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### **INFORMATIONAL SUPPORT OF EVENT MANAGER IN THE PROJECT OF ORGANIZATION OF SPORTS ACTIONS**

The subject of the study is the processes of information support of organizational projects. The aim of the work is to create an integrated web service for information support of event-manager in the projects of organization of sports competitions. The following tasks are solved in the article: analysis of means of information support of organizational projects, systematization of event-manager functions and means for their fulfillment, development of a web-resource for providing information support of the project of organization of sports competitions. The following methods are used: project management, communication management, queuing theory, integration of information systems, object-oriented programming. The results obtained: An analysis of the means of information support of organizational projects is carried out. It is concluded that the integration of web applications, mapping services and integration tools with social networks is necessary for effective management of organizational projects. Features and software of event-manager of projects of the organization of sports competitions which are systematized according to the main stages of the life cycle were studied. A diagram of use cases has been developed, which is the initial conceptual presentation of the information support system. A web-based user interface has been designed to create and edit online contest routes using a mapping service. The opportunity to integrate the event into the social network Facebook with editing posts was realized. The application of queuing theory methods is justified for managing the organizational risks of the project. Conclusions: Integration of modern technologies provides informational support to the event manager of the project of organization of sports competitions, which provides convenience and shortening of terms of performance of its functions. In addition, the developed web resource allows different types of project stakeholders to participate in polls, register for competitions, view reports from previous events and get directions for competitions directly on the site.

**Keywords:** event-manager, web resource, mapping API, competition organization, integration.

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### **ВИКОРИСТАННЯ МЕТОДІВ СТАТИСТИЧНОГО АНАЛІЗУ ПРИ ОБРОБЦІ ДАНИХ ОПИТУВАННЯ НАСЕЛЕННЯ**

Предметом дослідження в статті є процеси інформаційного забезпечення організаційних проєктів. Метою роботи є створення інтегрованого веб-сервісу для інформаційної підтримки event-менеджера в проєктах організації спортивних змагань. В статті вирішуються наступні завдання: аналіз засобів інформаційного забезпечення організаційних проєктів, систематизація функцій event-менеджера та засобів для їх виконання, розробка веб-ресурсу для забезпечення інформаційної підтримки проєкту організації спортивних змагань. Застосовуються методи: проєктного менеджменту, управління комунікаціями, теорії масового обслуговування, інтеграції інформаційних систем, об'єктно-орієнтованого програмування. Отримано результати: Проведено аналіз засобів інформаційного забезпечення організаційних проєктів. Зроблено висновок про необхідність інтеграції веб-додатків, картографічних сервісів та засобів інтеграції з соцмережами для ефективного управління організаційними проєктами. Розглянуто функції та програмні засоби event-менеджера проєктів організації спортивних змагань, які систематизовано за основними етапами життєвого циклу. Розроблено діаграму варіантів використання, що є вихідним концептуальним поданням системи інформаційної підтримки. Спроєктовано інтерфейс користувача веб-ресурсу з можливістю створення та онлайн-редагування маршрутів змагань за допомогою картографічного сервісу. Реалізована можливість інтеграції заходу у соціальну мережу Фейсбук з редагуванням постів. Для управління організаційними ризиками проєкту обґрунтовано застосування методів теорії масового обслуговування. Висновки: Інтеграція сучасних технологій забезпечує інформаційну підтримку event-менеджера проєкту організації спортивних змагань, що забезпечує зручність та скорочення термінів виконання його функцій. Крім того розроблений веб-ресурс дозволяє різним типам стейкхолдерів проєкту брати участь у опитуваннях, реєструватися на змаганнях, дивитись звіти з попередніх подій та прокладати маршрути для змагань безпосередньо на сайті.

**Ключові слова:** event-менеджер, веб-ресурс, картографічне API, організація змагань, інтеграція.

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### **ИСПОЛЬЗОВАНИЕ МЕТОДОВ СТАТИСТИЧЕСКОГО АНАЛИЗА ПРИ ОБРАБОТКЕ ДАННЫХ ОПРОСА НАСЕЛЕНИЯ**

Предметом исследования в статье являются процессы информационного обеспечения организационных проектов. Целью работы является создание интегрированного веб-сервиса для информационной поддержки event-менеджера в проектах организации спортивных соревнований. В статье решаются следующие задачи: анализ средств информационного обеспечения организационных проектов, систематизация функций event-менеджера и средств для их выполнения, разработка веб-ресурса для обеспечения информационной поддержки проекта организации спортивных соревнований. Применяются методы: проектного менеджмента, управления коммуникациями, теории массового обслуживания, интеграции информационных систем, объектно-ориентированного программирования. Получены результаты: Проведен анализ средств информационного обеспечения организационных проектов. Сделан вывод о необходимости интеграции веб-приложений, картографических сервисов и средств интеграции с соцсетями для эффективного управления организационными проектами. Рассмотрены функции и программные средства event-менеджера проектов организации спортивных соревнований, которые систематизированы по основным этапам жизненного цикла. Разработана диаграмма вариантов использования, которая является исходным концептуальным представлением системы информационной поддержки. Спроектирован интерфейс веб-ресурса с возможностью создания и онлайн-редактирования маршрутов соревнований с помощью картографического сервиса. Реализована возможность интеграции в социальную сеть Фейсбук с редактированием постов. Для управления организационными рисками проекта обосновано применение методов теории массового обслуживания. Выводы: Интеграция современных технологий обеспечивает информационную поддержку event-менеджера проекта организации спортивных соревнований, обеспечивает удобство и сокращение времени выполнения его функций. Кроме того разработанный веб-ресурс позволяет различным типам стейкхолдеров проекта участвовать в опросах, регистрироваться на соревнованиях, смотреть отчеты из предыдущих событий и прокладывать маршруты для соревнований непосредственно на сайте.

**Ключевые слова:** event-менеджер, веб-ресурс, картографическое API, организация соревнований, интеграция.

**Introduction.** The organization of a sporting event requires a so-called event management, which includes all planned, controlled and managed events that are necessary for its conduct [1]. In the project management team, the event manager performs this function during the planning and implementation stages [2].

Increasingly, special software and web applications are being used to manage projects and current tasks [3]. Special mobile applications and integrations between different project management systems play a special role in increasing mobility. Developing a web service for project and task management within the event-manager's activities will reduce the time spent on communication between members of working subgroups, as well as between coaches and athletes [4]. With the use of the mobile application for managing the organizational project, there is an opportunity to provide maximum convenience and mobility when planning, organizing and conducting competitions.

**Reviewing publications and setting a task.** Today, software and hardware used to support sports competitions and in the individual practice of athletes play a significant role: accurate fixation of athletes' achievements, online broadcasting of sports events, devices for measuring athletes' physical condition, programs for registering and processing sports results

The scientific publications consider the use of information technologies in the form of automated information systems in organizing and conducting sports competitions [5].

In the article by Melnichenko S. [6] the specifics of integrated management and information systems in the tourism sphere are revealed and the features of automation of separate functional groups of processes and subjects of projects of tourist activity are analyzed. In the work of Zanevsky I. [7] the main stages of creation of a solid information model of a tourist campaign are highlighted, which provides a consistent and logical use of a spectrum of standard information technologies (Word, Excel, Access, PowerPoint, FrontPage).

V.Kashuba's article [8] describes the functional components of competition information support: organization of automated workflow, creation of journalist and commentator information terminals, creation of a telecommunication information interface and competition scoreboard, organization of a competition web site. Consideration is given to the use of software to optimize competition for judges. The ways of realization of qualitative and operative judging of competitions, the analysis of tables are determined [9].

There are three stages related to the information support of the project on the organization of the competition: in the planning phase is the period of preparation for the competition; during the project implementation phase, the period of the sports event; on the completion phase - the period of completion of the sporting event. The information used in the stage of conducting and finishing sports competitions is organized into blocks: information on the site about the course of the competition; information for coaches; for viewers; for the media; for

advertisers information on the site about the results of the competition; final information for the participants of the competition, team leaders, coaches; information for sponsors; for the Federation; for a leading organization [10].

Studies are conducted to determine the aspects of implementation of modern information technologies in the field of physical culture and sports, such as sports training, sports competitions, wellness physical culture, sports management. The features of application of modern information technologies in some directions of the field of physical culture and sports are determined [11].

Therefore, the purpose of this work is to create an integrated web service for event manager information support in sports organization projects.

The following tasks are solved in the article:

- analysis of information support tools for organizational projects,
- systematization of event-manager functions and means for their execution,
- development of a web resource for providing information support to the project of organization of sports competitions.

**Research materials and methods.** Project management systems are used to operate the project team effectively. This is a set of tools, methods, methodologies, resources, and procedures that are used to solve project management tasks.

The project management system is selected (or formed) on the basis of the project management plan. In addition, the content of the project management system varies depending on the scope, organization features, project complexity and availability of required resources.

The goals of project management systems are:

- increasing the effectiveness of the project team;
- improving the quality of project management of project managers.

Among the tasks of project management systems are the following:

- providing project participants with simple and effective tools to accomplish tasks and access information;
- providing project team members with tools to plan projects and monitor their implementation.

For informational support of the event manager, a combination of various software tools, which are focused on managing remote participants, is usually used [12]. Thus Survey Monkey service is used to work with participants in the planning and completion stages. One of the comprehensive solutions is the Idonethis system [13].

The Wrike cloud service can be used to work together and manage the company's projects. This online project management system allows for the organization and transparency of management [14]. In its functionality, it is possible to split large projects into separate stages, attach third-party files and define the work time in advance. The emphasis is on teamwork, project changes are reflected in real time. Collaboration features include email integration for task and email management, user group management, inbound forms, task comments, messaging, discussion,

reconciliation and editing of texts, graphs and videos, as well as a team project messaging system.

A flexible and visual tool for organizing a project is the Trello system [15]. It operates a catalogue of lists filled with cards. Trello adapts to the specifics of the project, team and workflow. All updates occur in real time. Lists, labels, lead times are synchronized in Trello across multiple devices.

When organizing sports competitions in a certain territory, they use cartographic tools that require the following tools:

- client programming languages;
- server languages;
- integrated development environments;
- mapping APIs.

In order to select the most effective mapping service for a particular project, a comparative analysis should be made on several criteria (Table 1). So OpenStreetMap is the preferred resource for providing mass orienteering competitions.

Table 1 – Comparative analysis of cartographic resources

The criterion for comparison	Cartographic resource		
	Google Maps	Open StreetMap	Azure Map
Query limit per day	25000	none	25000
Possibility of use in Ukraine	used	used	used
Price per month	free for use in non-monitoring open source in nonprofit projects	open source project	200\$
Response time	0,2 sec	0,3 sec	0.6 sec
the presence of sports orientation cards	none	exists	none

Let us analyze the tasks of the event manager in order to determine the functionality of the information support system. It is the responsibility of the event manager to plan and execute the organizational procedures, that is, to identify the measures needed to implement the project [16, 17].

With regard to sports organization projects, the event manager should consider the following information [1]:

- classification of sports competitions;
- scale of competitions;
- a form of competition.
- subordination of sports activities at different levels,
- openness and democratic conditions of participation in competitions.

With the use of information support event manager will be able:

- at the planning stage to organize all competitions by type and date of the event, to create types of competitions by special filters, to develop routes for competitions;

- at the stage of project implementation, maintain databases on athletes, coaches, teams and clubs, check for violations of the rules at a distance, develop a route online, view the orders sent;

- to conduct surveys of users of different types at the stage of project completion in order to improve the quality of service and competition.

Note that to simplify the procedures for creating routes of the competition requires the use of online maps service.

Collaboration of event-manager with the site administrator allows solving the following tasks [18]:

- news writing;
- control of discipline in the forum;
- consulting of users;
- resolving issues and conflicts on-line;
- approval of authorization requests;
- removing comments that do not meet the rules;
- blocking users;
- updating the news base.

In order for as many people as possible to learn about the planned competitions, it is possible to use the possibility of integrating web pages into social networks [19]. In addition, the event Manager allows participants to share information and photos from the site on the social network Facebook.

**Study results.** The event manager information support system is a web-based service for sports orientation competitions, integrated with online maps and social networks. The diagram of the components of this system is shown in Figure 1.

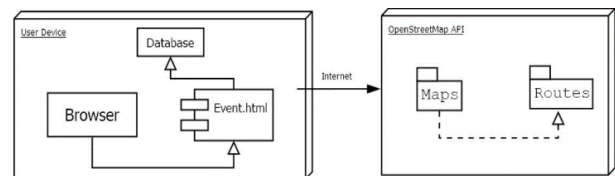


Fig. 1. Component diagram

Let us systematize the functions of event-manager by stages of the project lifecycle and identify the main tools of the information support system (Table 2).

Table 2 – Definition of the basic tools for realization of functions of event-manager

Stages of the project LC	Functions of event manager	Information support system tools
Planning	Systematization of competitions	Website
	Involvement of participants, registration of orders	Integration with social networks
	Development of routes	Mapping service
	Competition planning	Website
Implementation	Check for violations	Website, mapping service

End the Table 2

Implementation	Online route development	Mapping service
	Exchange of information with participants	Integration with social networks
	Maintaining a database	Website
Completion	Conducting a user survey	Integration with social networks

As the web service is focused on a narrow audience, except for the event manager, it consists mainly of professionally interested athletes and their coaches, as well as organizations engaged in sports orientation, the entire functionality of the site can be divided into four groups: event manager, administrator, athletes, and guest.

The use case diagram presented in Figure 2 is an initial conceptual representation of the information support system.

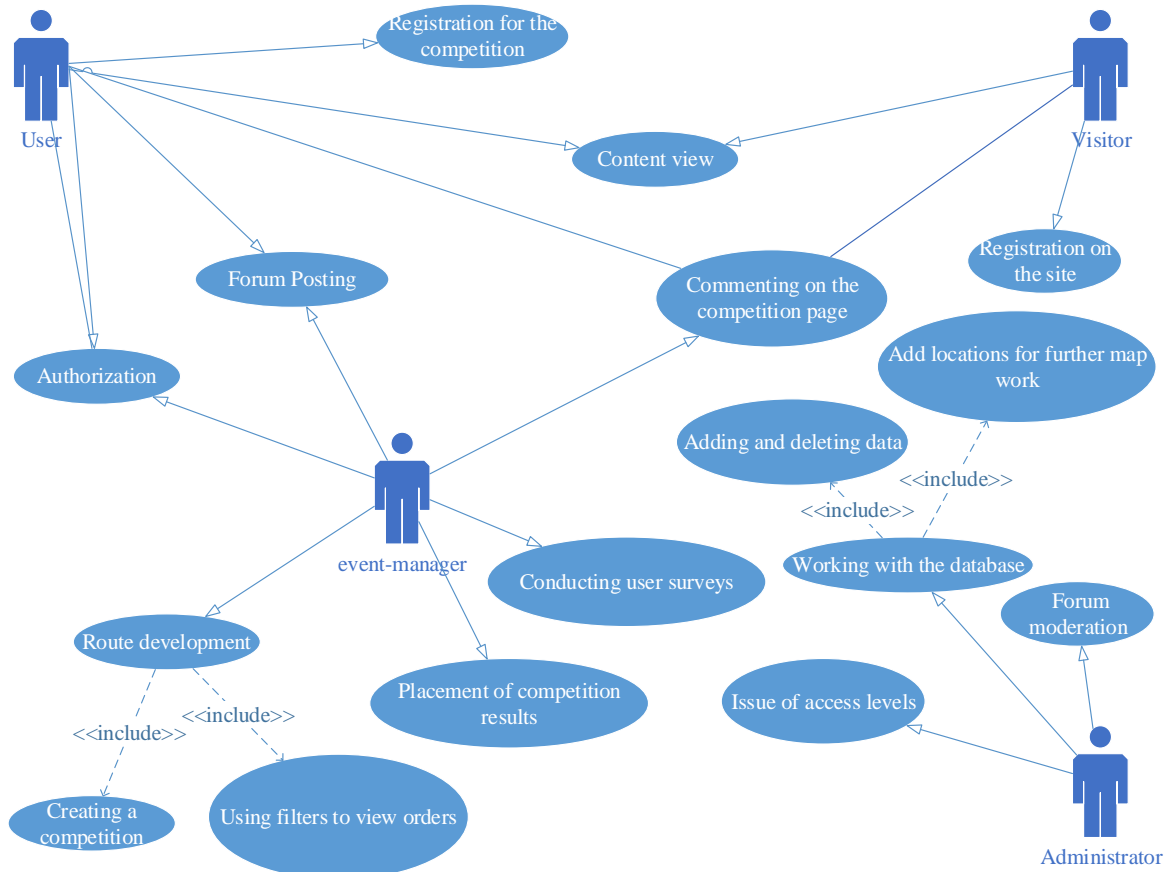


Fig. 2. Diagram of options for using the web service

As can be seen from the figure, the functionality of the web-service contains modes of operation for both the event manager and the main groups of project stakeholders. [20].

Stakeholder categories such as advertisers, athletes from other regions, or sports organizations, as well as sports interested people who have reached the site through search engines or advertising banners include the guests of the site.

Stakeholder users (athletes and coaches) have the opportunity to use the forum and feedback from the administrator. The athlete can also apply for the competition. After the competition, the user can view the results and view the photos.

The main functionality of the event-manager realizes the rights to add new events to the site, add the necessary files for the events (competition newsletter containing all the brief information about the upcoming competition: location, starting fees, mileage of distances by digits, etc.) you can add a result file to the created event.

Creating a new competition is divided into three stages: the first indicates the name and type of orientation, a brief description and dates of start and end. Then you can choose the venue: country, region and, if necessary, city. After that, the event manager will be able to pave the route for future competition. Also, the Event Manager can view, accept or deny the application for the competition.

In order to improve the connection between the event manager and the athletes, it is possible to conduct user surveys, then analyze the results and draw conclusions about the necessary changes,

To provide the above functions, the web service has the following pages and sections (Fig. 3):

- home page;
- news page;
- competition information page (by category and date);
- page of the event where you can register or ask questions;
- the forum page.

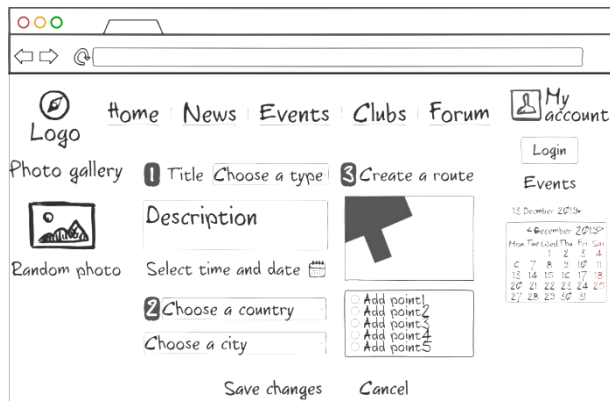


Fig. 3. Working page layout for creating a competition

Facebook was chosen as the platform for the posting, as this site has a Facebook Platform for third-party developers, which provides the necessary tools and products to access data on the social network. Open Graph protocol is used to integrate the data into the social network, which allows web pages to become a valuable object.

The following operations are used to ensure the functions of the event manager:

- Album;
- Application (description of the program registered on the social network);
- Check in (geographical information about the places where the user visited);
- Comment (comment on any object of the graph);
- Event (event, for example, description of time and place of competition);
- Insights (statistics on applications registered on Facebook, such as number of users, clicks like, etc.);
- other objects - Link, Message, Note, Page, Photo, Post, Review, Status message, Subscription, Thread, User, Video, Group, FriendList.

Figure 4 shows the page for choosing the route of the competition.

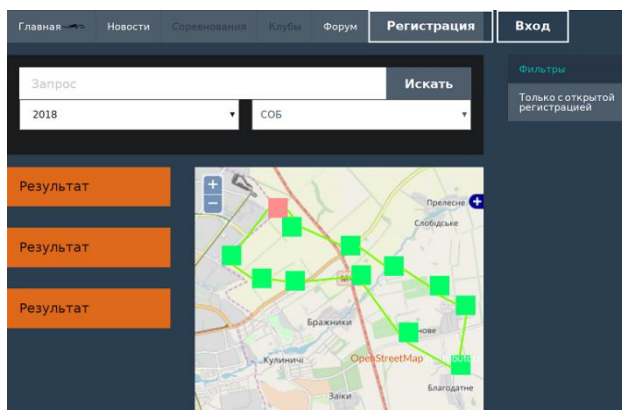


Fig. 4. Route interface

In the organization of competitions one of the main indicators characterizing the process of service of participants is the level of quality of the organization of the start of competitions. However, there may be risks of delaying the start of all participants due to the long acceptance of orders or lack of cards for participants. Methods of queuing theory should be used to analyze and

prevent these situations. The following indicators are calculated

- the probability of refusal to service orders;
- the relative throughput of the system;
- absolute throughput;
- average number of orders in the system;
- the average length of order stay;
- the average number of orders in the queue.

To describe the modes of receipt of orders for participation in the competition uses a system of limited waiting, as the unknown number of orders at a certain time. However, the event manager may set a time during which the order for participation in the competition will be accepted, after which it will no longer be possible to send his order. After the expiration of the waiting period, the event manager can use the site filtering to select the required age group and develop a route for it, and then save the created route (Fig. 5). All participants whose orders have been accepted can be used to organize the participants' start protocol.

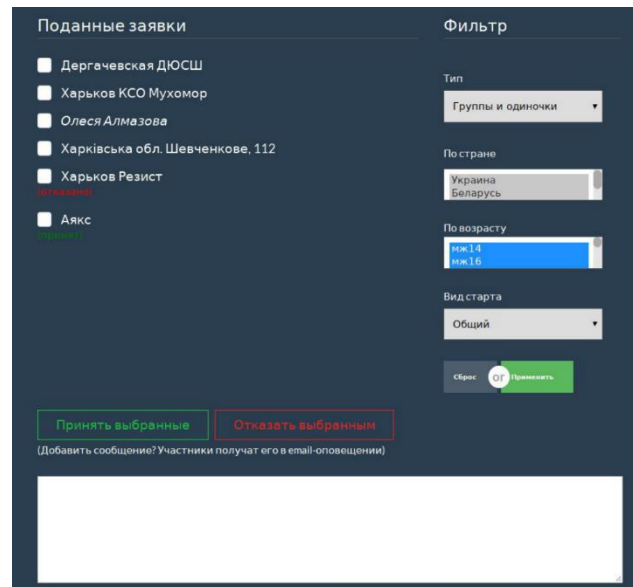


Fig. 5. The mode of work for the application for participation in the competition

**Conclusions.** The analysis of the means of informational support of organizational projects has been made. It is concluded that the integration of web applications, mapping services and integration tools with social networks is necessary for effective management of organizational projects.

Features and informational tools of event manager of sports event organization projects, which are organized according to the main stages of the life cycle, have been considered.

The user (event manager) interface of the web resource has been designed with the possibility to create and edit online the routes of the competition using the mapping service. The opportunity to share the event on the social network Facebook with editing posts was realized.

The result of this work is the integration of modern technologies to provide information support to the event manager of the project of organizing sports events. In

addition, the developed web resource allows different types of project stakeholders (athletes, coaches and other interested persons) to participate in polls, register for competitions, view reports from previous events and get directions for competitions directly on the site.

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