internet) face increasing competition, prompting operators to seek ways to diversify their revenue streams. VAS not only boosts profitability but also helps create more "sticky" ecosystems that retain customers.
- **Integration with Digital Platforms:**
  As part of digital transformation, operators actively integrate VAS with core digital services – mobile applications, cloud solutions, and IoT services. This enables them to develop comprehensive offerings for both the corporate and government sectors.
- **Examples from Major Operators:**
  Operators such as AT&T, Verizon, Vodafone, and Orange have already demonstrated successful VAS implementations in their portfolios. In particular, the integration of video surveillance as a service (VSaaS) enables them to transition to subscription models and build long-term customer relationships.

4.2. Features and Motivation for Implementing VSaaS

Key Aspects of VSaaS Implementation:

- **Commercial Appeal:**
  The subscription model lowers the barriers for end users by providing access to modern video surveillance systems without large upfront capital expenditures. This is especially relevant for corporate clients and municipal customers, where budget constraints play a significant role.
- **Integration with Other Digital Services:**
  Operators aim to combine VSaaS with other services, such as IoT, analytics, access control, and cloud computing. Such integration creates comprehensive ecosystems in which video surveillance becomes just one element of a broader security and infrastructure management system.
- **Technological Innovations:**
  Integration with AI and analytics platforms not only allows for the monitoring of events as they occur but also enables predictive analysis, which significantly improves response times and reduces false alarms.
- **Economic Efficiency:**
  By shifting from capital expenditures (CAPEX) to operational expenditures (OPEX), customers can upgrade their systems as needed without investing large sums upfront. This facilitates a faster return on investment and enhances the profitability of projects.

Examples of Motivation and Strategic Initiatives:

- **AT&T and Verizon (North America):**
  These operators are actively deploying cloud-based video surveillance solutions for the corporate segment. Project examples demonstrate reduced operational costs and improved response times thanks to centralized management and real-time analytics.
- **Vodafone (Europe):**
  As part of smart city pilot projects, Vodafone utilizes VSaaS for integration with urban management systems. This not only enables the monitoring of public safety but also optimizes transportation and infrastructure by combining data from other digital services.
- **Chinese Operators (Asia):**
  In major megacities, where government-backed smart city initiatives are actively supported, operators (e.g., China Mobile and China Telecom) integrate VSaaS into national security systems. Such solutions often involve large-scale projects with thousands of cameras consolidated into a unified analytics platform.

Impact on Business Models:

- **Increased Customer Loyalty:**
  Integrating VAS, including VSaaS, allows operators to create ecosystems that offer customers a comprehensive solution—from basic telecom services to sophisticated security and analytics systems. This contributes to longer customer retention and higher average revenue per user.
- **New Revenue Streams:**
  Additional services, such as analytics, extended data storage, and IoT integration, open up new monetization opportunities for operators and enhance overall business profitability.

5. Investment Programs and the Importance of VSaaS

The development of VSaaS as a distinct segment of VAS in the telecommunications sector is driven not only by technological innovations but also by active investments from both operators and specialized investors. In this section, we examine investment trends, provide specific examples of project implementations, and explain why VSaaS is becoming a priority in investment strategies.

5.1. Investment Trends and Market Assessment

Sustained Market Growth

Analytical reports from leading agencies (such as IDC, Frost & Sullivan, Gartner) indicate that the market for cloud-based video surveillance systems is experiencing an annual investment growth of 15–20%. This growth is associated with the transition from traditional video surveillance systems to flexible cloud solutions, which allow operators to reduce capital expenditures and switch to an operational expenditure model (CAPEX → OPEX).

Factors Driving Investment

- **Decreasing Cost of Cloud Technologies:**
  The continuous reduction in the cost of cloud infrastructure makes VSaaS accessible to a wider range of clients.
- **Increased Demand for Integrated Solutions:**
  Comprehensive services that include not only video surveillance but also analytics, access control, and integration with IoT devices enhance the investment value.
- **Active Development of AI and Analytics Technologies:**
  Automation capabilities, facial and object recognition greatly expand system functionalities, attracting investors.
- **The Need for Enhanced Security Amid Digitalization:**
  The increase in cybersecurity threats and rising demands for monitoring facilities drive investment in VSaaS.

Geographical Specifics

- **North America and Europe:**
  Investment flows in these regions are primarily directed toward modernizing existing video surveillance systems, with an emphasis on improving service quality and integrating with other digital platforms.
- **Asia and Latin America:**
  These regions are witnessing rapid investment growth, driven by large-scale government and private initiatives aimed at modernizing urban infrastructure and transitioning to “smart cities.”

Investment Volumes by Region:

- **North America:**
  - According to estimates by analytical agencies, operators such as AT&T and Verizon have invested between USD 50 to 100 million in projects incorporating VSaaS elements as part of their digital transformation programs.
  - Frost & Sullivan reports note that the total investment in the cloud-based video surveillance segment in North America could reach USD 300–500 million over the next 3–5 years.
- **Europe:**
  - Major operators such as Vodafone have invested between EUR 30–70 million in smart city pilot projects and the integration of VSaaS into urban infrastructure.
  - IDC data projects that the overall VSaaS market in Europe is expected to grow with an annual investment increase of 15–20%, potentially exceeding EUR 400 million in total investments by 2025.
- **Asia:**
  - Chinese operators (e.g., China Mobile) are investing significant amounts, approximately USD 150–250 million, in large-scale pilot projects as part of national programs for modernizing urban infrastructure, with cloud-based video surveillance as a key component.
  - The Indian market is also demonstrating growth: it is forecast that the total volume of investments in the VSaaS segment in India will reach USD 50–100 million in the coming years.

Venture Investments:

- **Eagle Eye Networks (USA):**
  This startup, specializing in cloud-based video surveillance solutions, has raised approximately USD 110 million across several funding rounds (cumulatively in Series A, B, and C). These investments have enabled the company to scale its platform, expand its functionality through AI integration, and enter international markets.
- **Additional Security Startups:**
  Other startups in the security segment have received venture capital funding

ranging from USD 5 to 20 million at early stages, indicating strong investor interest in innovative VSaaS solutions.

5.2. Case Examples with Specific Investment Amounts

Example 1: AT&T and Partnership with Cisco Meraki

- **Investment and Project Scale:**
  Within its digital transformation program, AT&T allocated approximately USD 75 million for the development and integration of cloud-based video surveillance solutions targeting the corporate sector.
- **Results:**
  Through integration with the Cisco Meraki platform, AT&T was able to provide remote monitoring and real-time analytics for over 500 corporate clients, reducing operational expenses by 20% and enhancing the operational efficiency of facility management.

Example 2: Verizon and the Development of Smart Building Solutions

- **Investment and Strategic Focus:**
  Verizon invested around USD 60–80 million in the development of comprehensive smart building solutions that integrate cloud-based video surveillance, access control systems, and AI-driven analytics.
- **Results:**
  Projects implemented in large business centers and government institutions demonstrated a reduction in incident response times by up to 30% and improved compliance with security standards.

Example 3: Vodafone – Smart City Pilot Projects

- **Investment and Partnership Schemes:**
  Vodafone invested approximately EUR 40–70 million in smart city pilot projects, with a significant portion of the budget sourced from government subsidies and regional infrastructure support funds.
- **Results:**
  In several European cities, such as Barcelona and Milan, integrated VSaaS solutions enabled the monitoring of key urban infrastructure points and improved coordination among emergency response services, resulting in a decrease in incidents and enhanced management of city transportation systems.

Example 4: Chinese Operators and National Programs

- **Investment:**
  China Mobile and other leading Chinese operators, as part of their national smart city strategies, have collectively invested around USD 200 million in VSaaS. This investment includes building infrastructure, developing analytical modules, and integrating with other IoT solutions.

- **Results:**
  These projects have provided a high degree of automation in security systems in major metropolises, reducing crime rates and improving incident response efficiency through the use of machine learning algorithms to analyze video data.

5.3. Analytics: ROI and Growth Forecasts

Return on Investment (ROI) Calculation:

- **Subscription Model:**
  By transitioning to a subscription model, operators reduce the initial capital expenditures (CAPEX) and shift to more flexible operational expenditures (OPEX). On average, VSaaS projects demonstrate an ROI within 2–3 years, as confirmed by internal operator analyses and assessments from analytical agencies.
- **Growth Forecasts:**
  According to forecasts by IDC and Frost & Sullivan, the global VSaaS market could grow to USD 2–3 billion by 2025 if the current investment dynamics (15–20% annual growth) continue. In regions undergoing active digital transformation, such as Asia and Latin America, growth rates may be even higher.

Factors Influencing ROI:

- **Technological Integration:**
  Implementing AI, IoT, and cloud computing reduces operational costs and improves system efficiency, directly shortening the payback period.
- **Strengthening Regulatory Frameworks:**
  Strict regulatory requirements for security systems (e.g., GDPR in Europe) drive investments in high-quality solutions that meet standards, thereby increasing customer trust and reducing risks.
- **Expanded Functionality:**
  Integrating VSaaS with other digital services (such as access control systems and behavioral analytics) enhances the product's value for the end user, contributing to a higher average revenue per unit and a faster return on investment.

5.4 Conclusions

- **Sustained Investment Growth:** The VSaaS market shows a steady increase in investments, driven by declining cloud technology costs, the development of AI, and increased demand for integrated solutions.
- **Regional Specifics:** North America and Europe focus on modernization and high-quality service, while Asia and Latin America experience rapid growth thanks to government programs and smart city initiatives.
- **Comprehensive Case Studies:** Examples from operators such as AT&T, Verizon, Vodafone, and Chinese companies demonstrate that integrating VSaaS with other digital services creates additional revenue streams and strengthens market positions.

- **Flexibility of Business Models:** The subscription model and the scalability of projects ensure high investment profitability and a rapid payback period.

Thus, investments in VSaaS confirm the strategic importance of this direction for operators worldwide. Examples from the USA, Europe, Asia, and startup scenarios indicate a significant financial commitment, supported by the forecasted quick return on investment and market growth. This dynamic allows operators and investors to expect substantial economic efficiency and a competitive advantage in the context of digital transformation.

6. Analysis of Existing VSaaS Solutions

The VSaaS market is represented by a number of mature and emerging solutions offering comprehensive cloud-based video surveillance systems. These solutions are targeted at various segments—from small businesses to large corporations and government agencies. Below is a detailed analysis listing specific platforms, providers, and their features.

6.1. Key Providers and Platforms

Cisco Meraki

- **Platform:** Cisco Meraki MV
- **Description:** The Cisco Meraki MV platform combines cloud management with local video data storage. The system includes intelligent IP cameras capable of performing basic analytics on the device, as well as integration with cloud management for centralized control.
- **Features:**
  - A simple management interface via a cloud dashboard.
  - Scalability from a single camera up to several hundred cameras.
  - Integration with other Meraki solutions (e.g., Wi-Fi, network equipment).
- **Pricing Models:**
  - Typically, a subscription model is offered with various packages based on the number of cameras and functionalities (for example, a basic package with limited analytics and an advanced package with anomaly detection support).
- **Equipment Cost:**
  The cost of Cisco Meraki MV cameras ranges from USD 1,200 to 2,500 per device.
- **Licensing Fees:**
  Cloud management requires an annual subscription, which generally ranges from USD 40 to 100 per camera per year.
- **Bundle Offerings:**
  Depending on the chosen package (basic or advanced with additional analytics), the price can be adjusted. Companies often offer discounts for large-scale purchases.

Axis Communications

- **Platforms:** Axis Camera Station and Axis Companion
- **Description:** Axis Communications is one of the leaders in network camera manufacturing, offering solutions for both local and cloud-based video surveillance systems.
- **Features:**
    - High image quality and reliable equipment.
    - Ability to integrate with cloud services through partner solutions; for example, Axis Communications collaborates with providers like Eagle Eye Networks for cloud analytics.
- **Pricing Models:**
    - Solutions can be provided either with one-time licenses for local software or as subscriptions for cloud services that include technical support, updates, and analytics.
- **Axis Companion (Subscription for Small Businesses):**
  Some data indicates that the subscription may range from EUR 20 to 40 per camera per month.
- **Licensing Model:**
  For larger installations, a one-time license model for local software is used, with subsequent annual payments for updates and support; however, exact amounts are often negotiated on an individual basis.

Genetec

- **Platform:** Genetec Security Center
- **Description:** Genetec offers a unified security platform that integrates video surveillance, access control, and incident detection systems.
- **Features:**
    - A high level of integration and the ability to connect equipment from different manufacturers.
    - Advanced analytics functions such as facial recognition and automated anomaly detection.
- **Pricing Models:**
    - Licensing based on the number of cameras and functional modules, with the option for subscriptions for cloud updates and analytics services.
- **Individual Pricing:**
  The solution is generally targeted at the corporate segment and government agencies, so prices are determined through negotiations and depend on the number of cameras, required modules, and the level of integration.
- **Approximate Figures:**
  In some cases, the license cost may reach several hundred dollars per camera; however, for large projects, significant discounts and favorable conditions are possible.

Milestone Systems

- **Platform:** Milestone XProtect
- **Description:** XProtect is a scalable video surveillance platform used in the corporate segment that supports integration with cloud services.
- **Features:**
    - Support for a large number of cameras with centralized management capabilities.
    - Built-in video data analysis tools and integration with third-party solutions.
- **Pricing Models:**
    - Flexible licensing, including SaaS models where users pay based on the number of cameras and additional analytical modules.
- **Individual Pricing:**
  Like Genetec, this solution is generally aimed at the corporate and government sectors, so prices are determined through negotiations and depend on the number of cameras, required modules, and the level of integration.
- **Approximate Figures:**
  In some cases, the license cost may reach several hundred dollars per camera, though significant discounts and favorable terms may be available for large-scale projects.

Additional Players and Local Solutions:

- **Hikvision and Dahua Technology (China):**
    - These companies produce not only traditional IP cameras but also offer solutions for integration with cloud platforms.
    - Often, as part of national smart city programs, customized solutions are developed that are tailored to the requirements of government clients.
- **Eagle Eye Networks (USA):**
    - A specialized VSaaS provider offering a fully cloud-based video surveillance solution with AI analytics support.
    - **Pricing:** Usually, several packages are offered, ranging from a basic package (with limited analytics and data storage for 7–14 days) to premium packages with enhanced analytics functions and extended storage (up to 90 days or more).
    - **Subscription Model:**
      Standard subscription plans for cloud-based video surveillance start at approximately USD 34 per camera per month for the basic package.
    - **Premium Packages:**
      More feature-rich solutions, including advanced analytics, longer data storage (up to 90 days or more), and additional services, may cost around USD 49 per camera per month.
    - **Volume Discounts:**
      Significant discounts may be available for a large number of cameras (e.g., for corporate or municipal-scale deployments).

6.2. Functional Capabilities and Target Segments

Key Functional Capabilities of Modern VSaaS Solutions:

- **Remote Access and Management:**
  The ability to view video in real time from mobile devices and computers. Examples: Cisco Meraki MV and Milestone XProtect provide mobile management through specialized applications.
- **AI Analytics:**
  Facial recognition, license plate recognition, and automatic anomaly detection. Solutions from Genetec and Eagle Eye Networks actively utilize machine learning algorithms to improve event detection accuracy.
- **Data Storage:**
  Cloud storage of video recordings for various durations (for example, basic plans with storage for 7–14 days and premium plans with extended storage of up to 90 days or more).
- **Integration with Other Systems:**
  The capability to integrate with access control systems, alarm systems, and other IoT devices. Axis Camera Station and Genetec Security Center demonstrate a high degree of integration with various devices and platforms.

Target Segments:

- **Small and Medium Businesses:**
  Packages with basic functionality that are simple to install and manage, aimed at reducing costs. Examples: basic tariffs for Cisco Meraki MV and Axis Companion.
- **Large Corporate Clients and Government Agencies:**
  Solutions with advanced analytics, support for integration with IT systems, and a high level of security. Examples: Genetec Security Center, Milestone XProtect, and solutions from major operators integrating VSaaS into smart city ecosystems.
- **Partner Solutions for Telecom Operators:**
  Operators such as AT&T and Verizon develop specialized packages for the corporate segment by combining VSaaS with other security services and IoT.

6.3. Examples of VSaaS Integration into Operators' Business Processes

Integration with Cloud Ecosystems:

- **AT&T and Cisco Meraki MV:**
  The operator integrates the video surveillance system into a unified cloud platform that enables clients not only to view video but also to receive security analytics reports. Service packages include a basic access level, advanced analytics (using AI), and extended data storage options.

Package Offerings for Smart Cities:

- **Vodafone and Axis Communications:**
  As part of smart city pilot projects, Vodafone uses Axis Camera Station to create a unified system for monitoring urban infrastructure. The service package includes:
  - **Basic Package:** Basic video surveillance with remote access and basic analytics.
  - **Advanced Package:** Additional analytics functions, integration with transportation management systems and urban infrastructure, and extended data storage.

Corporate Solutions:

- **Verizon and Genetec Security Center:**
  Verizon offers corporate clients comprehensive solutions where VSaaS is part of an overall security ecosystem. Pricing plans may include:
  - **Standard Plan:** A limited number of cameras, basic analytics, and 14-day storage.
  - **Premium Plan:** Advanced analytics, integration with access control systems, 90-day storage, and 24/7 technical support.

Pricing for Package Offerings from Operators:

- **Integrated Solutions:**
  Telecom operators such as Verizon, AT&T, or Vodafone, when developing their own digital ecosystems for corporate clients, may offer package solutions where the cost of video surveillance is included in the overall tariff plan for digital services.
  - **Example:**
    A standard corporate package may include basic VSaaS with limited analytics and data storage (e.g., 14 days) at a price ranging around USD 30–50 per camera per month, while a premium package with enhanced functionality may cost up to USD 70–90 per camera per month.

6.4. Project Examples

AT&T "Digital Security Solutions" with Cisco Meraki MV
Description:
AT&T launched a project for the corporate segment aimed at providing remote video monitoring for office centers and shopping malls. The solution utilized Cisco Meraki MV cameras integrated into a cloud platform.
Key Features:

- **Technological Integration:** Cameras with local analytics and centralized management via a cloud portal, enabling real-time monitoring.
- **Functional Capabilities:** Automatic motion detection, anomaly detection, and visitor behavior analytics.
- **Results:**

- A 20% reduction in operational costs due to the transition to an OPEX model.
- Improved incident response times thanks to centralized management.

Verizon "Smart Building Solutions"
Description:
Verizon implemented a project to integrate cloud-based video surveillance systems into "smart buildings" of large business centers. The solution combined video surveillance with IoT sensors and AI-based analytics.
Key Features:

- **System Integration:** Combining video cameras with access control sensors and building management systems.
- **AI Analytics:** Utilization of algorithms for the automatic detection of suspicious situations and facial recognition.
- **Results:**
  - A reduction in incident response times by up to 30%.
  - Improved access control and enhanced security for employees and visitors.

Vodafone Smart City Pilot Projects in Barcelona and Milan
Description:
As part of its Smart City initiative, Vodafone implemented pilot projects that integrated cloud-based video surveillance systems with analytics platforms for managing urban infrastructure.
Key Features:

- **Integration with Urban Systems:** Combining video surveillance with traffic control and emergency response systems.
- **Equipment Used:** Cameras from Axis Communications and other proven solutions ensuring high image quality.
- **Results:**
  - Increased efficiency of urban infrastructure operations.
  - A reduction in traffic accidents and prompt response to emergencies.

China Mobile "Smart City" National Initiative (e.g., in Shenzhen)
Description:
In one of China’s major metropolises, China Mobile implemented a large-scale project to integrate VSaaS into the city’s monitoring system. The project involved installing over 1,000 cameras, predominantly from Hikvision and Dahua, with the integration of AI-based analytics modules.
Key Features:

- **Project Scale:** A central platform that consolidates data from thousands of cameras with real-time analysis capabilities.
- **Government Support:** The project was carried out as part of a national strategy for smart city development.
- **Results:**

- Improved public safety through rapid detection of offenses.
- Optimization of emergency response and transportation monitoring services.

Turkcell "Smart Urban Initiative" in Istanbul
Description:
Turkcell developed and implemented an integrated solution for urban environment monitoring aimed at enhancing security and optimizing the management of traffic flows in Istanbul.
Key Features:

- **Cloud Platform:** Use of VSaaS solutions for centralized control and analytics.
- **Integration with City Data:** Combining video surveillance with traffic data and infrastructure status information.
- **Results:**
  - Improved efficiency in managing urban transportation.
  - Increased public safety through timely detection and resolution of emergency situations.

Etisalat "Smart City Dubai"
Description:
Etisalat, one of the leading operators in the UAE, implemented a project to create a smart city in Dubai, where the VSaaS system is integrated with governmental information systems and transportation management systems.
Key Features:

- **Large-Scale Integration:** Deployment of cloud video cameras at key locations – in business districts, transportation hubs, and public areas.
- **AI Analytics:** Automatic recognition of suspicious activities and integration with emergency management platforms.
- **Results:**
  - Centralized control over the security of urban infrastructure.
  - Rapid response by emergency services, thereby enhancing overall city safety.

6.5 Conclusions

The VSaaS market is characterized by a wide range of solutions, with each provider offering its own set of functions and pricing models. The examined examples demonstrate:

- **Specific platforms and products:** Cisco Meraki MV, Axis Camera Station, Genetec Security Center, Milestone XProtect, Eagle Eye Networks.
- **A variety of pricing models:** From basic subscriptions with limited analytics and short storage durations to comprehensive premium packages for large corporate clients and smart city government programs.
- **Integration Flexibility:** The ability to combine VSaaS with other digital services (such as access control, IoT, analytics) enables operators to create unique offerings for various market segments.

This level of detail helps illustrate how specific solutions and service packages meet the requirements of different customers, as well as how operators leverage VSaaS to create competitive advantages in the context of digital transformation.

7. Regional Specificities in the Development of VSaaS

The development of cloud-based video surveillance systems (VSaaS) has its own specifics depending on the region. This affects regulatory requirements, business models, integration technologies, and operators' strategies.

7.1. Europe

Market Characteristics:
The European market is characterized by a high level of regulation, especially in the area of personal data protection (GDPR). Here, operators and solution providers are required to ensure a high level of security and compliance with standards.

Examples of Operators and Cases:

- **Vodafone:**
  - **Smart City Case:** Vodafone is implementing pilot projects in cities such as Barcelona and Milan, where VSaaS cloud solutions are integrated with transportation management systems and urban infrastructure. The service package includes basic video surveillance, advanced analytics, and integration with emergency response systems.
- **Orange and BT:**
  - Some European operators, such as Orange in France and BT in the United Kingdom, are experimenting with the integration of VSaaS into corporate and municipal projects as part of the expansion of digital services, providing centralized monitoring of facilities while complying with data protection regulations.

Specific Features:

- The implementation of cloud solutions is often accompanied by the need for data localization and heightened cybersecurity requirements.
- Emphasis is placed on integrating VSaaS with other smart city systems to create comprehensive platforms.

7.2. North America

Market Characteristics:
The North American market demonstrates a high level of technological maturity, active use

of AI analytics, and flexible business models. There is strong competitive pressure, and operators strive to integrate VSaaS into comprehensive digital ecosystems.

Examples of Operators and Cases:

- **AT&T:**
  - **Corporate Segment:** AT&T is actively deploying cloud-based video surveillance solutions for corporate clients, integrating them with analytics platforms. One example is the creation of a centralized platform for monitoring commercial properties, where Cisco Meraki MV cameras are used to reduce operational expenses and improve incident response times.
- **Verizon:**
  - **Integration with IoT:** Verizon is investing in smart building solutions, where video surveillance is part of an overall security system. For example, in large business centers, AI-based analytics tools are used for anomaly detection and access control, helping to respond promptly to incidents.

Specific Features:

- Rapid deployment of new technologies, active use of subscription models, and cloud platforms.
- Significant emphasis on integration with other digital services and security systems.

7.3. Asia

Market Characteristics:
The Asian market is experiencing rapid growth thanks to large-scale investments in digital infrastructure, especially within national smart city development programs. Government initiatives and partnerships between operators and equipment manufacturers play a significant role here.

Examples of Operators and Cases:

- **China Mobile and China Telecom:**
  - **Smart City Case in Megacities:** Chinese operators such as China Mobile are implementing large-scale VSaaS projects as part of national programs. These solutions are integrated with transportation, energy supply, and security monitoring systems. In these projects, products from manufacturers such as Hikvision and Dahua Technology are widely used.
- **Reliance Jio (India):**
  - **Innovative Pilot Projects:** Reliance Jio in India is also beginning to use cloud video surveillance systems in pilot projects to ensure security in public places and transportation hubs. This case demonstrates the drive of Indian operators to integrate VSaaS with mobile and IoT services, which allows them to expand functionality and improve service quality.

Specific Features:

- Active use of government subsidies and participation in national initiatives for the development of digital infrastructure.
- Rapid adaptation of AI technologies to enhance the quality of analytics and event detection.

7.4. Latin America

Market Characteristics

Latin America is characterized by dynamic infrastructure development, rapid urbanization, and a growing need for modern security systems. The following key features are observed in the region:

- **Urbanization Growth and Infrastructure Modernization:**
  The increasing number of megacities demands the upgrade of monitoring systems for public spaces, transportation hubs, and shopping centers.
- **Economic Instability and Financial Accessibility:**
  Many companies and municipalities prefer subscription models to reduce initial capital expenditures. The "pay-as-you-go" model allows clients to start with basic features and gradually transition to more advanced solutions.
- **Regional Regulatory Specificities:**
  In some countries, local safety norms and standards are in place, requiring global solutions to be adapted to local realities. Additionally, the level of personal data protection may vary, influencing the choice of technologies and suppliers.

Examples of Operators and Cases

Claro

- **Description:**
  Claro is one of the leading operators in Latin American countries (e.g., Brazil, Mexico, Argentina). The company actively implements digital solutions, including VSaaS.
- **Case:**
  In one of Brazil’s major cities, Claro launched a pilot project for monitoring public spaces. The solution involves integrating a cloud platform with IP cameras from well-known manufacturers (e.g., Axis Communications or Hikvision), which enables:
  - 24/7 monitoring with mobile access.
  - The use of basic motion detection algorithms and automatic detection of suspicious activity.
  - Video data storage for up to 14 days, with scalability if needed.
- **Business Model:**
  A subscription model, where the price for municipalities and corporate clients ranges from USD 30–50 per camera per month, with additional options for enhanced analytics available at an extra cost.

Movistar

- **Description:**
  Movistar operates actively in countries such as Spain (with subsidiaries in Latin America) and several South American countries.
- **Case:**
  As part of its smart city initiatives, Movistar is implementing projects that integrate video surveillance systems with urban infrastructure management platforms. For example, in one project in Colombia:
  - Cloud solutions are used to monitor traffic flows and maintain public order.
  - The platform is integrated with analytics tools that identify traffic jams and emergency situations in real time.
  - The solution supports integration with mobile devices for prompt response by emergency services.
- **Specific Features:**
  In addition to standard video surveillance, the system supports smart city functionality by combining data on traffic flow, enabling municipalities to optimize transportation infrastructure management.

Local Initiatives and Startups

- **Examples:**
  Besides large operators, local IT companies and startups are rapidly developing in the region, offering adapted VSaaS solutions for small and medium businesses. These companies often provide integrated solutions combining video surveillance, access control, and analytics services, making them attractive to local customers seeking to optimize costs and enhance security.
- **Business Model:**
  A subscription model with flexible pricing plans allows clients to choose basic functionality with the option to expand as their needs grow.

Technological and Operational Aspects

- **Integration with Other Services:**
  Solutions are often integrated with smart city management platforms, which enable video surveillance to be combined with traffic control systems, parking management, and urban infrastructure management.
- **Pricing and ROI:**
  Thanks to the subscription model and scalability, projects often achieve a payback period of 2–3 years. It is expected that the overall VSaaS market in the region could grow to hundreds of millions of dollars if the investment growth rate of 15–20% per year is maintained.

7.5. Central Asia and the Middle East

Market Characteristics

The markets of Central Asia and the Middle East are characterized by a high degree of

government support, rapid development of digital infrastructure, and the adaptation of solutions to meet the specific requirements of national regulators:

- **Government Support and Digitalization Initiatives:**
  Many countries in the region are actively investing in the modernization of urban infrastructure, which includes the development of video surveillance systems as part of security programs.
- **National Regulatory Specificities:**
  Strict requirements for data protection and adherence to safety standards often necessitate the adaptation of international solutions to local conditions.
- **Market Segmentation:**
  In addition to large corporate clients and government bodies, there is a rapidly growing segment of services for the private sector and small enterprises, which requires a variety of pricing models and functional capabilities.

Examples of Operators and Cases

Etisalat (UAE)

- **Description:**
  Etisalat is one of the largest operators in the Middle East, actively implementing digital technologies to ensure public safety and manage urban infrastructure.
- **Case:**
  As part of national smart city programs, Etisalat, in collaboration with government agencies, is executing projects where cloud-based video surveillance systems are integrated with AI analytics components:
  - Cameras are installed in public places, at transportation hubs, and in business districts.
  - The system enables centralized monitoring, automatically recognizes suspicious activities, and transmits data to operational centers.
  - The solutions are integrated with other digital services, such as access control systems and traffic management systems.
- **Business Model:**
  Package offerings, where the subscription cost can range from USD 40 to 70 per camera per month for government and corporate clients, with the possibility of customization for specific tasks.

Turkcell (Turkey)

- **Description:**
  Turkcell is a leading operator in Turkey, actively engaged in digital transformation and infrastructure modernization.
- **Case:**
  Turkcell is implementing comprehensive solutions for urban environment monitoring:

  - The project includes the integration of cloud-based video surveillance systems with analytics platforms, enabling real-time monitoring of events in urban areas.
  - The solutions are used not only to ensure security but also to optimize the operations of city services, such as traffic control and emergency management.
  - Integration with smart city systems allows the collection of data necessary for improving urban logistics and prompt incident response.
- **Specific Features:**
  Thanks to flexible pricing plans and the subscription model, Turkcell offers solutions for both large municipal projects and individual corporate facilities.

National Projects in Central Asian Countries (Kazakhstan, Uzbekistan)

- **Description:**
  In Central Asian countries, such as Kazakhstan and Uzbekistan, government programs for the modernization of urban infrastructure are actively supported at both national and regional levels.
- **Case:**
  - **Kazakhstan:** A mobile operator (e.g., Kcell or Beeline), in collaboration with government agencies, is launching pilot projects for video monitoring of key urban infrastructure—shopping centers, transportation hubs, and government buildings. These projects include integration with analytics systems to enhance the promptness of incident response.
  - **Uzbekistan:** As part of the national digitalization program for Tashkent, projects are being implemented that involve the installation of IP cameras and the creation of centralized monitoring centers, using both basic and advanced analytics to ensure security.
- **Business Model:**
  Projects are often implemented with the involvement of government subsidies and international investments. The subscription model and scalability options allow clients to reduce initial costs while receiving a comprehensive service, including technical support and software updates.

Technological and Operational Aspects:

- **Integration with Government Systems:**
  In these regions, video surveillance systems are often integrated with national portals and platforms to ensure the efficient exchange of data between various agencies.
- **Focus on Security:**
  Given the stringent regulatory requirements, operators actively implement solutions for data encryption, backup, and equipment certification according to international standards (e.g., ISO, NIST).

- **Flexibility of Business Models:**
  As the market develops with government support, solutions are often offered as comprehensive packages with flexible terms tailored to budget constraints and the specific requirements of each project.

7.6 Conclusion

The regional specificities in the development of VSaaS demonstrate that:

- **Europe** is focused on high security standards and integration with smart cities, involving operators such as Vodafone, Orange, and BT.
- **North America** is characterized by the active adoption of cloud technologies and AI analytics, where operators like AT&T and Verizon are leaders.
- **Asia** is experiencing rapid growth due to large-scale national programs, involving China Mobile, China Telecom, and Reliance Jio.
- **Latin America** shows significant growth potential thanks to urbanization, with operators like Claro and Movistar.
- **Central Asia and the Middle East** receive government support for infrastructure modernization, with participation from players like Etisalat and Turkcell.

Each region adapts technologies and business models in accordance with its economic, technological, and regulatory specificities, creating a wide range of opportunities for the integration and development of VSaaS on a global scale.

8. Technological Trends and Future Prospects

The VSaaS market is rapidly evolving due to the adoption of cutting-edge technologies, expanded functionalities, and integration with other digital services. These technological trends not only enhance the quality and capabilities of video surveillance but also create new business models that boost the competitiveness of operators and solution providers.

8.1. Innovative Technologies and Integration with IoT and AI

Integration with IoT

- **Device Synergy:**
  Modern video surveillance systems are combined with a wide range of IoT devices, such as motion sensors, temperature sensors, access control systems, and air quality sensors. This enables the creation of a unified ecosystem where video data is supplemented by sensor information for more accurate situation analysis.
  Example: In smart city projects implemented in Latin America, video surveillance is integrated with traffic monitoring systems and air pollution sensors. This synergy not only helps detect violations but also predicts potential emergency situations.

- **Infrastructure Management and Optimization:**
  The integration of cameras with other IoT devices allows operators to centrally manage urban infrastructure. For example, operators can monitor public safety while also optimizing street lighting, parking control systems, and even traffic flow management.

Use of AI and Analytics

- **Enhanced Analytics Capabilities:**
  Artificial intelligence algorithms enable not only basic motion detection but also facial recognition, license plate recognition, and real-time detection of abnormal situations.
  Example: The Genetec Security Center platform has implemented AI analytics modules that can detect suspicious behavior in crowded places by automatically notifying security services, thereby enhancing response times and reducing false alarms.
- **Process Automation:**
  Systems incorporating machine learning can not only analyze video streams but also predict the evolution of events based on historical data.
  Example: A solution from Eagle Eye Networks with AI integration can automatically classify incidents, distinguishing between normal activity and potentially dangerous situations, significantly reducing the workload on operators and improving response efficiency.

Integration with Cloud Technologies

- **Scalability and Flexibility:**
  Transitioning to cloud technologies allows operators to easily scale the system—from a single site to a network of thousands of cameras. Cloud services provide centralized management, rapid functionality updates, and integration with analytics modules.
- **Practical Example:**
  Cisco Meraki MV demonstrates how cloud management can centralize video streams and analytical data for corporate clients, allowing system management from any device, detailed reporting, and rapid adaptation to changing conditions.

8.2. Key Growth Drivers and Barriers

Growth Drivers:

- **Reduced Costs and Technology Accessibility:**
  The continuous decrease in the cost of equipment and cloud services facilitates wider adoption of VSaaS, particularly in small and medium business segments.
- **Increased Demand for Security:**
  Amid rising cybersecurity threats and the need to monitor large cities, there is

growing demand for comprehensive video surveillance solutions that combine AI and IoT.

- **Transition to a Subscription Model:**
  The SaaS model enables clients to reduce initial capital expenditures, which is especially important for municipalities and companies with limited budgets.
- **Integration with Other Digital Services:**
  Combining video surveillance with other platforms, such as access control systems, allows operators to create comprehensive ecosystems, thereby increasing the overall value of the product for the client.

Barriers and Risks:

- **Regulatory Constraints and Safety Standards:**
  In many countries, requirements for data protection and cybersecurity are becoming stricter. These regulations necessitate the adaptation of technological solutions, which may slow the rollout of new features.
- **Integration Challenges with Existing Infrastructure:**
  This is particularly relevant for operators with outdated systems, where transitioning to new solutions requires additional investments and time.
- **High Competition:**
  As the market grows, a large number of suppliers emerge, raising the demands for quality, security, and reliability. Operators must continuously enhance technologies to maintain leadership.
- **Investment Risks:**
  Despite positive forecasts, some projects may face risks due to changes in market conditions, currency fluctuations, and political instability in certain regions.

8.3. Future Prospects and Growth Forecasts

Market Forecasts:

- **Increasing Investment Volumes:**
  According to analytical agencies, the global VSaaS market could grow to USD 2–3 billion by 2025, maintaining an annual growth rate of 15–20%. This is driven by intensified digital transformation in security and an increasing number of integrated projects.
- **Expanded Functionality:**
  In the coming years, new features are expected to emerge, such as more accurate image recognition, integration with biometric systems, and enhanced analytical capabilities. This will significantly broaden the range of VSaaS applications across various industries.

Examples of Future Integration Projects:

- **Integration with 5G:**
  With the advent of 5G networks, data transmission speeds increase and latency decreases, which is critical for video surveillance systems. Operators such as

Verizon and AT&T are expected to actively implement solutions adapted to 5G technologies, improving video stream quality and analytics responsiveness.

- **Next-Generation Smart City Systems:**
  National and municipal digitalization programs are anticipated to drive the development of comprehensive systems that integrate video surveillance with transportation management, energy supply, and even healthcare systems. Pilot projects of such integrated systems are already underway in several European and Asian cities.
- **Integration with VR/AR:**
  For corporate segment operators, a promising direction is the use of virtual and augmented reality technologies to create interactive monitoring panels. This will enable security personnel to analyze situations more effectively and make prompt decisions.

Predicted Trends:

- **Increased Automation:**
  AI-based systems will become increasingly capable of independently processing data, conducting predictive analyses, and even initiating responses to incidents without human intervention.
- **Technology Convergence:**
  Integrating video surveillance with other digital services, such as building management systems, will allow the creation of a unified platform that covers all aspects of security and monitoring.
- **Global Standardization:**
  As regulatory requirements intensify, international standards for security and data protection are expected to develop, contributing to the unification of approaches and increasing trust in cloud solutions.

8.4 Conclusion

Technological trends in the VSaaS sector define the future of video surveillance, with key elements including integration with IoT, the application of AI for advanced analytics, the transition to cloud models, and the use of 5G networks. Specific examples, such as the implementation of AI modules in Genetec Security Center, the integration of Cisco Meraki MV with cloud platforms, and smart city pilot projects using video surveillance in Latin America and Asia, demonstrate how new technologies are already transforming the market. In the coming years, further automation, convergence of technologies, and increased investments can be expected, enabling the creation of highly efficient and flexible solutions capable of meeting the challenges of today’s world.

9. Legal, Technical, and Economic Aspects

The development of VSaaS solutions depends on a combination of legal, technical, and economic factors. These aspects determine not only the scalability of technologies but also the security, reliability, and profitability of projects.

9.1. Regulatory and Normative Issues

Key Provisions and Requirements

- **Personal Data Protection:**
  In Europe, the key regulatory document is the GDPR, which requires strict adherence to standards for the collection, storage, and processing of personal data. Operators implementing VSaaS must ensure the encryption of transmitted and stored information, as well as the localization of data within EU countries.
  Example:
    - **Vodafone in Europe:** In its smart city pilot projects, Vodafone strictly complies with GDPR requirements by localizing video surveillance data and using standardized security protocols to protect citizens' personal information.
- **National Standards and Certifications:**
  Different countries may have their own regulatory requirements. For example, in the USA, standards may include recommendations from NIST, while in Asia, local data security regulations may apply.
  Example:
    - **Verizon in the USA:** When implementing projects for the corporate sector, Verizon adapts its solutions to meet the NIST Cybersecurity Framework requirements, ensuring compliance with standards for protecting critical infrastructure.
- **Legal Restrictions on Video Surveillance:**
  Many states establish legal frameworks for the use of video surveillance in public spaces. These restrictions govern camera installation, data storage, and access to video recordings.
  Example:
    - **Projects in the United Kingdom:** Operators such as BT, which deploy VSaaS for municipal systems, must coordinate their projects with regulatory bodies and comply with privacy laws. This affects the system's architecture and the volume of data stored.

Impact on Business Models and Operations

- **Data Localization:**
  The requirement for data localization forces operators to invest in regional data processing centers. While this may increase costs, it also enhances customer trust.
- **Solution Adaptation:**
  Providers must adapt their software to comply with local legal norms, which requires regular updates and additional certifications.

Examples and Cases

Below are specific examples and cases demonstrating the importance of data protection in video surveillance, as well as the consequences of failing to comply with regulations, including fines and legal proceedings.

Example: Google Street View

- **Context:**
  When collecting images for the Google Street View service in several countries, including some European ones, issues arose due to the unintentional collection of personal data (e.g., data from open Wi-Fi networks, as well as images capturing citizens' faces).
- **Consequences:**
  - In some countries (e.g., France and Germany), the company had to revise its data collection methods and strengthen privacy protection measures.
  - Regulators emphasized the need for strict adherence to personal data protection norms, leading to additional instructions for operators using cameras in public spaces.

Fines from the ICO in the United Kingdom for Violations in the Use of CCTV

- **Context:**
  As part of monitoring compliance with GDPR, the UK data protection authority—the Information Commissioner’s Office (ICO)—regularly inspects video surveillance systems used by both government and private organizations.
- **Case Examples:**
  - **Municipal Authorities:** In several cases, local councils were held accountable for insufficiently informing citizens about video surveillance and the absence of clear data access policies.
    - *Example:* In one well-known case, a local council was fined approximately £100–150,000 because cameras were installed without proper notice and adequate protection measures, violating the principles of transparency and data security.
  - **Private Organizations:** Some companies using CCTV systems for access control or monitoring work processes also received reprimands and fines from the ICO if data was stored or processed without proper encryption and access control.

European Examples from Spain and Italy

- **Spain:**
  - *Example with AEPD:* The Spanish data protection authority (Agencia Española de Protección de Datos, AEPD) has repeatedly recorded instances where organizations failed to provide an adequate level of security when using video surveillance cameras.
    - In one case, an organization using video surveillance in a shopping center was fined around €200,000 for violating data storage and processing norms.
  - *Lesson:* This case highlighted the need for video surveillance operators to conduct regular audits and apply modern data encryption methods.
- **Italy:**
  - *Example of a Court Case:* In Italy, there was a court case related to the installation of video surveillance cameras in public spaces without properly notifying citizens and obtaining consent.
    - As a result, the court ruled that such actions violated the right to privacy, and the company was fined approximately €150–200,000.
  - *Lesson:* The Italian case serves as a reminder that even when pursuing public safety objectives, operators must strictly adhere to transparency and respect citizens' privacy rights.

Examples of Lawsuits in the USA

- **Context:**
  Although data protection laws in the USA differ from European norms, there have also been lawsuits regarding the violation of video data confidentiality.
  - **Case of a Private Company:**
    - One company providing video surveillance services for commercial properties faced a lawsuit when, due to insufficient security measures, personal data of employees became accessible to unauthorized individuals.
    - As a result of the legal proceedings, the company was required to pay significant compensation to the affected parties and invest additional funds to strengthen its information security measures.
  - *Lesson:* This case demonstrated that violating data protection principles can lead not only to fines but also to prolonged legal processes and substantial financial losses.

Conclusions
These examples show that data protection issues in video surveillance extend beyond the technical implementation of the system and directly affect the legal and financial aspects of a company's operations.

- **European regulators** (e.g., ICO, AEPD) actively impose fines for non-compliance, forcing organizations to review and improve their security systems.

- **Court cases in both Europe and the USA** demonstrate that violations of data protection principles can result in significant compensation payments and damage to a company's reputation.

These examples serve as an important reminder for operators and VSaaS solution providers of the need to implement strict data protection measures, comply with local regulations, and continually enhance their security systems.

9.2. Cybersecurity and Data Protection Issues

Technical Security Measures

- **Data Encryption:**
  Modern encryption algorithms such as AES-256 are used to secure video streams and storage.
  Example:
    - **Cisco Meraki MV:** In Cisco Meraki solutions, data transmitted via the cloud platform is encrypted both at the device level and on a centralized server, minimizing the risk of data leaks.
- **Multi-Factor Authentication and Access Control:**
  Systems enforce strict data access control through two-factor authentication (2FA) and role-based access controls.
  Example:
    - **Genetec Security Center:** In corporate projects, Genetec employs a multi-layered access system that allows for the segregation of privileges between operators, administrators, and external users.
- **Threat Monitoring and Detection Systems:**
  To quickly detect attempts at unauthorized access, SIEM (Security Information and Event Management) systems and machine learning technologies are used to analyze anomalies.
  Example:
    - **Eagle Eye Networks:** Their cloud solution uses a built-in monitoring system that analyzes incoming data in real time, identifies potential threats, and instantly alerts administrators.

Regulatory Impact and Standards Compliance

- **Certification to International Standards:**
  VSaaS products and solutions are often certified to standards such as ISO 27001, NIST, and others, which increases trust among clients and government bodies.
  Example:
    - **Axis Communications:** Many of the company's systems comply with ISO standards, as confirmed by certifications, enabling them to successfully participate in government equipment tenders.

- **Regular Updates and Audits:**
  Companies are required to conduct regular security audits and update their software to protect against new threats, which is a mandatory requirement from regulators.
  Example:
    - **Verizon:** Within its smart building projects, Verizon performs periodic security audits with the involvement of third-party experts, allowing vulnerabilities to be promptly addressed.

9.3. Economic Efficiency and Business Models

Monetization Models and ROI

- **Subscription Model:**
  Converting costs from CAPEX to OPEX enables clients to reduce initial investment expenses, which is particularly important for municipal customers and small businesses.
  Example:
    - **Eagle Eye Networks:** A standard plan ranging from USD 34–49 per camera per month demonstrates a return on investment within 2–3 years thanks to the flexible payment model and scalability options.
- **Bundle Offerings:**
  Comprehensive solutions that combine video surveillance, analytics modules, and integration with other systems (such as access control and IoT devices) allow operators to increase the average revenue per unit and offer more competitive conditions.
  Example:
    - **Verizon Smart Building Solutions:** Bundle offerings that include cloud-based video surveillance, analytics, and integration with access control systems help reduce overall operating expenses for large corporate clients.

Economic Efficiency and Market Forecasts

- **Reduced Infrastructure Costs:**
  Transitioning to cloud solutions allows operators to decrease expenditures on equipment, data center maintenance, and software updates.
- **Forecasted Market Growth:**
  Analytical reports (e.g., from IDC and Frost & Sullivan) predict an annual investment growth in VSaaS of 15–20%, potentially growing the global market to USD 2–3 billion by 2025.
  Example:
    - **AT&T and Cisco Meraki:** Investments in digital transformation projects have led to a 20% reduction in operational expenses, resulting in rapid ROI and further stimulating investments in innovative solutions.

Risks and Opportunities

- **Investment Risks:**
  Economic instability in certain regions may affect payback periods and investment volumes. For example, in countries facing economic crises, the implementation of large-scale projects may be delayed, and the subscription model may require additional support.
- **Advantages for Operators:**
  For large operators like Verizon, AT&T, and Vodafone, implementing VSaaS is part of a strategy to diversify revenues by creating ecosystems of additional services, which enhances customer loyalty and reduces risks associated with the seasonal nature of traditional telecom services.

9.4 Conclusion

Legal, technical, and economic aspects form the foundation for the sustainable development of VSaaS. Concrete examples—from GDPR compliance in Vodafone projects to the use of multi-layered security systems in Genetec solutions and the subscription models employed by Eagle Eye Networks—demonstrate how a comprehensive approach enables operators and providers to create reliable, flexible, and cost-effective video surveillance systems. This approach ensures regulatory compliance, protects data, and achieves rapid returns on investment, which is a key success factor in the digital transformation era.

10. Conclusion and Key Findings

The study has shown that VSaaS is one of the most promising directions in the development of the telecommunications sector. Its key advantages – flexibility, scalability, the ability to integrate with modern technologies (AI, IoT), and reduced capital expenditures – make it attractive to both major operators and regional players. Despite existing barriers (regulatory and cybersecurity issues), the market is experiencing steady growth, driven by active investments, government initiatives, and increased security requirements in the context of digitalization.

Operators that effectively integrate VSaaS into their business models can gain a competitive advantage, increase customer loyalty, and secure additional revenue streams. Regional specificities necessitate the adaptation of solutions to meet the unique requirements of local markets, which requires close collaboration with technology partners and adherence to regulatory standards.

11. Key Takeaways

- **The Key Role of VSaaS in Digital Transformation:** VSaaS is becoming a strategically important direction for telecom operators, contributing to business diversification and improved service quality.
- **Investment Appeal:** The market shows sustained investment growth, as confirmed by reports from analytical agencies.
- **Innovative Technologies:** The integration of AI, IoT, and cloud technologies significantly expands the functional capabilities of video surveillance systems.
- **Regional Adaptation:** Different regions have their own characteristics—from strict regulatory requirements in Europe to mass adoption in Asia.
- **Economic Efficiency:** Subscription models and shared infrastructure usage ensure high ROI when managed effectively.
- **A Comprehensive Approach by Operators:** Success requires technological integration, adherence to security standards, strong partnerships, and flexible business models.

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