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PLATFORM ONE4ALL AS SERVICE ORIENTED ARCHITECTURE (SOA) IN IMPLEMENTING COMPUTER SOLUTIONS

Abstract:

The paper presents platform one4all uses several computer products implementing as services for realization of the basic/fundamental business processes, communication and workflow management, project management, or the analysis of business activities. The newly presented the foundations of building the systems of Service Oriented Architecture, SOA, their conception and influence on functioning of the whole enterprise.

1. INTRODUCTION - SOA

Service-oriented architecture (SOA) is an emerging architectural style that helps meet several demands. SOA projects designed to quickly and iteratively deliver on business goals are referred to as a "real-world" approach to service orientation [5].

Creating systems based on the model of service oriented architecture has become a widely applied practice thanks to which it is possible to create computer solutions for enterprises which are characterized by the higher elasticity and expandable architecture.

Companies implementing computer solutions strongly emphasize   close cooperation with business partners which leads to creating complex structures with many applications communicating in order to exchange information between them.

To prevent the negative outcomes of the integration of many applications which should cooperate during the exchange of information, the enterprise should develop and integrate two main areas: business applications and the environment in which they work. Business applications are the services created or bought which can be applied directly to various functions of business organizations. On the other hand, the working environment is a set of services realized by the computer infrastructure which are used by business applications [3].

Thanks to implementing the philosophy of SOA, the enterprise can become fit and the services which we initiate in the enterprise lead to the introduction of the general government.

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2. THE CONCEPT OF SOA - ASSUMPTIONS

Service-oriented architecture (SOA) as shown in Fig. 1 is currently the most popular conceptual architecture for the IT industry addressing the problem of business integration. The concept is brought forward by distinct business motivations. Drivers for SOA in the enterprise domain include the tremendous growth of IT applications, the ever-increasing use of IT tools throughout every aspect of each business, and the resulting need to integrate both in a coherent, scalable, and manageable fashion. The trend toward outsourcing noncore competencies, including the outsourcing of IT as a utility, further fuels this movement. In addition, the plethora of mergers and acquisitions, and the significant increase in business-to-business partnerships and supply chain relationships also point to the pressing need to integrate IT tools and business processes. These are significant drivers that can be summarized as continuous business transformation, and these are the drivers that in large part shape the approach required to address this problem space. These drivers lead to an adoption of service middleware based on loosely coupled granular components and message-based communication; they expose only as much or as little of the underlying network capabilities as needed to ensure successful reuse of the components by multiple services [1].
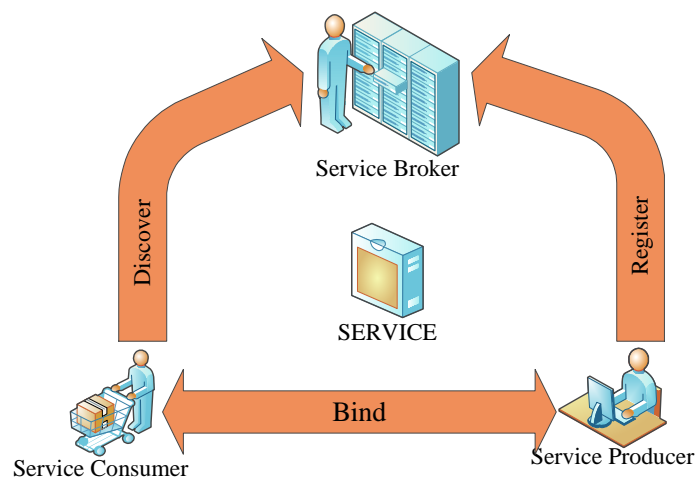

Fig. 1. Basic service-oriented architecture concept

In order to better understand this concept it is necessary to implement of a larger number of components and the relation between the service consumer and service producer, thanks to which SAO becomes easier to understand.

Fig. 2 shows the Service-oriented architecture with more components and more their relations:
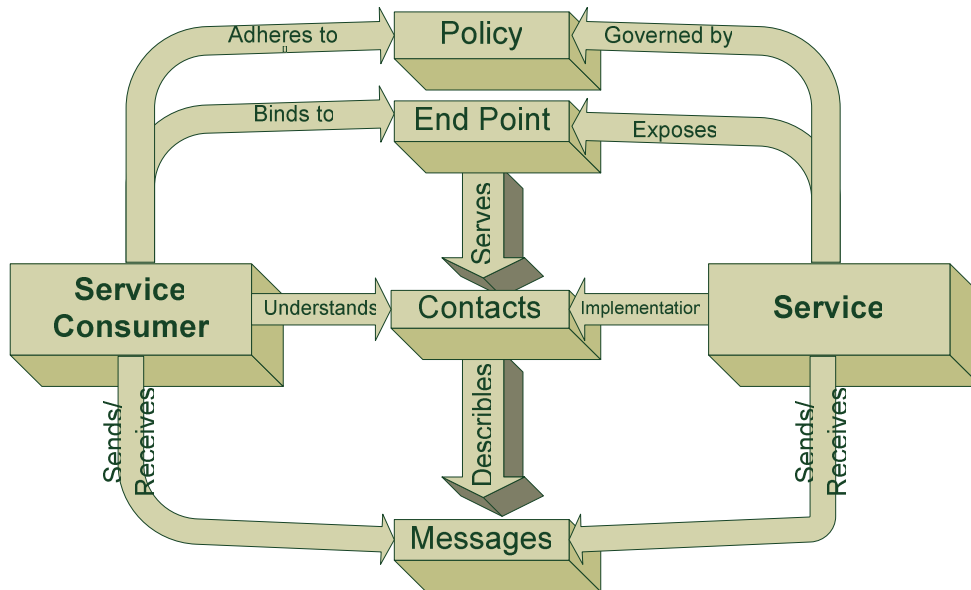
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Fig. 2. SOA components and their relations

The components of SOA and the relations among presented in Fig. 2 above define the directions we can take in creating the system.

Services

The central pillar of SOA is the service. We can defines service as "a facility supplying some public demand". A Service should provide a high cohesion and different services. Services should be coarse grained pieces of logic. One of the characteristics of services is service autonomy. Autonomy means the services should be self-sufficient, at least to some extent, healing properties.

Contract

The collection of all the messages supported by the Service is collectively known as the service's contract. The contract can be unilateral, meaning a closed set of messages the service chooses to provide. A contract might also be multilateral or bilateral, that is, between a predefined group of parties. The contract can be considered the interface of the Service akin to interfaces of object in object oriented languages.

End Point

The Endpoint is an address, a URI, a specific place where the service can be found and consumed. A specific contract can be exposed at a specific endpoint.

Message

The unit of communication in SOA is the message. Messages can come in different forms and shapes, for instance, http GET messages (part of the REST style) ,SOAP messages, JMS messages and even SMTP messages are all valid message forms. The differentiator between

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a message and other forms of communication such as plain RPC, is that messages have both a header and a body. The header is usually more generic and can be understood by infrastructure and framework components without understanding, and consequently coupling to, every message type. The existence of the header allows for infrastructure components to route reply messages (e.g. correlated messages pattern) or handle security better (see Firewall pattern).

Policy

One important differentiator between Object Orientation or Component Orientation and SOA is the existence of policy. If an interface or contract in SOA lingo, separates specification from implementation. Policy separates dynamic specification from static/semantic specification. Policy represents the conditions for the semantic specification availability for service consumers. The unique aspects of policy are that it can be updated in run-time and that it is externalized from the business logic. The Policy specify dynamic properties like security (encryption, authentication, Id etc.) , auditing, SLA etc.

Service Consumer

A service doesn't mean much if there isn't someone/something in the world that uses it. So to complete the SOA picture we need Service Consumers. A service consumer is any software that interacts with a service by exchanging messages with the service. Consumers can be either client applications or other "neighboring" services their only requirement is that they bind to an SOA contract.

Looking at this SOA definition we can see SOA has a lot of emphasis on interface. Starting from the messages which are the parts of the interface, the contract which is the collection of the messages, the endpoint where the contract is delivered and the policy which governs the behavior of the endpoint. Thus SOA has a total of four different components that deal with the interface vs., for example, OO which only has one. The focus on interfaces is what gives SOA the ability to create loose coupling, composable components, reuse and achieve the various design goals. Another nice attribute of this definition is that we can use as a base for both the technical and the business perspectives of SOA as the common elements of both perspective are used in this definition [6].

3. PLATFORM ONE4ALL

Platform one4all uses Microsoft software to integrate computer solutions in an enterprise. Thanks to using XML language to exchange data between applications it is possible to implement the solution of other manufacturers, such as SAP.

Fig. 3. One4all platform and Microsoft Dynamics business management software in SOA architecture

Decision on choosing the strategy of the informatization requires from the organization (both public institution and private) defining the concrete and measurable goals that will assure them a possibility of their future progress and development, obtaining competitive advantage on the market and also increase effectiveness and rapidness of actions.

one4all is a comprehensive solution that can be easily adopted to the need of the both public and private sector. The solution is built based on the proved technology and environment of the Microsoft systems and know-how and experience of the specialists working on its creation and further development. Operational activity of an organization becomes more effective and forecasting of the desired development directions is possible due to the application of the one4all solution.

one4all in the particularly helps to:
- eliminate the "bottle-necks" and integrate business processes and actions
- manage available funds in the most effective way
- simplify complex processes of human resource and payroll management
- improve project management
- ensure safe and efficient communication and exchange of information among the members of the organization
- organize the work in the most effective way
- assure a proper safety and data protection.

The solution one4all integrates such areas of the organization activity (Fig. 4):
- realization of the basic/fundamental business processes
- communication and workflow management
- project management
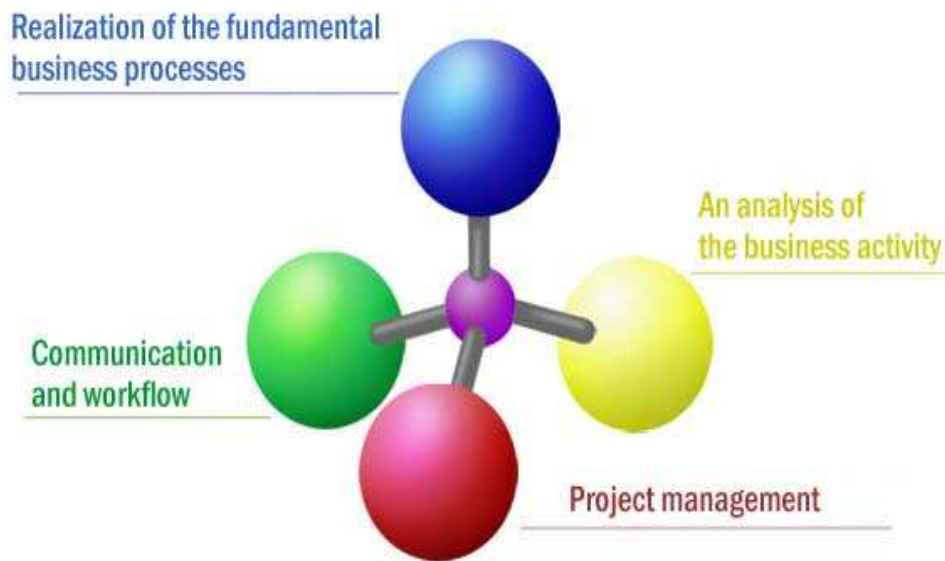- an analysis of the business activity

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Fig. 4. one4all integrates such areas of the organization activity

Realization of the basic business processes

Area of the realization of the basic business processes is covered by the hand of the ERP class solution to manage organization. This solution makes it possible for the employees and the whole organization to make more optimal business decisions. It contains comprehensive functionalities that automate and improve management of the financial processes, petitioner relations, services for the community, human resources and other. It allows therefore on the integration of processes, technology and employees that can be in the any place in the world. Use of this part of one4all influences then efficiency improvement and overall better functioning the whole organization.

A great example of the processes in this area is a situation in which an institution is assigned with the additional financial means to perform a concrete project. To our institution is sent a letter with such notification. Thanks to the one4all solution within just a few seconds this information is available to all managers who should be informed about this. Also, money is transferred on an account of the institution that on the other hand what has its effect in budget enlargement. Due to the home banking functionality accountant doesn't have manually enter date into the system, only needs to check and book them. So, the work is automated and accelerated and error free.

one4all:
– automates and improves financial processes in each area of functioning the institution
– increases efficiency of the employees
– influences the overall level of the petitioner satisfaction

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Communication Management

In today's' times accessibility, exchange and passing through an information is a key aspect of every institution's activity. one4all allows managing knowledge database and sharing the documents through the built-in Documents Center which improves the flow of information in the organization. All data is accessible through the internet and intranet portals created to ensure quick, easy and intuitive access to the required information. Information about events is sent to entitled and interested persons automatically. one4all also gives an opportunity for many engaged persons in concrete task to work on one document at the same time. Another plus is an ability to manage the following versions of the same document with a full insight into changes tracking with an option of reviewing and accepting them. Also, in order to: ensure better communication and understanding of the sent information, create better relations between employees and eliminate barrier of distance one4all uses a communication platform that allows voice and vision transmission for the unique chance to have tele- and video conferences.

The situation when a director of an institution receives a letter with a request to prepare an opinion for the superior institution can be a great example of how to use functionality of this area of one4all solution. The letter is scanned and registered in one4all and from that level is sent to director and then he gives order to the managers and they to their employees. At this time an employee receives an alert which means that he was just assign a task; it also gives them the information about the deadline, other people involved in the task and so on.

Employees of the departments located in a considerable distance from each other use internet cameras to communicate. This way they can effectively exchange ideas and information. During work they create working versions of documents about which other member of the team are notified by e-mail and have access to them. The director receives one and final version of the document already accepted by the managers, but in each second can see how the works were performed.

one4all:
- assures the safe access to information with the use of internet and intranet
- causes simplification of procedures concerning the information and documents exchange
- makes team working in various locations more effective
- eliminates or limits the quantity of paper work
- gives a full insight into the history of the versions of the documents

Project Management

In order to more effectively achieve goals and in optimal way use given resources more and more organizations uses a projectile approach towards their activity. Answering such needs one4all makes it possible to manage and run projects. By just one click managers are able to check use of resources, their accessibility in the concrete moment, work progress and deadlines of each task in the schedule. Resources are booked as a result of full automation in the moment of creating the project and participating employees informed about assigned tasks and deadlines of the particular stages of the project. one4all tracks the whole cycle of the life of the project in a quick and easy way, plans expenditures and controls costs.

We can imagine a situation when a director of an institution is asked to deliver a report concerning the progress of works of the project co-financed by the superior institution. In such situation he asks his employees to indicate the stage of the works for which they are responsible for. Employees who can work in various locations after receiving e-mail with such request actualize the stage of their work. After doing that they send a feedback e-mail that is received by the director what gives him knowledge about the current stage of the particular

works in the project. Such report in a graphic form shows whether works are done on time, tasks are assigned in optimal way to the employees or changes need to be done. Thanks to the functionality of the project management a director not only can easily make a need report but also in any time react to the dynamically changing situation.

one4all:
– supports planning and using of accessible human, material and other resources
– allows controlling the course of the realization of the particular stages of the project
– allows automatically tracking of the cause- effects linkages between individual tasks
– automatically informs participating human resources about allotments and changes in the project and assures obtainment of the back information about the progresses of works (also through internet)

Reporting and Analyses

It is possible to create measurable and effective reports and analyses due to the fact that one4all uses the information from the areas of the realization of business processes, communication and workflow management and project management. Such personalized and answering to specific needs reports are used by the managers and specialists and support them in decision making processes and forecasting future actions. Managers are able to quickly and wisely react to the changing situation due to the fact that analytical data is accessible in the real time. The solution is very functional and friendly use considering the fact that data is presented both in a graphic and tabular form.

Nowadays, many institutions participate in the distribution of the money coming from the external sources (e.g. grants or the financial means of EU) both as final incumbents and intermediary institutions. It isn't uncommon that project managers need to prepare wide and very detailed periodical and final reports. In order to do so they need information from various areas and it is often causing many problems. Using one4all all necessary is already gathered in one solution and creating such multidimensional report is done practically at once. As a result of the use of one4all project managers can concentrate on the realization and the maximization of the obtainment of the positive effects and not on details of reporting.

Additionally, the report which in this moment is merely a fulfillment of the formal requirements can serve to yet better planning next projects in the future thanks to it's

one4all:
– allows making very advanced reports and analyses
– assures access to the information in a real time
– allows making simulations of the various actions, their analysis and predicting results therefore better planning and managing processes in a institution

The utilization of services contained in one4all system is possible thanks to using http protocol and an internet browser (Fig. 6).
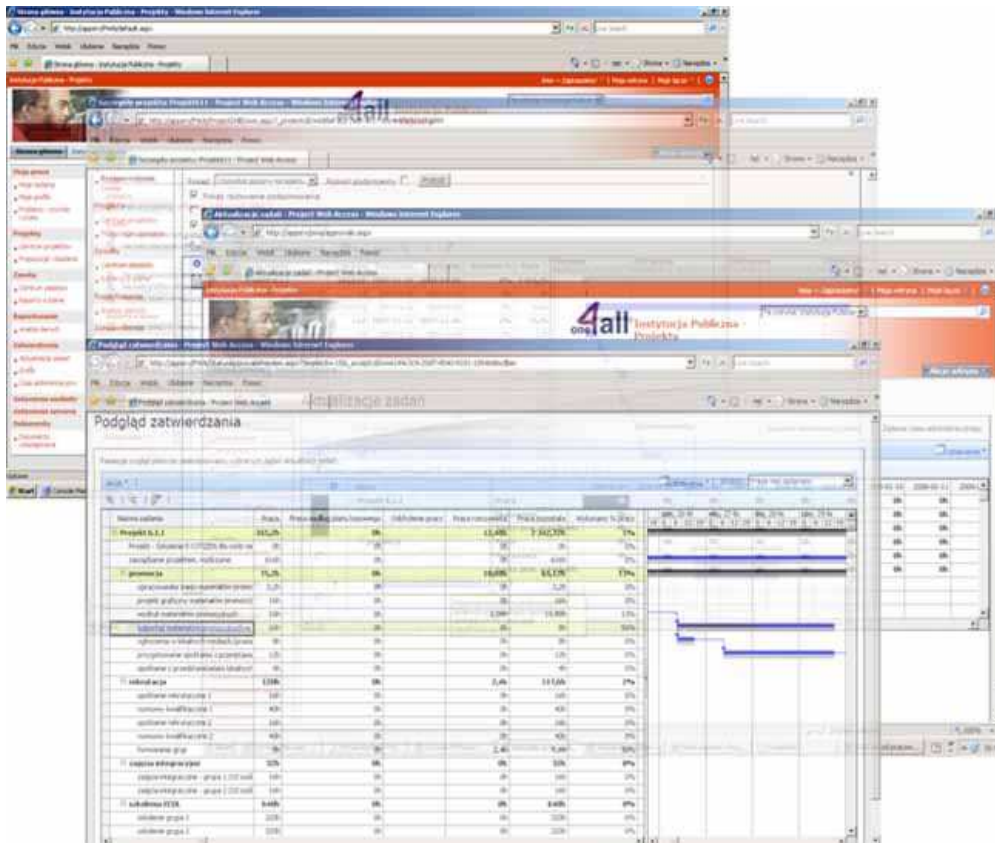
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Fig. 6. Platform one4all in internet browser

The area of the realization of basic business processes is done with the help of services realized by the solutions of class ERP (**Enterprise Resource Planning**) which support the management of the organization. This solution enables employees and the whole organization to make optimal business decisions. The complex functionalities which the solution contains automate and improve financial processes, customer relationships management, business services, human resources management and logistic processes (**SCM – Supply Chain Management**), which include the efficiency of transportation (**TMS - Transportation Management System**), the optimization of utilization of the area (**WMS - Warehouse Management System**), selling-buying production processes, and other processes within the organization (Fig. 7,8).
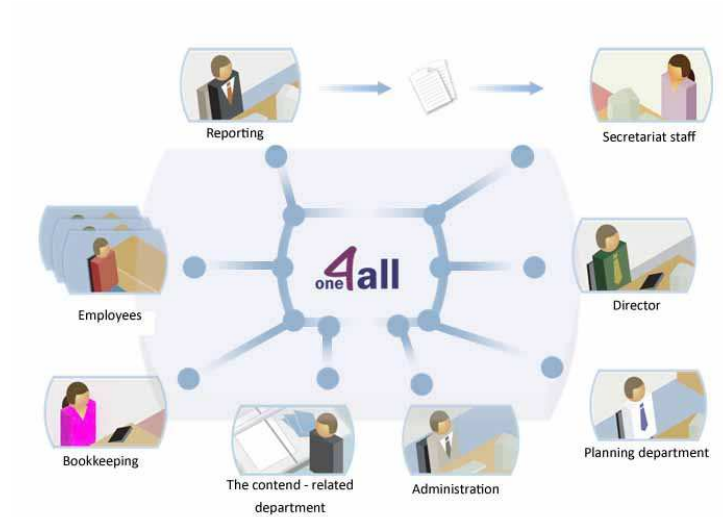
Fig. 7. Description of content-related schedule for the platform one4all

Fig. 8. Description of increase a budget.

4. ENVIRONMENT AND THE COMPONENTS OF SERVICES IN THE PLATFORM ONE4ALL

The solution **one4all** uses the data from the areas of the realization of business processes, the management of transport and workflow and the management of projects. In this system, it is possible to create effective reports and analyses. Such personalized reports and analyses are used by managers and experts, helping them in the process of making future decision and predicting future behaviors. Because that analytic information is accessible in the real time, managers can react immediately to the changing situation.

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The platform **one4all** facilitates leadership and management projects. **one4all** allows to follow the whole cycle of the life of the project in the quick and easy way, to plan expenditures and control the costs.

The following Services are included in the solution **one4all**:

- **Microsoft Dynamics AX 4.0** is the elastic solution to the management of the organization which enables employees the organization to make optimal business decisions. The work with the software Microsoft Dynamics AX is similar to working with other application from Microsoft, such as Microsoft Office or Microsoft SQL Server. This means that the new application possesses the same elements as the systems and software which are already used in the organization.

- **Microsoft Dynamics CRM 4.0.** The key processes realized by using the system of CRM are, for example, gaining new customers and building long-lasting relationships with them.

- **SAP Business All-in-One** offers the complex solutions of the world class in the form of pre-configured packets at the affordable price to small and medium-size firms. SAP In the case of firms working in the specific line of business, SAP solutions reflect processes realized in the given environment / sector.

- **ILS.NET**. Sending goods in the chain of deliveries requires the co-ordination of many business processes, including transport, storing and the management of orders. Thanks to the solution Integrated Logistics Solutions ™ one can balance the demand with the supply in the chain of deliveries assuring the delivery of the goods expected by the customers. Exactly compiled orders, the improved process of the realization of deliveries and the total transparency of the goods stored in warehouses will allow to tie all processes in the chain of deliveries.

- **Microsoft Office SharePoint Server 2007** is the integrated packet of easy to use server applications which increase the efficiency of the organization and optimize the co-operation of people, content, processes and business applications.

- **Microsoft Office Communications Server 2007** administers communication in real time (synchronic communication): instant messages, technology VoIP and videoconferencing. Because it co-operates with other existing telecommunication systems, the enterprises can implement advanced technology VoIP without the need to exchange older telephone nets.
- **Microsoft Office Project Server 2007** allows for more effective management of the work of an organization by coordinating it during the entire project, beginning from single and finishing with more complex projects.

- **AX People** is a modern, licensed by Microsoft system which allows managing human resources in the organization. AX People is fully integrated with Microsoft Dynamics AX, but it can also work in the independent way, using only the core of this system.

- **Microsoft® SQL Server™ 2008** is the newest platform for managing and analyzing

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data which offers the highest safety of information data along with the comfort and low costs of data management.

5. CONCLUSIONS

The platform one4all is the new concept of the platform which can offer a potential customer a range of services which can be implemented and developed, depending on the specific needs of the organization. The nature of the platform **one4all** makes it possible to implement several services, thanks to which

–   Helps to promote the development of the **informative society** since the platform **one4all** allows to work **"at the distance"** and create the new global possibilities of employment; increase the availability of experts services; decrease of costs connected with creating new work places and commuting. The platform one4all makes communication services accessible, enabling the broadcast of sound and picture, employees can contact through tele- and video-conferences which assure more effective communication and better understanding of information, building perfect relationships and overcoming distance barriers.

–   The platform **one4all** for higher education institutions – the Modern University, makes it possible to realize advanced functions of e-learning/distance learning which results in raising the quality of teaching and lowering of the costs of education; the access to attractive teaching materials; the better possibilities for self-education.

–   The platform **one4all** allows access to services of advanced internet applications which allow implementing the electronic trade and give access to global markets; allowing consumers the choice of the best offers; lowering of the costs of distribution and promotion.

–   The utilization of the platform **one4all** is effective in improving the organizational economic activity through: improvement exchanging of information between enterprises and inside enterprises in distant geographical locations; lowering of the costs of the economic activity; facilitation and the acceleration of accounts; the possibility of the remote management of the financial centers at the banks.

–   The platform **one4all** for public institutions allows the remote access to legal acts, information about realized undertakings, auctions organized by the administration, legislative plans and the electronic exchange of the correspondence.

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