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CHARACTERISTICS AND APPLICATION OF UNIFIED COMMUNICATIONS AS A SERVICE (UCAAS) IN ENTERPRISES

CHARAKTERYSTYKA I ZASTOSOWANIE UNIFIED COMMUNICATION AS A SERVICE (UCAAS) W PRZEDSIĘBIORSTWACH

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Summary: The article presents the concept of unified communication in cloud computing. Nowadays communication is becoming a key management factor because of the increasing role of information resources. New concepts and models of communication are the result of the constant evolution of information technology. Multidimensional and integrated communication is an important element of modern business processes, determining their efficiency, effectiveness and performance. The first part of the study presents the basic communication tools in the organization. On this basis, the essence of Unified Communications as a Service (UCaaS) is presented as a new communication model. Next, the benefits and risks resulting from the use of UCaaS were pointed out. The last part of the article describes examples of the practical implementations of UCaaS in Polish enterprises.

Keywords: communication, enterprise, UCaaS.

Streszczenie: Artykuł przedstawia koncepcję ujednoczonej komunikacji w modelu cloud computing. Obecnie komunikacja staje się kluczowym czynnikiem zarządzania ze względu na rosnącą rolę zasobów informacyjnych. Nowe koncepcje i modele komunikacji są wynikiem ciągłej ewolucji technologii informatycznych. Wielowymiarowa i zintegrowana komunikacja jest ważnym elementem nowoczesnych procesów biznesowych, determinującym ich wydajność, skuteczność i wydajność. Pierwsza część artykułu zawiera prezentację podstawowych narzędzi komunikacji w organizacji. Na tej podstawie przedstawiono istotę Unified Communications w modelu usługowym (UCaaS). Następnie zwrócono uwagę na korzyści i zagrożenia wynikające z zastosowania UCaaS w organizacjach. Ostatnia część artykułu opisuje przykłady praktycznych wdrożeń UCaaS w polskich przedsiębiorstwach.

Słowa kluczowe: komunikacja, przedsiębiorstwo, UCaaS.

1. Introduction

With dynamic changes in a demanding and competitive market, enterprises are being increasingly forced to implement appropriate information and communication technologies. Communication technologies play an important role in achieving business goals as they represent a key component of contemporary business processes, determining their efficiency, effectiveness and performance. The implementation of new business models, mobility, virtualization and the digital transformation of enterprises represent new challenges for the communication tools used in business practice. Consequently, communication tools are being constantly improved, influencing the effective functioning and development of enterprises.

Nowadays, unified communications as a service (UCaaS) solutions are becoming an important field of improvement of communication tools in enterprises. The aim of this article is to describe UCaaS systems, which are likely to represent an alternative or complement previous communication solutions used in enterprises. In order to achieve this goal, the benefits and threats of UCaaS solutions were presented and the results of research on the effects of the implementation of this class of communication systems in enterprises were presented. Furthermore, the paper also discusses examples and the effects of the implementation of UCaaS systems in Polish enterprises.

2. Unified communication and collaboration tools in enterprises

The communication process essentially includes a set of various activities related to communicating and the transfer of information between participants. The effectiveness of the communication process is determined by its speed, level of expenditure required for its implementation, and the legibility and value of the delivered contents for all participants. The effectiveness of communication in enterprises determines the dynamics and effectiveness of activities and decision-making while improving activity, reinforcing ties, enhancing teamwork and increasing employee trust. Communication plays an important role in business processes, both within the enterprise and in its collaboration with other entities in the market environment. Consequently, any enterprise should design and implement appropriate tools and measures which would most effectively support communication processes.

The concept of Unified Communications has been defined in the literature in various ways. Unified Communications can be generally defined as "communication services across geographical boundaries and networks based on rules and policies that provide seamless integration between services" [Fikry et al. 2012]. Another definition emphasizes that unified communications is a framework for integrating various asynchronous and real-time communication tools, with the goal of enhancing business communication, collaboration and productivity. Unified Communications

does not represent a singular technology, rather it describes an interconnected system of enterprise communication devices and applications that can be used in concert or successively [Fikry et al. 2012]. According to K. Riemer and F. Fröbner, Unified Communications Systems integrate traditional and novel communication media (speech, text, video) and devices (phone, computer) with present information and further collaboration features [Riemer, Fröbner 2007].

The development of UC systems was mainly sparked by the emergence of an increasing number of communication tools in business practice, without the possibilities of simple data transfer between each other and the progressive convergence of telecommunications and information technologies. The factors stimulating the emergence of unified communications systems also included the increasing popularity of mobile telephony, more widespread access to high bandwidth Internet networks, the growing demand for visual communication, progress in data transmission technologies, and the dynamic development and growing importance of social media. The purpose of UC systems is to facilitate communication between employees through the integration of different communication tools and forms (e.g. voice communication, e-mail, instant messaging, text messages, message boards, and audio and video conferences). The basic tools integrated within UC systems include:

- Telephony and Voice: including traditional phone calls (PSTN), IP telephony, mobile calls, computer telephony (soft telephony) and video telephony (video telephony).
- Instant Messaging & Presence: sending quick messages between users and displaying the user availability status to a selected group of other users.
- Meeting Solutions: videoconferencing, web conferencing and audio conferencing that provide real-time multimedia communication between users,
- e-mail: allows users to text or send multimedia messages (including voice mail) in asynchronous mode.
- Collaboration Applications: containing various types of software facilitating teamwork and enabling simultaneous work on shared data and documents (e.g. calendar, shared virtual spaces, whiteboarding).

Gartner, an analytics and research firm, presented six different kinds of communications in the UC area in a similar way: Voice and telephony (including mobility), meeting solutions (audio conferencing, videoconferencing and web conferencing), Messaging (email with voicemail and unified messaging), Presence and Instant Messaging, Clients (including desktop clients and thin browser clients) and Communications-enabled applications (like integrated contact centres, communications platform as a service and workstream collaboration) [Elliot, Blood 2015; O'Connell et al. 2017].

UC systems, utilizing a uniform and convenient interface, provide employees with a choice of different (both newer and older) communication tools that are optimal for the given conditions. As a result, UC systems provide enterprise

employees with a uniform platform to communicate from any location (e.g. office, home or other locations), using any device (e.g. smartphone, tablet, laptop, personal computer) and at any time, according to their personal preferences. More specifically, within the framework of a uniform application, messages and contents in UC systems can be effectively aggregated and then presented to the employees according to the adopted priorities. Various tools supporting communication and integrated within UC systems allow for their smooth adjustment to the changing needs of the enterprise. Nowadays, with the emphasis on teamwork, these systems are increasingly referred to as unified communication and collaboration (UCC), whereas their task is to additionally integrate communication tools with the solution in the area of collaboration support in order to improve the exchange of information and knowledge. The general idea of the functioning of UCC systems is illustrated in Figure 1.



Fig. 1. Idea and components of unified communication and collaboration systems

Source: [Kurzi 2015].

UC systems can be installed and configured within the enterprise's own IT infrastructure or implemented using various forms of outsourcing. UC systems include interfaces which enable connecting them with other ICT systems used in the enterprise (in particular with ERP or CRM systems). Integration with other applications used in the enterprise allows UC systems to support business processes. UC systems offer configuration options that enable the secure and reliable performance of communication processes within the enterprise. Furthermore, communication and collaboration principles and standards adopted in a given enterprise can also be implemented in UC systems. Consequently, enterprises that use UC systems can implement a comprehensive communication strategy that links people, processes and technology and ensures higher productivity of employees and better collaboration between teams, improved staff cooperation with partners and customers, whereas the faster exchange of information and knowledge will lead to generating innovations.

3. The concept and idea of UCaaS systems

In general, UCaaS can be regarded as a cost-effective model for on-demand delivery of unified communications services in the cloud [Tesfamicael et al. 2015]. Another approach considers UCaaS as a modern solution that includes standard unified communication functions, i.e. text messaging, presence management, voice (telephone), videoconferencing and chat services. This technology integrates multiple communication channels into a single, user-friendly platform. Furthermore, unlike UC, it does not require the implementation of an expensive and complex system in the enterprise because this technology is used in the cloud [Internet 3]. Today, UCaaS systems available in the cloud have become an alternative to locally purchased and implemented integrated communication solutions. Cloud computing helps users avoid expenditures on the creation and development of the communication infrastructure, because they can rent and use the ICT solutions they need using the network. With the lack of investment costs for the purchase of ICT solutions and the speed of implementation, UCaaS services are now becoming available not only for large companies, but also for enterprises from the SME sector. Furthermore, UCaaS systems provide companies with substantial flexibility, as they are only billed for the actual use and necessary licences and can smoothly control their number at any time. The literature emphasizes that UCaaS are an economical solution because the company can give up using dedicated and often expensive technical resources, whereas delivery, maintenance and administration of the system is the responsibility of the service provider. Furthermore, the company pays only for the use of the functionalities they need [Rusewicz 2017]. An obvious precondition for using UCaaS systems is that the enterprise should have an appropriate Internet connection that guarantees the proper level of quality of the communication services launched in the cloud (in the case of larger companies, it is also possible to directly connect the

user's WAN network to the provider's data centres). Using the network, enterprise employees, regardless of their location, can easily access and use modern, advanced and scalable communication services. UCaaS systems made available by the provider as part of cloud computing services (using virtualization, aggregation and self-service tools) can be used at the same time by many users who do not need to have knowledge about the physical method of the organization and functioning of the provider's IT infrastructure.

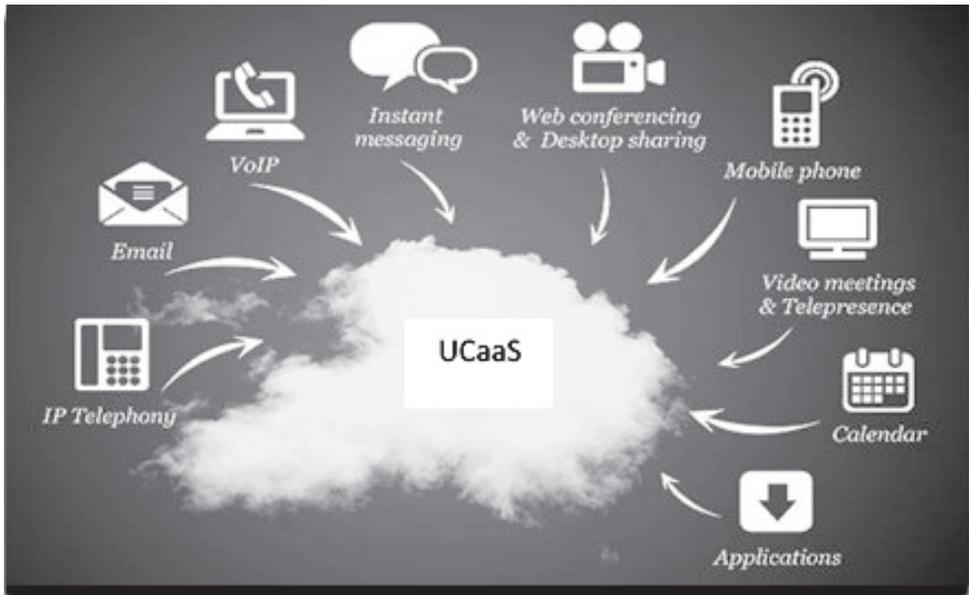


Fig. 2. Example range of solutions available within UCaaS systems

Source: [Internet 2].

As mentioned before, UCaaS offers similar functionality as UC systems, with an example of the range of available solutions within unified communications as a service presented in Figure 2. From the technical standpoint, UCaaS is composed of a set of the following components [Lazar 2018]:

- Application servers – are run by UCaaS providers in their own data centres; hosted in third-party data centres; or hosted in public cloud services from companies like Amazon, Google and Microsoft. Application servers provide telephony; instant messaging; unified messaging; team chat; conferencing; and, in some cases, contact-centre services.
- Software clients – are either downloaded onto users' devices, like a computer or smartphone, or accessed via a web browser using WebRTC (Web Real-Time Communications) or a plug-in.

- Endpoints – include phones, videoconferencing systems and digital whiteboards that are bundled into the cost of the license or purchased separately by the customer.

Different types of cloud computing allow for its implementation in small and medium-sized enterprises as well as in large and international corporations. Depending on the needs and capabilities of the company, unified communications as service systems can be implemented in the following models:

- Single-tenancy: each recipient has its own dedicated software platform located in the data centre which can be modified and integrated with other (e.g. on-premises) applications. In the single tenancy model, services are created individually for each customer (which generates higher costs) and sharing applies only to hardware. The single tenancy model is preferred by larger companies with high security needs in the area of communication services.
- Multi-tenant – in which many recipients share a single (identical for all users) software platform located in the data centre which cannot be changed but only parameterized by users. In the multi-tenant model, customers share both hardware and software using infrastructure owned and managed by the service provider. A significant number of users who can simultaneously use telecommunication services within the same infrastructure of the service provider may impact on the security levels and efficiency of the used unified communication solutions. Usually only a small number of telecommunication devices (router, switch, phones) is located in an enterprise using UCaaS, whereas the rest of the infrastructure is located in the data centre of the service provider. Generally, the cost of the service is charged monthly and depends on the number of users. Such providers as Google (Hangouts), Microsoft (Skype for Business Online), Cisco (Spark), BroadSoft (Broad Cloud) offer their services using the multi-tenant model.
- Hybrid – an intermediate solution being a combination of the above two models (single-tenancy and multi-tenant), in which high safety levels as well as lower costs can be taken into account simultaneously.

The boundary between public and private cloud services may result from [Kowalczyk 2015]:

a) functionality: a specific type of solution is assigned to a specific type of cloud (e.g. videoconferencing and IP telephony services can be provided using a public cloud, while electronic mail and applications for cooperation are provided inside the enterprise within a private cloud),

b) geographical location: individual solutions are provided depending on the user's location (e.g. in the company's headquarters, telephony services are provided using a private cloud, whereas in its local branches, telephony is based on a public cloud),

c) range of application: depending on the defined quantitative or qualitative requirements, the communication solution is activated using a specific type of cloud

computing (e.g. for five users, videoconferencing is based on a private cloud; if the number of users in a video conference is larger, the services are automatically switched to the public cloud that ensures higher efficiency).

4. Benefits and threats of using UCaaS systems in enterprises

The use of unified communication systems in the cloud allows companies to achieve significant benefits that can improve their market position and competitiveness. There are also some threats involved in using UCaaS systems, which managers should realize when making decisions on the implementation. In general, the most important benefits related to the use of Cloud Computing include:

- avoiding costs of purchase, implementation, maintenance and development of dedicated hardware and software and no need to have the in-house data centre for communication services (allocation of saved funds for other business purposes),
- change of the capital expenditures (CapEx) model into operational expenditures (OpEx) – elimination of significant investment costs and incurring clearly defined periodic subscription fees for communication services (higher predictability of IT costs),
- flexibility of communication services: the enterprise has to pay for the number of necessary licenses and can control this number smoothly depending on the changing needs resulting from the development/regression of business activity,
- scalability of communication services: the possibility of a problem-free extension/reduction of the current communication solution by the modules and functionalities made available by the service provider,
- speed of implementation of communication services: significant shortening of the launch time is caused by no necessity to wait for the delivery of hardware, reduced time of installation and configuration of the solution; the speed of implementation is particularly noticeable in the case of opening new branches and in the case of employing new employees in the enterprise,
- availability of services regardless of the geographical location of employees: support for mobility, remote work and teamwork of employees (access to communications and collaboration capabilities anywhere, anytime, on any device and any network), devices and operations are controlled from a uniform interface (e.g. a web-browser),
- improving the efficiency of communication services: modern and technologically advanced solutions available within UCaaS can improve the quality of communication inside the enterprise and between the enterprise and its customers, suppliers or agents,
- improved employee productivity: the possibility of choosing the best communication channel for the employee at a given moment and integration with other business applications (e.g. CRM) improves the effectiveness of communication and collaboration processes, thus increasing staff productivity,

- reduction of investment risk involved in ICT technologies: by using modern and dynamically updated communication solutions offered by the service provider that are well-proven in business practice,
- shifting responsibility for the efficient functioning and development of ICT resources to the provider, who delivers and manages the communication platform located in their data centre,
- professional technical support and services offered by the provider: the substantial knowledge and experience of the professional service provider results from specialization and providing services for many clients, which allows to meet the strict SLA requirements concerning the quality of communication services,
- high level of security of communication services guaranteed by the service provider: security is provided as a component of communication services; furthermore, the service provider has the possibility to create a redundant infrastructure that ensures continuity of communication services and dynamic updating of security-enhancing patches,
- easiness and unified management of the enterprise communication system: the user has a simple, user-friendly and intuitive portal facilitating the management of communication systems within the enterprise (along with automatic configuration and administration options), which facilitates the analysis of user activity and optimization of the use of ICT resources,
- lower demand for IT staff: this means no need to increase the employment of experts with knowledge in the area of ICT systems and helps avoid costs of recruitment, training or personal leaves of IT employees (by relying on outside experts).

Depending on the expectations concerning the implementation of UCaaS, the scope of its implementation and the specificity and potential of the enterprise, these benefits, although measurable for any entity, may be noticeable to a greater or lesser extent. In order to maximize the benefits of using UCaaS, a thorough analysis of existing communication systems, functioning and efficiency of business and communication processes, and the analysis of the communication and collaboration needs should be performed. The analysis allows for choosing concrete UCaaS solutions and an estimation of the change and value of a given solution in the context of achieving financial savings, improving work efficiency and providing new opportunities for both employees and the entire enterprise.

A survey conducted in 2017 by IDC among small and medium-sized enterprises in the USA showed that entities, depending on their size, indicated different priorities of the benefits generated by the implementation of UCaaS solutions. Small businesses said the top benefits of UCaaS are lower TCO, increased security, and cost savings from outsourcing the management/maintenance of the solution, whereas medium-sized businesses cited increased security, lower TCO, and reducing internal IT staff workloads as the leading benefits of UCaaS. Therefore the most important benefits of UCaaS applications in SMEs are mainly of an economic and security related

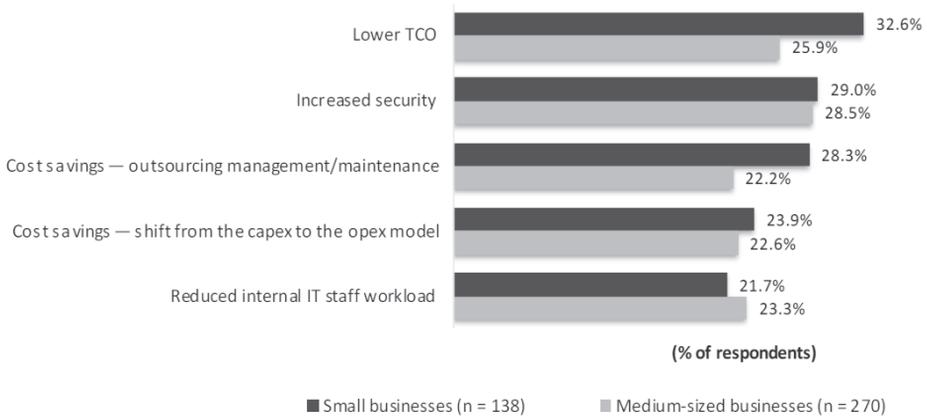


Fig. 3. Benefits of UCaaS for SMEs

Source: [IDC’s U.S. Enterprise Communications Survey 2017].

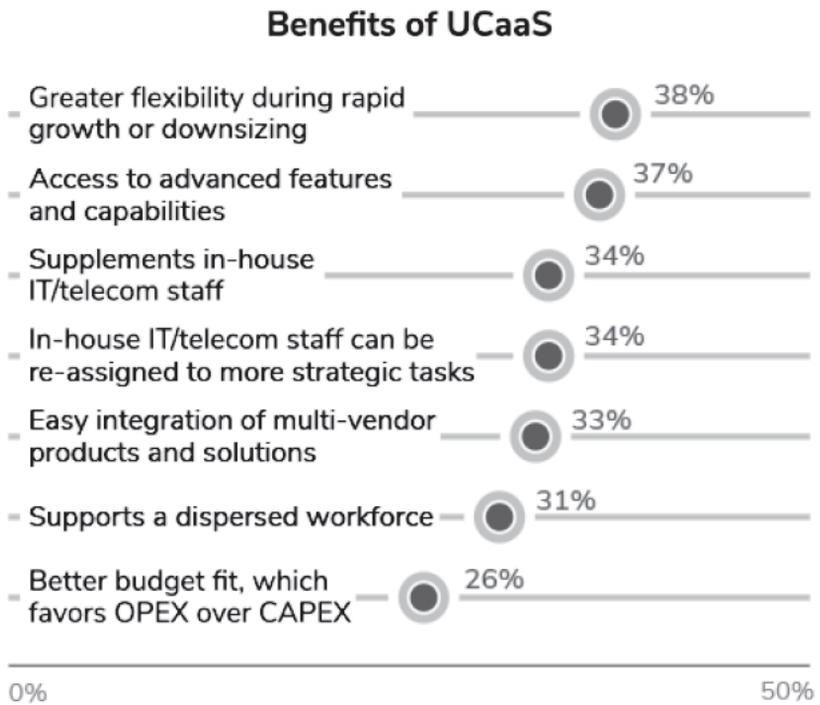


Fig. 4. Benefits of UCaaS

Source: [Frost, Sullivan 2017].

nature. Qualitative benefits such as greater flexibility, improved functionality and efficiency or mobility support were not indicated as significant benefits of UCaaS by the entities of the SME sector. The replies of the respondents are presented in Figure 3.

Slightly different were the most important benefits of the use of UCaaS were indicated by the respondents of a survey conducted by Frost & Sullivan in 2017 among 1934 global IT decision makers and influencers. The results of the survey on UCaaS benefits indicated by respondents are illustrated in Figure 4. It is worth noting that in this survey, the financial effects related to UCaaS implementation were last in terms of the number of indications. The most important benefits emphasized by the respondents included greater flexibility, access to new functionalities, reduction of the IT department or the ability to transfer its employees to perform more strategic tasks, easier integration and support for mobile staff. Therefore, the qualitative effects (awareness of the role of UCaaS in shaping an effective communication and collaboration environment) and organizational effects (concerning IT employees), are noticeable in this group of respondents as a result of the use of UCaaS.

The use of unified communications as a service is also accompanied by the number of the risks and challenges which should be taken into account by the recipients before they purchase and start using UCaaS. Individual threats and their severity depend on the type of cloud (i.e. public, private or hybrid cloud). In general, the most important limitations and barriers of UCaaS include:

- Security-related barriers, such as the lack of access to services and data resulting in serious disruptions in an enterprise's functioning, loss of control over valuable data, unauthorized disclosure of data to competitors, non-compliance of UCaaS solutions with the adopted security policies (insufficient voice security level and data security level or provider's failure to meet the required standards, e.g. HIPAA, PCI, SOX), sudden closure of business activity by the service provider.
- Technical barriers: for example, power or network failures, problems with access to high Internet bandwidth in some locations, variable quality of calls making it difficult to maintain good relations with customers, difficulties in integrating local and already used communication systems with cloud solutions, problems with data migration between clouds, limited intuitive technological solutions leading to difficulties with management.
- Legal barriers, such as the lack of comprehensive legal regulations, problems related to the requirements and guidelines for processing personal data, risk of non-compliance with the regulator's guidelines, difficulties in negotiating contracts with the provider.
- Psychological barriers: for example, the beliefs and mentality of decision-makers, low level of trust, being accustomed to the existing communication and collaboration systems, lack of information and knowledge about the specificity of UCaaS, reluctance of employees towards the implementation of new communication and collaboration methods.

- Market barriers: the lack of incentives and promotions for recipients, immaturity of some UCaaS solutions, doubts concerning the professionalism of some providers, the risk of higher UCaaS costs than originally assumed, poor range of domestic UCaaS solutions for the SME sector, insufficient activity of organizations that standardize the functioning of cloud computing and promoting information and knowledge about cloud solutions and UCaaS.

In recent years the perception of problems and challenges related to the implementation of UCaaS in enterprises has been gradually changing. A survey by Spiceworks of over 250 IT professionals conducted on behalf of NEC in 2013, indicated that the major problems of UCaaS were availability/uptime and performance/service levels, which significantly overtook other challenges such as lack of budget, integration, bandwidth adequacy, switching costs, and security. The results of the Spiceworks' survey concerning the most important challenges related to UCaaS implementation are shown in Figure 5.

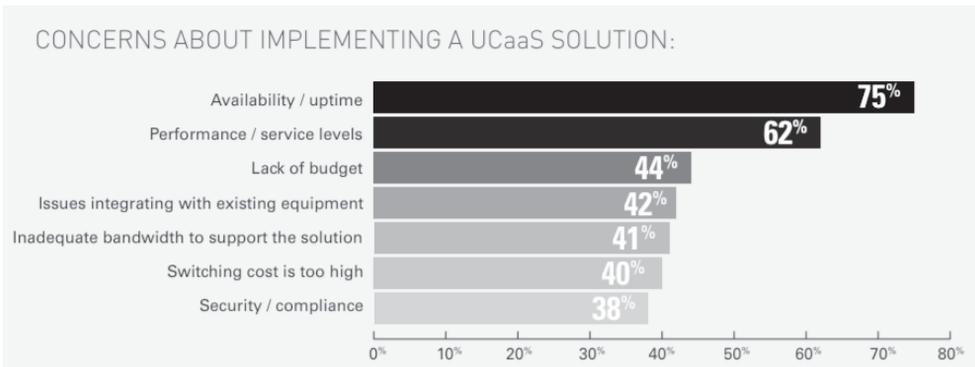
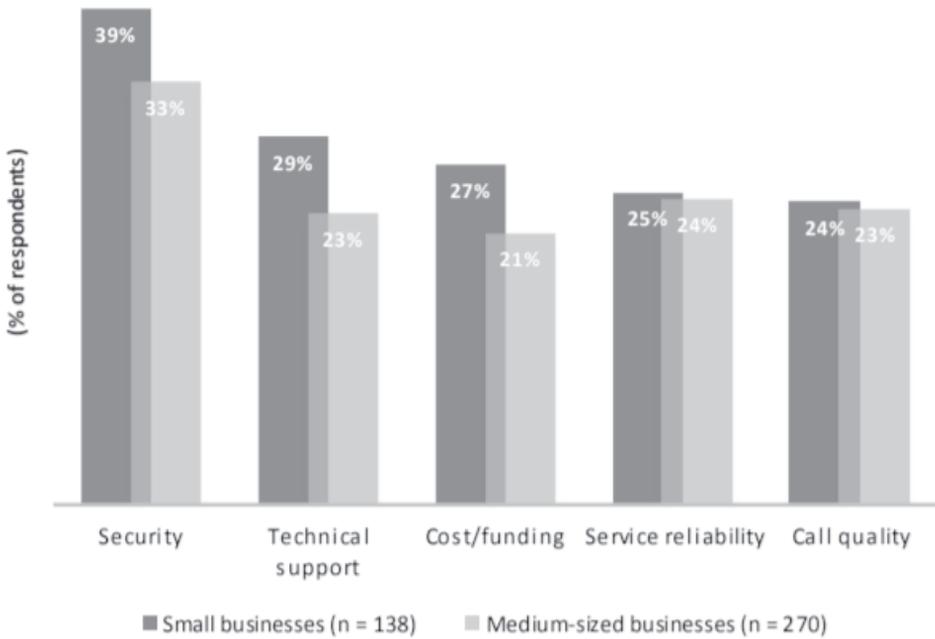


Fig. 5. Concerns about implementing a UCaaS solution

Source: [Internet 1].

Furthermore, in the report published by NCloud which conducted a survey in 2016, the respondents highlighted the following most important problems of UCaaS implementation: disruption of service (51%), integration of existing technology (48%), management/prediction of monthly costs (46%). In another survey, conducted by IDC in 2017 in a group of SMEs, the most important concerns and challenges about deploying UCaaS were security, technical support, cost/funding approval, service reliability and call quality. The most important threats indicated in the IDC report by enterprises from the SME group are shown in Figure 5. The types of problems and challenges related to UCaaS implementation highlighted in this survey are essentially similar, but their priority and significance for the respondents varies.

In the IDC survey the security aspect was of particular interest, indicated by SMEs as both a significant benefit and the most important threat to UCaaS. Security was cited as a threat by 39% of small businesses and 33% of medium-sized



Base = SMB UCC users and intenders

Note: Multiple responses were allowed.

Fig. 6. Top SMB Concerns About Deploying Cloud UCC

Source: [IDC’s U.S. Enterprise Communications Survey 2017].

businesses participating in the survey. However, it should be emphasized that in the case of SMEs, which usually do not have sufficient capital and a team of ICT specialists, UCaaS solutions offered by external providers are usually characterized by a higher level of security compared to the level that the enterprise is able to ensure on its own. UCaaS service providers have to incur significant expenditure on multi-layer security mechanisms and their continuous improvement because any security problems (especially those publicized in the media) would make it difficult for them to retain their current and find new customers.

The indications of SME respondents to technical support problems (29% of small businesses, 23% of medium-sized businesses) showed that enterprises are afraid of complications in implementing and maintaining UCaaS, despite service providers’ assurances of a wide range of assistance services, quality of service (QoS) and the employment of top-class experts who are able to solve various ICT problems. However, unlike UCaaS solutions, the implementation of ICT services by the enterprises themselves and the combination of communication solutions from different providers may generate hardware and software compatibility problems in the future.

The reliability of services and call quality were also emphasized by SMEs with regard to UCaaS (24% of small businesses, 23% of medium-sized businesses). Uncertainty about the stability and quality of communication processes can discourage potentially interested enterprises from implementing UCaaS. Insufficient quality of communication services may affect the performance of important business processes and, as a result, limit the revenues. Therefore it is critical to analyse the communication requirements of a given enterprise and compare them with the opportunities for using the UCaaS solutions offered by service providers in order to guarantee the proper level of quality of communication services. Nowadays the reliability and quality of UCaaS services is either similar or often higher than the efficiency of the local communication solutions provided and maintained by internal IT departments in enterprises. Furthermore, ensuring the continuity of communication services and recovery after failures represent other areas where UCaaS may offer better efficiency than internal or conventional solutions.

5. Examples of implementation of UCaaS systems in Polish enterprises

The popularity of cloud computing technologies has led to the migration of self-developed on-premises communication environments towards UCaaS solutions that integrate multiple communication channels, e.g. voice calls, mobile technologies, social networks, videoconferencing and applications that support employee collaboration. Forecasts of research and analytical firms are very optimistic about the further development of the UCaaS market. For instance, a report conducted by Markets And Markets finds that the UCaaS market size is expected to grow from \$17.35 billion in 2016 to \$28.69 billion by 2021, at a Compound Annual Growth Rate (CAGR) of 10.6 percent during the forecast period. Growing trends towards mobility and Bring Your Own Device (BYOD) are some of the key factors driving the UCaaS market. Other driving forces include the growing need for operational efficiency and cost savings [MarketsandMarkets 2016]. Furthermore, TMR estimates that the global UCaaS market was pegged at US\$8.23 bn in 2015 and is projected to be worth US\$79.3 bn by 2024. The market is likely to expand at a remarkable CAGR of 29.4% during the forecast period [TMR... 2016]. The above forecasts may suggest that many large and small enterprises will be interested in the near future in improving their communication processes in order to increase the efficiency and effectiveness of their business processes.

The scale of UCaaS applications in Poland is not yet significant compared to more developed European countries (in 2016, IDC estimated the value of the Polish UCaaS market at USD 140 million). However, it can be expected that in the coming years the dynamic development of Unified Communications systems will be noticeable in the cloud computing model. The major users of UCaaS solutions in

Poland include large and dispersed enterprises (e.g. from the financial, logistic and hotel services sectors) interested, on the one hand, in the integration and centralization of communication services, and, on the other hand, in the flexibility and the lack of need to incur capital expenditures during opening/closing their branches and employing/dismissing employees. An important role in the growth of the Polish UCaaS market may also be played by small and medium-sized enterprises that are facing the challenges of modernization of their telecommunications infrastructure, or undergoing a restructuring or dynamic development phase which modifies the communication needs. With the high level of investment costs and the need for immediate access to modern telecommunication solutions, enterprises from the SME sector may be interested in UC systems paid for in the form of a monthly subscription. The range of UCaaS solutions in Poland is not yet substantial, but, due to the presence of key service providers of the global telecommunications services in the Polish market, either directly or through distributors, it is expected that their number will be gradually expanding in the coming years.

One of the companies offering UCaaS services in Poland is Focus Telecom, which provides enterprises with a UCaaS platform called:

- Wirtualna Centrala: this is an advanced communication tool for enterprises, which includes not only the virtual branch exchange, but also voice announcements system, mobile telephony integration, grouping of users and numbers, call recording and archiving, billing, statistics and reports, and quick and convenient configuration.
- Focus Contact Center is a platform integrating such communication channels as telephony, e-mail, website form, chat, social media, fax, text messages, video and a tool facilitating the collection and processing of information in order to improve the effectiveness of customer service and internal communication processes. It can be integrated with CRM and ERP systems and live chat.

Table 1. Examples of UCaaS implementation in Poland

Service provider	User	Scope of implementation	Effects
1	2	3	4
Orange Poland and Integrated Solutions	Onet.pl Group	Updating and modernization of telecommunications infrastructure, including the abandonment of the previous telephone exchange. Options that allow for displaying presentations on videoconferencing sets were implemented, the voice and text communicator Jabber was installed on computers and mobile devices (including smartphones); integration of voice and text communication, integration of videoconferencing sets (Jabber and Polycom) and Contact Center (Thulium), UCaaS connection. Project duration is assumed to be approx. 5 months.	<ul style="list-style-type: none"> – the opportunities for using the corporate fixed-line telephony in any place, – conversion of CAPEX into OPEX expenditures, – shifting responsibility for telecommunications infrastructure to the provider

Table 1, cont.

1	2	3	4
Integrated Solutions	Danone (Żywiec Zdrój company)	Modernization of the telephone exchange and introduction of VoIP technology in the company's office based on Cisco solutions. Management of telephones, including the virtual telephone exchange, was outsourced to the provider, with the number of telephones using UCaaS optimized (to about 20 telephones) and the specific band was reserved for voice transmission. Ultimately, it is planned to implement UCaaS in six Danone offices in Poland and replace the previously purchased IP solutions. The expected number of telephony users within UCaaS is about 360 people.	<ul style="list-style-type: none"> – exclusion of hardware investments and fees related to maintaining telecommunications infrastructure in favour of fixed monthly subscription fee, which facilitates budget planning, – optimization of communication needs, which translates into a smaller number of phones and reduced costs of services
Orange Poland and Integrated Solutions	Elektro-polska	Outsourcing of all tasks related to the maintenance and provision of telecommunications services. IP telephony based on Cisco solutions was implemented and connections with adequate bandwidth, a call management system and voice services were ensured. Duration of migration: 1 day (after previous tests). Furthermore, voice mail integrated with the e-mail system and UCaaS system integrated with Active Directory was launched, which allowed for the implementation of the enterprise's address book. The UCaaS solution is used by approximately 240 users in more than 30 branches.	<ul style="list-style-type: none"> – shifting responsibility for the maintenance and development of telecommunications infrastructure to service provider, – reduction in the costs of telecommunications services, – increasing the availability of telecommunications services (guaranteed by an appropriate SLA level), – improving employee mobility, – improved flexibility and scalability of IP telephony
Integrated Solutions	Companies of the WPP Group	Integration of communication processes in a distributed organizational structure (four companies of the Y&R, Mindshare, MEC and GroupM holding) and improving the quality of communication connections and facilitation of the management of telecommunications services. As part of the UCaaS platform implementation, switches, Cisco cameras and fibre optic cables were provided, whereas services and devices were configured, and a softphone was installed on notebooks of the employees who travel the most often.	<ul style="list-style-type: none"> – no capital expenditures, – flexibility and scalability as well as consolidation of the communication environment, – meeting corporate standards concerning communication and the adopted quality (SLA) and cost-related requirements, – lower number of failures reported to the IT department improving the quality of communications between employees and the quality of contacts with customers,

1	2	3	4
			<ul style="list-style-type: none"> – support for teamwork and mobile work of employees
Netia	Opole City Hall	Cloud integration of fixed telephony, IP telephony, fax services, instant messaging (Microsoft Lync), e-mail (Microsoft Exchange Server) and collaboration platform (Microsoft SharePoint). The unified communication platform also offers the opportunity to work together on shared documents, make presentations in broadcast mode and join a multi-user video conference in HD mode from any computer or modern mobile device	<ul style="list-style-type: none"> – unification of the communication platform, – flexibility in terms of adaptation of communication solutions to changing needs, – scalability that ensures opportunities for expanding the number of users performing communication processes
Integrated Solutions	BOŚ Bank	Modernization and integration of telecommunications infrastructure in the headquarters and Warsaw branch. Implementation of the solution that allows for voice calls, the use of a corporate communicator, teleconferencing and videoconferencing, and includes the functionalities of secretarial and managerial sets (including call recording and IVR). As part of the implementation, Cisco devices equipped with screens and cameras were provided, allowing for starting connections and videoconferencing	<ul style="list-style-type: none"> – focus on core business, – unification of the communication platform to ensure easy maintenance, – conversion of CAPEX into OPEX expenditures, – discharging the IT department

Source: the author’s own study based on materials available at [Internet 6; Internet 7].

Another entity providing UCaaS services in Poland is Netia, offering “Nowa Netia”, a multifunctional tool for individual offices and enterprises with distributed structures that integrates conventional telephony with solutions based on smartphones, tablets and computers. Consequently, it is possible to use a fixed-phone number to make and receive calls using any device, e.g. smartphone, tablet or computer, in a convenient place. “Nowa Netia” integrates conventional solutions and modern telecommunication services with the use of a unified communications business communicator. Benefits for consumers include mobility, safety, ease of use, and predictability of costs. The product was implemented in the Provincial Specialist Children’s Hospital in Olsztyn and in PGA Polska Sp. z o.o.

Another example of a UCaaS provider in Poland is MCX Pro, which offers a tool that combines multiple communication channels (voice communication, videoconferencing, presence management, chat and text communication) into a single, easy-to-use platform that supports both communication and teamwork. Another interesting UCaaS product is OpenScape Cloud from Unify, a platform (running within a multi-tenant, single-tenancy or hybrid models) enabling access to real-time communication, groupware tools, social networking platform or mobile

use solutions. OpenScape Cloud is available in several versions that differ in the number of users participating in the session, the option of recording and creating notes, and has many examples of scenarios of applications for different users from the automotive, financial, energy, education, healthcare and public sectors.

Examples of UCaaS implementations in Poland with a clearly defined scope of implementation and the possibility to determine the effects of implementations confirmed by the recipients are presented in Table 1. It should be expected that the number of reports on the efficient, effective and reliable implementation of UCaaS in Polish enterprises will be constantly increasing, whereas the unified communications as a service systems will become a popular ICT solution used to improve the activities of enterprises in the area of the communication, collaboration and performance of business processes.

6. Conclusions

Efficient and effective communication processes play an increasingly important role in the activities and development of modern enterprises. The increasing diversity of communication channels, employee mobility and popularity of cloud computing are conducive to the emergence of integrated and unified communication systems offered to enterprises in the form of services by external providers. UCaaS solutions can support a wide range of businesses, from large or medium-sized to small businesses seeking a reduction in costs of connections, improvement in operational efficiency, increasing employee productivity and customer satisfaction. While the use of UCaaS helps enterprises achieve substantial benefits, the cloud-based UC systems are continuing to raise controversy, making it difficult to implement and broadly accept this form of purchasing and distribution of telecommunications services.

This article described solutions of unified communications as a service and presented examples of UCaaS implementations in Polish companies. The forecasts of analytical firms for the development of UCaaS in Poland and all over the world are optimistic, but further development of research and progress in mitigating the risks related to such systems is needed. Further adaptation of UCaaS solutions in Poland depends on the professionalism of providers and customers' knowledge needed for the proper planning and implementation of the solution of unified communications as a service, consistent with the needs of both employees and customers and the goals adopted in the enterprise. This article represents a starting point for the authors to develop a strategy of implementation of UCaaS solutions in enterprises interested in improving the effectiveness of their communication and business processes and becoming competitive in the e-economy.

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