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Low-Code Application Platform in Meeting Increasing Software Demands Quickly: SetXRM

Ender Sahinaslan[a] , Onder Sahinaslan[b] and Mehmet Sabancıoglu[c]

Maltepe University, Department of Informatics, Istanbul, Turkey

[a] dr.endsa@gmail.com,
[b]Corresponding author: ondersahinaslan@maltepe.edu.tr
[c] mehmet.sabancioglu@gmail.com

Abstract. The dependence on technology, digital transformation and the need to work remotely are increasing day by day. It is predicted to increase further after this COVID-19 pandemic. The desire to digitize every object also leads to the need to develop or update many application software. It is very difficult with traditional software development methods to produce flexible solutions to such dynamic and changing demands on time. At the same time, there are problems such as finding qualified human resources and high cost in writing and updating corporate program codes that can be considered complex on a large scale. Low-code software development platforms provide solutions for such problems. These platforms aim to produce flexible and less costly programs in a shorter time by using drag-and-drop components through visual interfaces without requiring deep programming knowledge.

This study is based on the examination of the SetXRM platform, which is one of the new generation low-code applications that helps to produce more flexible and short-term solutions to the increasing software needs of the enterprise.

Keyword: Software Platform, Low Code, Next Generation Coding, SetXRM

2020 Mathematics subject classification: 68M11, 68N19, 68U35, 94A29

INTRODUCTION

Technological changes such as the Internet, IoT and Industry 4.0 and the COVID-19 pandemic cause rapid changes in all areas of life. Perhaps the only thing that does not change today is change itself. These changes bring different needs and demands with them. Companies are in a destructive global competition at the point of meeting these demands at the desired quality and speed [1]. This situation obliges companies to review their business manners, to be open to all kinds of technological innovations, new applications and approaches.

Applications with user interfaces in information technologies play a very important role in the use and spread of these technologies. It is vitally important for organizations to produce the applications needed in such a rapid change or to produce solutions at the same speed for changes and updates to be made in existing applications. In this case,

institutions have to evaluate new generation low-code software development applications instead of the old known classical software development approaches. These application development platforms do not require engineers or expert programmers with a lot of technical knowledge and experience, as well as producing easy and fast programs. Thus, it offers faster and more economical solutions to institutions that want to lead in global competition. In this study, low code development platforms will be presented through SetXRM software development platform.

LOW CODE DEVELOPMENT PLATFORM

The low-code development platform (LCDP) is a tool for faster application development with very little programming knowledge, rather than traditional programming approaches that require a certain expertise in the field of programming. Thanks to these software development tools, it is possible to develop basic applications without writing any code by hand. For this reason, the term "low-code" or "no code" is also used in the literature. It is possible to develop applications very quickly by using the visual user interface and ready-made auxiliary tools on these application development platforms. Thanks to these tools, rapid improvements can be made in the form of drag-and-drop by using the auxiliary tools on the platform by observing a certain business process flow, almost without the need for additional coding.

Low code is a software development approach to coding that allows users to create and manage applications quickly with minimal manual coding required [2]. The basic ideas of the low-code development platform date back to the fourth generation programming languages, which were fast application development tools of the 1990s and early 2000s [3]. Although the low code development platform dates back to 2011, [4] this term was first used in 2014 by Forrester Research analysts [5]. This model is based on model-driven design, automatic code generation and visual programming principles similar to previous development environments. One of the main goals of the emergence of such LCDP development platforms is to involve end users in meeting their growing software development needs. Thus, they provide timely solutions to increasing business needs by those who do the work themselves, quickly and easily without requiring too much technical knowledge. According to the results of the study conducted with 451 researchers [6], it was concluded that the improvements made with low-code platforms were realized in 50% -90% shorter time than the improvements made with classical coding languages. This also contributes to reducing human resource costs, which are valuable in the field of computers, but which are very costly for businesses. In short, it also reduces initial installation, training, distribution and maintenance costs [7].

The main reasons why LCDP environments are preferred in application development are as follows:

- **Transparent.** LCDP is accessible to everyone and provides a direct application development environment to the user.
- **Scalable.** These platforms are developed from a global perspective and have more scalable features.
- **Development Speed.** The drag-and-drop method of ready-made buttons is capable of rapid development without long-running analysis, design and software development processes.
- **Secure.** Application security is the responsibility of the platform owner, not the developer. LCDP holders make improvements by considering international Information Security standards (ISO / IEC 27001, PCI-DSS etc.).
- **User Experience.** Each LCDP platform offers visual page design tools for users. Different themes can be created and used for each user.
- **Database.** With design-run, the fields, components and data types desired to be used in the application are presented within the platform. There is no need for a separate VT application, maintenance and management.
- **Flexible and Modular.** Developers can easily create their own workflow management (BPM) process and authorization flow as they wish.

In addition, different possibilities are offered for developers who do not know any programming, code knowledge, or professional programmers who want to add more features to the existing architecture.

LOW CODE DEVELOPMENT PLATFORM: SETXRM

About the Product and Company

In Turkey since 2002, it was developed by the company that produces software solutions for various sectors were lower arm application development platform [8]. This development platform basically has LCDP standard development features. With this platform, organizations in need can develop their own digital applications over the cloud in an easy and flexible way. They can make their digital transformation easily and quickly. According to company data [9]; SetXRM platform is used by public and corporate companies operating in many areas such as health, energy, chemistry, food, machinery, automotive, service and service. Success stories with many corporate companies are also included on its website. The application is used in many corporate companies and is understood to be in demand. The main reason for considering this application in the research is that it is a domestic product, we can access all kinds of information that will be needed in the research more easily and quickly, and we have a certain usage experience within the team.

SetXRM Features

General features of the LCDP platform are as follows:
1. Unlimited module design and report design (can connect multiple DB)
2. Validation and Business Rules and Business Flows Drawing
3. Notifications and Form Templates
4. Listing Functions: Regular Table, Drill Down, Gantt, Calendar, Kanban, Maps, Business Flows Drawing Notifications and Form Templates
5. Active Directory or Other Identity & Access Management SSO and permission integration Multiple projects in one server configuration. No new server costs for new projects
6. Fully project clone from an existing Project and module clone from an existing Project to a new project or existing Project
7. System creates Record Logs on each CRUD operations. Records' older version can be seen and compared.
8. Excel add-in (import, export and update bulk data)
9. Outlook add-in (insert and update data on any designed module by using Rest API)
10. Multiple Page Designs for one module
11. Multi language support and Currency Exchange Service
12. Time triggered notification and reporting functions
13. Sending HTTP request to any web service with Business Rules
14. Formula Fields (all C # methods supported)
15. Delegation and Custom Menus for each user or permission group
16. Access Management (can be integrated LDAP or other Identity and Access Management)
17. Custom update, insert actions with Business Rules

Some of SetXRM Technical Details

1. ClientScripts (JavaScript and HTML) can be added to any module, so Business request that cannot be done with no code can be done with Client scripts
2. Multiple projects in one server configuration. No new server costs for new projects
3. Seperate read and write DB. Listing and reporting functions use read DB for performance issues
4. Supported DBs: Microsoft MsSQL and PostgresSQL
5. REST API; system automatically creates API for each module. Apifunctions: api.setcrm.com
6. Code: C#, ASP, .Net, MVC5, HTML5, CSS3, Bootstrap
7. Uses Github as continuous integration and delivery system
8. Passed EPA check. No need to do EPA check for new projects.
9. Uses free open Source tools: RabbitMQ Server, FullCalendar.io,Microsoft.AspNet.MVC, Castle.Core, EntityFramework, Nlog
10. Responsive front-end to use on mobile devices and 12 different bootstrap themes for users
11. Native apps can be developed by using Rest API

CONCLUSION

Low-code platforms are rapidly spreading around the world with their easy, fast, reliable, flexible and secure application development features. According to global research firm Gartner [10], 65% of application development efforts will be using low-code platforms by 2024. The rapid acceptance of these platforms in a short time also shows how high the need for these platforms is. On the other hand, it is also effective for software developers to want to take advantage of the software development comfort provided by these platforms instead of conventional methods. Because it is a tiring and boring work that can take days with classical development tools and requires a lot of attention manually. In addition, not only businesses but also societies and individuals have used hundreds of applications a day, but they cannot find answers to different requests and expectations. However, thanks to such low-code software platforms, every individual who knows the basic programming logic very little will have the opportunity to develop the software and develop software freely. This also means meeting their demands quickly and cheaply within businesses, and their many advantages in global competition. All these expectations are indicators that there will be greater momentum in the orientation towards these platforms day by day.

The SetXRM low code development tool we examined in this study almost meets all the features expected from such applications. The information received from the manufacturer is that SetXRM is now accepted on a global scale, especially due to its fast and easy development features, and it is also preferred by large-scale companies such as Mercedes. Although this study is based on a product, it has been observed during our research that the application logic of other low code application development platforms is similar and differ in the development interface and pre-prepared tools. In this respect, SetXRM implementation features will be useful in understanding all other low code platforms. Since anyone can write a program in the near future, educational institutions and universities can start raising awareness and training on low code development without much delay. Classic coding methods will likely be used in much more restricted private areas after a while. With Industry 4.0, smart low code platforms to be developed in the future [11], robots will now be used by smart machines. These areas can also be considered as opportunities for improvement.

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