

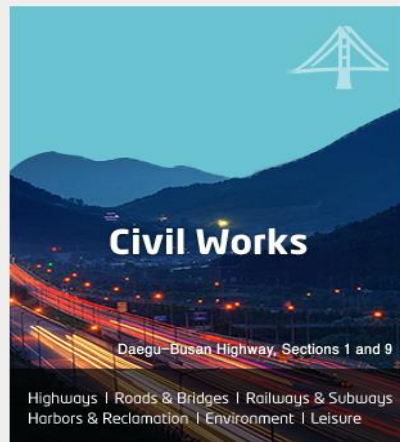
Case Study - Establishing BAROCON, the Daewoo E&C's integrated systems for managing construction projects

Daewoo E&C

Daewoo Engineering & Construction (E&C) has been leading the Korean construction industry for about 40 years since its foundation in 1973. The company has established numerous infrastructures in various fields of the society, including roads, rails, bridges, ports, and airports. The E&C company has also erected many residential and non-residential eco-friendly buildings to which best design and technology was applied.

Moreover, Daewoo has constructed a number of large-scale industrial facilities such as thermal, nuclear, and tidal power plants as well as LNG tanks. The followings are examples of the foregoing achievements: GK Tunnel, to which the world's most advanced immersed tube method is applied; Nurimaru, a building where an APEC meeting was held; Wolsong Nuclear Powerplant, which is famous for the world's shortest construction period of its kind; and PRUGIO, a brand of Daewoo's flagship residential complex. As seen in the aforementioned accomplishments, Daewoo E&C provides cutting-edge technology and finest service in almost every field of construction including civil works, architecture, housing, and plants.

Thanks to the persistent research and excellent business result, Daewoo was selected as the No.1 construction company in Korea by the Ministry of Land, Infrastructure and Transport for three consecutive years from 2006, reinforcing its leadership in the nation. The company is now making an all-out effort to be a world-class player, going beyond the domestic market.

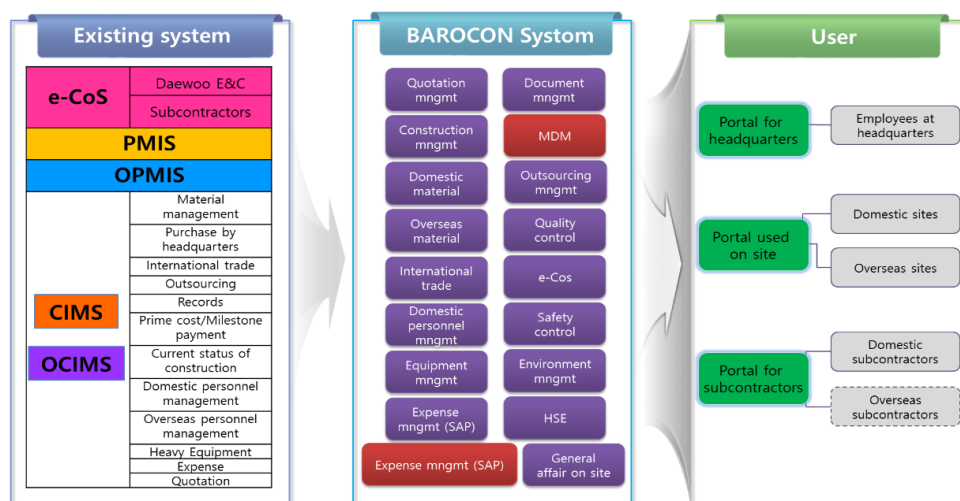


Project Overview

Daewoo E&C was required to improve its business process, in line with the company's managerial motto for 2012 "Construction Convergence Innovator." In particular, there was a great need for a system that can be utilized by the employees working overseas. To this end, a project was planned to establish "BAROCON," a system for managing cost throughout the entire construction process.

BAROCON aims to strike a balance between integration and connection. For that, the project planned to extract necessary elements, redefine them, and form task modules by grouping them. The modules, each of which once constituted a system, would compose the integrated system as a whole. This system is the biggest system ever for the company since its foundation.

Diagram of Structure of System

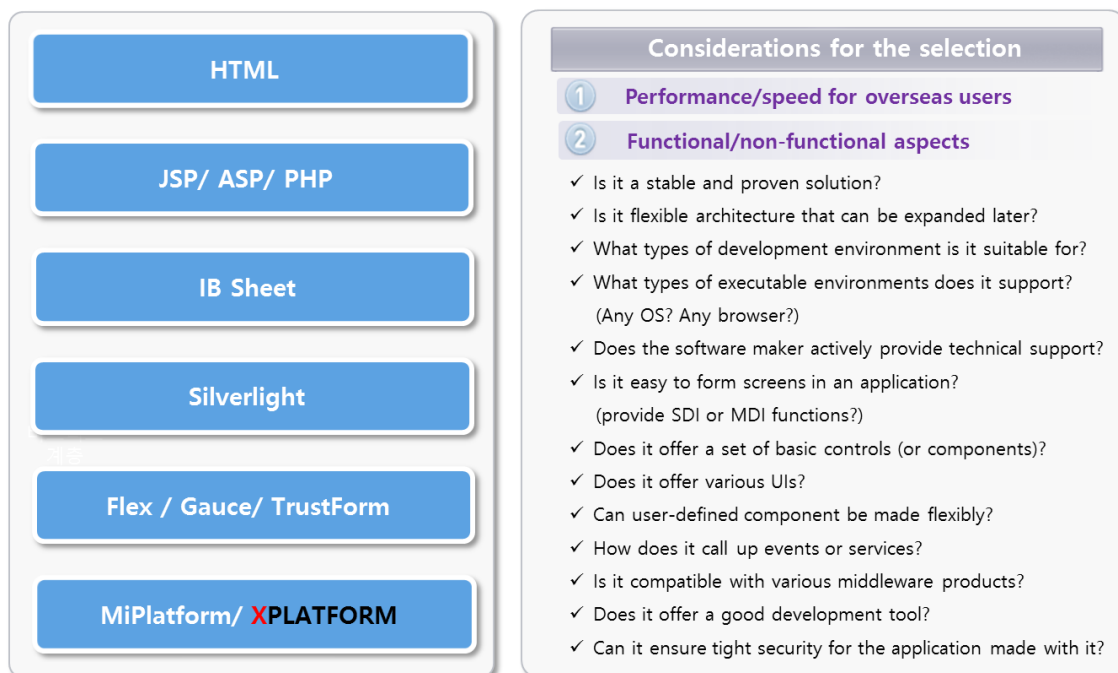


Introducing the Nexacro Platform

The process of screening development platforms began as soon as the project kicked off. With NEXACRO in mind, UI standardization was carried out while our consultative group reviewed other similar products by performing simulation tests. The key was whether a platform could show stable performance and guarantee work efficiency in overseas operations in comparison to using JavaScript or Flex to establish JavaServer Pages.

In fact, Daewoo's biggest concern was to establish system that can stably run abroad. The company wanted to have system that can work even in overseas construction fields. Accordingly, we had to consider a number elements including various PC environments (or diverse nationalities), system stability, security and mobile usability. Moreover, we hoped that the development platform used in the BAROCON project would be compatible with the existing framework, which was .Net Framework. Previously, Daewoo E&C had established system in its foreign bases by using .Net Framework.

All in all, the construction company chose NEXACRO as a standard UI development tool for building the client-tier system after forming a standard framework for the server tier by expanding the Spring Framework. The reason for the selection was that NEXACRO excels in terms of performance when applied to the overseas system.



Best/Suggestion	Item	Client opinion
Best	UX Studio	<p>The development tool is equipped with various functions including events and properties while making it easier to design and position components.</p> <p>It is possible to apply same properties to multiple screens though copy & paste.</p> <p>Developing similar screens is simple and quick.</p> <p>Various components are offered including buttons and grids.</p>
	Development productivity	<p>Once the standard of patterns or templates is determined, using XPLATFORM is thought to be over-50% faster than direct coding as well as using Visual Studio or client/server tools.</p>
Suggestion	Preparation for future	<p>XPLATFORM should adapt to non-active X development environment.</p> <p>TOBESOFT should prepare for the competition against open source products.</p>

Why they chose the Nexacro Platform

Effects of NEXACRO Platform

Defining standard UIs resulted in consistent layout and animation, allowing us to create dynamic design.

As its development environment is based on languages similar to 4th generation programming languages (4GLs), developers familiar with 4GL or Miplatform could get used to NEXACRO effortlessly. Moreover, as the platform uses standard JavaScript, developers who had worked only on web projects could easily become accustomed. In conclusion, overall development productivity went up.

- No problem in using abroad
- Compatible with existing frameworks
- Guaranteed performance even under poor network environment
- Great usability
- Increased speed thanks to the application of the XP cache mode/compressed data transfer
- Over-50% faster than direct coding as well as using Visual Studio or client/server tools

Screen Design with NEXACRO Platform

- The system is designed to divide requests into two routes according to defined process. (eg. The route is determined by menus or methods.)
- Requests from on-site servers can be divided according to menus. (The algorithm is adjustable depending on on-site situations.)

- Data of on-site tasks is stored in the database (DB) installed at the relevant site. Then, it is that either the data can be accessed through synchronization or the data is secured inside the database.
- BAROCON system supports multiple languages for overseas users.
- BAROCON system can manage locales of each country, multilingual messages, and multilingual phrases.
- Multiple languages can be supported using attributes of NEXACRO's components.
- The multilingual converter works for a wide range of items including messages, menu names as well as titles of components including Edit, Static, Tab and Grid column.

The Developer Perspective

“Stable system that ensures the performance of the company’s overseas network”



Byeon Sung-Oh,
Senior Manager
IT Planning Team of Daewood



Kim Sung-Min,
Junior Manager
IT Planning Team of Daewoo E&C

Q. What was the key point of the project?

What mattered a lot was to separate domains to ensure accessibility for BAROCON users, each of whom were under various environments. To separate domains means dividing the system according to features of users: home/abroad, headquarters office/sites, and Daewoo employees/subcontractors. In addition, we needed to build servers with minimum investment of resources and with consideration of the network environments in the field. For instance, if the server is optimally composed after gate division by minimizing cost and considering the network situations on site, tuning at the application level will be possible. However, it will fall short of upgrading the network performance. Therefore, we employed special architecture to achieve our twofold aim—cost and performance. We established an independent file server and installed a web application server (WAS) and database in it. Meanwhile, we uploaded NEXACRO-based sources on on-site web servers; that is, we uploaded static pages containing elements that can be hosted on the Web. With this structure, users in the field are set to access the relevant on-site servers while, however, their requests are directed to the headquarters’ server, leading headquarters’ WAS to process the business logics.

Q. How happy are you with the overall outcome of the project? Give a score out of 100 points.

I would give 80 points. We enjoyed a great deal of benefit thanks to NEXACRO Platform’s flexibility and development productivity. However, it is regrettable that there was a lack of self-study materials on the product that could allow developers to learn more about NEXACRO Platform before the beginning of the project. Once a project is launched, developers are usually unsatisfied with just one course of training. Accordingly, I’ll reserve

the remaining 20 points for future improvement: I expect Nexaweb to offer more training programs.

Q. How do you evaluate the experience of developing system with NEXACRO?

We decided to introduce distributed server environment after we were advised by a Nexaweb's engineer that such architecture would improve the network performance without spending much cost. As a result, our overseas systems are enjoying faster speed. Because it is distributed server architecture, there is a chance of a problem in the data synchronization. To solve the problem, the NEXACRO-based sources in on-site servers are always synchronized with the headquarters' server. This method is thought to be the best solution up to date.

BAROCON's stable performance and faster speed were achieved thanks to the NEXACRO Platform's cache mode and compressed data transfer. We could establish an effective network by utilizing simple and low-cost architecture rather than building costly servers. We would like to present our experience as an exemplary case to companies that consider establishing similar systems.

Q. Development productivity is believed to be the biggest advantage of using NEXACRO Platform. Do you agree with that?

As NEXACRO is quick and simple to produce similar screens, its development productivity is incomparable. Uniformity in designs, positions, buttons, and grids can be achieved by copying sources. In other words, the copy & paste function expedites repetitive parts of developers' job. Moreover, the development platform supports JavaScript 100%, giving developers more flexibility as they can access scripts.

Q. Which functions of NEXACRO did you like in particular?

They are cache mode and compressed data transfer, which were used in building distributed server architecture outside Korea. They are the ones that resolved the performance issue, which was the biggest concern in this project. We also like multilingual support. This function can be managed by registering each country's locale, multilingual messages, and multilingual phrases. Multilingual support function can be developed through a property value of NEXACRO Platform's component. When users select a certain language in the favorite page, NEXACRO is reloaded, converting the language. Multilingual conversion is applied to a wide range of items including messages and menu names as well as titles of components including Edit, Static, Tab, Grid, and Column.

This multilingual support drew positive responses from local personnel since the communication between Korean and non-Korean employees became easier thanks to commonly understandable menu names. Accordingly, supporting other languages than English is now under our consideration. Last but not least, NEXACRO allowed us to easily

utilize ActiveX objects, which permit what the Web cannot do (eg. accessing DLLs). Use of OCX objects and Hangul Office Viewer was made possible by this feature.

Q. Was there any difficulty during the project using NEXACRO Platform?

Performance was compromised when applying the expression function to all rows, dealing with too much data, or using certain functions too often. Although those issues were fundamentally caused by the poor conditions of the overseas networks, we had to apply patches in order to solve those problems.

Q. Do you have any demands or inquiries regarding NEXACRO Platform or development?

We hope that Nexaweb will prepare preemptive measures for common errors that can occur during development projects by inducting technical experts for each client or each issue. We believe that this knowledge sharing will help the software company to save its resources because its technical support team will receive less feedback from clients.

About the Nexacro Platform

Nexaweb provides software and services for the development of enterprise-class mobile, tablet, and web applications. Nexaweb was founded in 2000, offering tools and enterprise to develop web and, later, mobile applications for the enterprise. Today, Nexaweb has more than 2,200 sutomers around the world across a range of industries.



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