GBS AppDesigner

- Intuitive web application design and modernization of existing applications -
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1 Introduction

In the age of social business, the deployment of modern web technologies and the improvement of collaboration are increasingly added to the agendas of companies. These web technologies do not only increase the agility of an organization, but also improve the access to contents.

In this context, modern collaboration platforms can be understood as a central starting point for staff members to find the right contact person and to share knowledge. Until now, however, one crucial component was missing in this context: the application view. Hence, it was not possible for employees to create and provide applications in the environments of social business and collaboration platforms. If at all present, these possibilities were limited to IT departments and connected to significant expenditures.

This is where the new GBS AppDesigner comes in. It is a flexibly deployable Web 2.0 development framework. Its central task is to facilitate the development of modern web-enabled and process-supported business applications by users within the specialist departments. Hence GBS AppDesigner can be seamlessly integrated into existing environments and is part of an IT modernization strategy, which aims to achieve increased flexibility, productivity and efficiency.

With GBS AppDesigner, applications with low and medium complexity can be designed with next to no programming knowledge. For more complex tasks, such as the integration of third-party systems (e.g. ERP or CRM solutions), experienced developers are able to take advantage of all options to expand. Even existing IBM Notes/Domino applications can be modernized and web-enabled, as well as integrated into other platforms, such as Java EE, or Microsoft SharePoint. Based on the expectations placed on modern tools, GBS AppDesigner provides an intuitive web interface and the possibility of distributing the applications to mobile devices that are based on Apple iOS (iPhone, iPad) or Google Android. These applications are native apps that also allow for the full exploitation of the device’s abilities, as well as for further processing when the device is offline.

Due to its multifarious usage possibilities, GBS AppDesigner's architecture is designed to be very flexible and independent of specific platforms. This applies to the operating systems (Microsoft Windows, Red Hat Linux), compatible middleware, meaning the application servers (IBM Domino, IBM WebSphere, JBoss, Microsoft SharePoint) and database servers (Apache Derby, MS SQL, Oracle, IBM DB2). It also applies to the devices, or user systems (IBM Notes/Domino, Microsoft Outlook, all important web browsers, iOS or Android devices). A particular focus was placed on the development of exchangeable modules and a clear alignment with standard technologies. GBS AppDesigner can thus be customized for the individual needs of each customer, based on the varied nature of the IT landscape.
2 Application scenarios

GBS AppDesigner provides a wide application range across industries. Due to its future-oriented architecture, it can be used in accordance with the business strategy and thus improves the possibilities of creating and providing modern collaborative applications.

2.1 Modernization

Corporations often own a large number of IBM Notes/Domino applications, which have been accumulated over time and no longer meet the company's needs. Most of these applications are not web-enabled and either limited in their integration into the existing portal infrastructures, or cannot be integrated at all. Companies with several hundred or thousand applications face significant difficulties in providing the appropriate applications to the respective user and oftentimes are unaware which applications are used how and by whom. Furthermore, these applications are no longer equipped with a state-of-the-art user interface, which is standardized across the company's departments. This can significantly threaten the acceptance among users. This is where GBS AppDesigner comes in, by simplifying the modernization of these applications and providing them in a context, which is enabled for portals. GBS AppDesigner's platform independence is one of the architecture's key characteristics and allow for new application possibilities during the deployment of the created and modernized applications in later stages.

A GBS Insights analysis will help determine which applications can be modernized using GBS AppDesigner. GBS Insights provides all necessary information needed for migration, optimization and mobilization. This information results from a detailed analysis of the existing system environment. In this context, usage, dependency, distribution and integration data are generated. Based on the level of complexity and usage, applications relevant for a modernization project are selected.

GBS AppDesigner expands an existing IBM Notes/Domino application with its own design elements. Practically everything needed for a parallel interface is copied into the existing application. In most cases, this allows for a parallel usage both by users employing IBM Notes Client, as well as users employing a web-browser. Exceptions should be regarded individually and usually identifiable with the various function types of the employed controls for storing data, such as Rich Text Editor in IBM Notes and the browser. Experienced developers can also program their own controls and use them in GBS AppDesigner.

In addition, it must be determined, whether IBM Notes users should have the possibility to see the web form in the client. Since the technology of the IBM Notes/Domino environment is based on XPages, it can be determined within the opening event of the document, whether the form should be opened as an XPage or with its classic design. Corresponding to this requirement changes must be implemented in the existing design. In addition, the application's design must also be delivered with open design from the technological perspective (for the developer).

If this is not possible, data/documents created via a browser can also be managed in a secondary database and synchronized into the “old” database. This is done, for example, by GBS Insights tools. As mentioned, the possible processing of these documents in the original database, should be examined on a case-by-case basis.
Figure 1 - Import of IBM Notes Forms

Figure 2 – Dynamic view of existing forms of an IBM Notes application
Figures 1 through 4 show the possibility of importing existing IBM Notes forms into the GBS Process Repository, as well as an example of their later representation in the browser. For this, the fields are initially shown in a single-column table within GBS AppDesigner. The examples show a simple migration of the “Journal” form of the Lotus Notes notebook-application into GBS AppDesigner format. For this purpose, the IBM Notes form was exported into a XML file and transferred into the XForms-standard format. GBS AppDesigner uses the XForms standard to depict the design and the contained formulas. GBS AppDesigner provides views separately. With the transformed form, the existing application is now equipped with two alternative user interfaces – a classic version and a modern, web-enabled version.

Applications designed with GBS AppDesigner, meaning forms and workflow definitions, are platform independent and do not require a separate migration (as long as, for example, Java Script was used as a formula language). This makes GBS AppDesigner ideal for the use in modernization scenarios. The term ‘platform independent’ means that these GBS AppDesigner applications are also instantly deployable in a pure Java EE server, such as JBoss, without requiring any additional migration efforts. The same applies to a modernization strategy, as well as a Microsoft SharePoint environment. These applications can also be run there without any additional migration efforts in respect to programming.
2.2 Application building

GBS AppDesigner allows an intuitive creation of applications with low to medium complexity. One of the future versions will also make possible a wizard-supported integration of third-party applications via web services. This makes it possible to develop complex deep integrated applications, too. However, the largest ROI is generated by solutions, for which IT departments do not have much time, but are in high demand among users: Specialized applications, which support frequently occurring tasks in a quick and simple manner. IT departments usually make these applications low priority, because they are not critical to business and resources are oftentimes planned and budgeted for other ventures.

![GBS AppDesigner](GBS_AppDesigner.png)

*Figure 5 - GBS AppDesigner – Form creation*

The quick and simple creation of an application requires tools that can be used for easily comprehensible operation. GBS AppDesigner contains just these tools for the creation of forms (Figure 5), as well as for workflow modeling. There are various simple and pre-designed controls for the creation of forms, which come with their own rules for entry checks (currency, email addresses, region). This saves the user much of the work. Thanks to the number of sample applications, the user is also able to access a number of solution ideas to implement own forms.
Figure 6 shows the numerous possibilities of reacting to typical events in the use of boxes in a form. This includes, for example, the event “calculated value”, which runs when a box is modified in the form. Another example is the “initial value”, which is entered when a new form or dataset is created. The formulas shown in Figure 6 are built using Java Script and Server Side @-Formula. These formulas can be entered into the form directly, or using a separate wizard.
In respect to the design of the foundational workflows, the integrated solution GBS Workflow Modeler supports the BPMN 2.0 Standard (Business Process Modeling and Notation), as shown in Figure 7. This notation is regarded as the most promising process modeling language, because it not only has a tried-and-tested, comprehensive catalog of shapes for the process description, but it also effortlessly combines the developer's view with the user's view in one model. For that reason, this standard is recently introduced into many corporations. GBS Workflow Modeler supports an expanded Stencil Set 1, which is recommended in the standard and allows the modeling of more complex workflows.

2.3 Migration of IBM Domino applications

Several migration concepts have already been discussed in Section 2.1. During the implementation of a migration process, the tools from the GBS Insights environments are used. IBM Notes/Domino data in particular are transferred into relational databases. The migration of existing application logic (e.g. Lotus Script libraries) of IBM Notes into Java EE applications is not planned at this point in time. It should also be noted that GBS AppDesigner allows for the use of customer's own controls (e.g. the user's individual application logic).

These controls also have to be re-implemented for the new platform. GBS Insights Analyzer helps to determine which existing applications can be modernized or migrated using GBS AppDesigner. In order to achieve this, the existing applications are analyzed using a criteria catalog optimized for GBS AppDesigner and assigned to migration categories. Using the aforementioned form conversion, as well as existing special GBS controls, some of the applications resulting from the GBS AppDesigner classification can be migrated automatically or manually. In this context, migrated applications can be used in a browser, as well as in collaboration platforms, such as IBM Connections or Microsoft SharePoint.
2.4 Integration in collaboration platforms

Collaboration and social business platforms, such as IBM Connections are equipped with numerous functions that improve the collaboration of employees. The primary purposes are the linking employees and the sharing of knowledge. If one regards IBM Connections or Microsoft SharePoint as the central work area of users, it is also sensible to integrate this into business applications.

It is not only possible to upgrade Central IBM Connections services this way. Their added value generated by well-integrated business applications can also be experienced by the company. For this reason, GBS AppDesigner can be integrated with collaboration platforms and allow for staff members to instantly use the created applications. In order to be able to use the GBS AppDesigner application in IBM Connections, the owner of a community adds the GBS AppDesigner iWidget to this community using the iWidget catalog. The GBS application has the same access limitations and rights as this community.

GBS AppDesigner applications with workflow support also allow the automatically creation of activities in Connections. Users also receive the new created activity as soon as the task is assigned to them as link in an email.
The tasks corresponding to one workflow are displayed in the activity stream, activities, or in “Action required”, as shown in Figure 9. The user is then able to open the GBS AppDesigner document via the “Open Document” link. Since a “single sign-on” can be configured for this environment, the user is not required to enter an IBM Notes Web password. The document is opened to the user from IBM Domino in the IBM Connections environment like a new IBM Connections document.

2.5 Mobilization of applications

The open architecture of the GBS AppDesigner framework allows for the swift integration of an application into any application server and mobile infrastructures. The pilot version of this implementation is now available.

Using this method, the final appearance of applications can be checked on a smartphone or tablet during their creation and optimized accordingly. The applications created in this manner can then be run on both Apple iOS and Google Android devices.

3 Architecture

3.1 Workflow as a foundation

GBS AppDesigner integrates powerful workflow technologies of the GBS owned workflow solution. This framework consists of four basic components:

1. Process Engine (and application logic)
2. Process Directory
3. Organization Directory
4. (Database)
In the IBM Notes/Domino environment, the process engine is integrated in a standard IBM Notes application database. The application’s data and design are stored and managed together. In the Java EE environment, the program logic is separated from the data repository (model) and from the user view (view), analogous to the concept of the model view controller (MVC). Relational systems (e.g. IBM DB2, Oracle, MS SQL or Apache Derby) are used as databases. A data persistence module, with which any desired relational databases can be configured as data storage, allows for a customer-specific exchange of these database(s).

The process directory contains the description of the respective tasks of a workflow definition, including all of their dependencies on other tasks and properties (editor, used form, etc.). In addition, it contains the description of all GBS AppDesigner forms and a number of templates (layout, formulas). At least one Process Directory is commonly configured for applications. In the Organization Directory, organizational structures and objects specific to the company are managed. The latter can consist of roles and groups, as well as material resources. IBM Domino Directory (N&A) can be used optionally, but neither provides the same flexibility nor the same multi-level possibilities.

### 3.2 Component integration

![Architecture of GBS AppDesigner](image)

Figure 10 – Architecture of GBS AppDesigner

Figure 10 represents the GBS AppDesigner’s architecture. The use of the Apache Tomcat Server is still mandatory at this point in time. For later versions, it is planned to also integrate the form builder functionalities into the OSGi framework of the IBM Domino Server. This will be implemented based on the procedure conducted for Workflow Modeler, which has already been installed in the OSGi Framework. Both design tools are already implemented in Java / Java Script and communicate with
the IBM Domino Server respectively the applications installed therein via web services. The GBS Servlet provides for this purpose an interface with a uniform appearance. Both GBS AppDesigner and Workflow Modeler only produce meta-data that are stored as IBM Notes documents in the Process Directory.

3.3 Dynamic form creation

It can be said for GBS AppDesigner in particular that no IBM Notes design elements are stored or modified in the user database. As soon as the basic libraries of the GBS AppDesigner framework are integrated into a database, no additional design modifications are made. If a user creates an application, this application is only described with meta-data that are interpreted and dynamically analyzed for the time during which it runs – meaning when an end user starts the application. Since subsequent applications are only used via a web interface, no performance problems arise.

This is the case because for (most) web applications, the interfaces are usually only interpreted and displayed while the execution.

![Diagram](image)

Figure 11 – Dynamic mask creation

The dynamic creation of a form based on meta-data allows for the flexible deployment of these tools on various platforms. On the one hand, this means that it can be used with IBM Domino, as well as on a Java EE application server. On the other hand, it is also possible to use the same data to create applications for mobile devices.

Figure 11 highlights how GBS AppDesigner creates XML files with the XForms format. XForms is a globally accepted standard for the creation and usage of web forms. Initially, only a generic XPage is needed in order to display a website using GBS AppDesigner. Depending on the target system, this may be a Java Server Page (JSP), or a standardized mobile app. Any customer or developer can
incorporate controls in this generic JSP/XPage, which are then available when the application runs. These controls may, for example, be graphic objects or controls with special access to external systems. As soon as the page is opened by the user, the XForms Parser retrieves the desired XForms XML file from the Process Directory and combines the design element descriptions it contains with the controls with which the corresponding user server is familiar. In an IBM Domino context, these are Dojo controls, for iOS, they are HTML-5 controls. The respective server can then use these controls and display them in the dynamically created form.

3.4 Connecting a form with a workflow

The ability to create forms is a basic requirement of a web application. Thus the GBS AppDesigner allows the creation of web forms with a web based in form editor. Documents created using a form are later opened from views. An application is completed when it is equipped with its own views and forms. When these forms are used in a corporation, they are components of very individual approval processes. Each form can also be connected to a workflow task. Forms with a workflow connection also automatically receive their own control bar and specific actions. It is additionally possible to use customized controls.

![Figure 12 - Workflow Controls / Sections of a GBS AppDesigner mask](image)

In addition to buttons for the completion of a task and a preview of the graphic process definition, a form assigned to a workflow also contains its own section (sub form in the realm of IBM notes). It displays the recent task within the workflow definition (progress bar) and contains additional tabs. These tabs contain details about the task in the workflow, its processes, or options that for example allow reserving a task for the current user (view Figure 12).
As soon as a form is incorporated into a workflow, the Process Engine contained in the core is activated and retrieves all process information from the Process Directory, in which the XForms forms are managed as well. The necessary editors are determined based on the workflow definition in the GBS Organization Directory. In certain customer scenarios, the Domino Directory of IBM Notes/Domino can alternatively be used.

The use of the Organization Directory is mandatory in the environment of a Java EE Server. Independent of the technological foundation, each directory has the option of synchronizing content with the primary directory on the server. In IBM Notes/Domino, this is the Domino Directory, in Java EE it is any LDAP-enabled directory, which means that the Domino Directory of the IBM Domino Server can also be used.

### 3.5 Additional modules

<table>
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<tr>
<th>Clients</th>
<th>Lotus Notes</th>
<th>Web Browser</th>
<th>Mobile Devices &amp; Tablets</th>
<th>Outlook</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modules</td>
<td>Workflow</td>
<td>Migration</td>
<td>SDK</td>
<td></td>
</tr>
<tr>
<td>GBS</td>
<td>Security</td>
<td>Workflow Modeling</td>
<td>Data Persistence</td>
<td></td>
</tr>
<tr>
<td>AppDesigner</td>
<td>Deployment</td>
<td>Form Design</td>
<td>Social Platforms</td>
<td></td>
</tr>
<tr>
<td>Framework</td>
<td>Organization Directory</td>
<td>Organization Modeling</td>
<td>Mobile Devices</td>
<td></td>
</tr>
<tr>
<td>Data</td>
<td>IBM Notes nsf</td>
<td>Relational: IBM DB2, MySQL, Derby, MS SQL, ...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Application / Social Platform Server</td>
<td>IBM Connections</td>
<td>IBM Domino</td>
<td>IBM WebSphere, JBoss, Java EE</td>
<td>Microsoft SharePoint</td>
</tr>
</tbody>
</table>

*Figure 13 – Overview of the whole architecture*

Opposed to the described modules, Figure 13 lists additional modules, tools and connectors for the integration with other platforms. This also includes a graphics tool, with which organizational structures can be managed effortlessly. In respect to Java EE servers, the topic of security is solved with an individual module that is closely linked to the Process Engine and the Organization Directory. In IBM Notes/Domino, the standard function of this platform can be used for this purpose.
4 Examples of application

The following examples show simple, but important business applications, which can contribute significantly to the optimization of processes and cost savings. All examples can be implemented in a short amount of time and are thus quickly available for the use in businesses.

■ Internal Organization
  □ Management and requests of
    ▪ Memberships in organizations with expiration control
    ▪ BahnCards, credit cards, cellular phones, business cards
    ▪ Special office equipment
    ▪ Reception of special benefits
    ▪ Building keys / access control
  □ Company-wide suggestion systems
  □ Pin boards/swap meets
  □ Business orders & process descriptions

■ IT management and requests of
  □ Password and access keys
  □ Certificates (Software signing) and encryption
  □ Software (SaaS, security software, web conferences)

■ Controlling
  □ Leasing agreements with expiration control
  □ License management

■ Customer service
  □ Surveys / feedback
  □ Complaints
  □ FAQs/support
  □ Registration – event management
5 Conclusion

GBS AppDesigner is a solution that not only simplifies and accelerates the creation and provision of applications in a comprehensive manner, but can also be understood as part of a comprehensive modernization strategy. The platform-independent approach is the backbone of a wide range of applications. Applications that were static until now, meaning that they were closely linked to a PC in the workplace, can be made more agile and flexible with GBS AppDesigner. The use of modern, standardized web technologies ensures that these applications can be used in various ways on mobile devices and in any browser.

Thanks to its intuitive interface and integrated workflow mechanisms, GBS AppDesigner enables specialized departments to create applications for frequently recurring tasks, completely without requiring any programming knowledge and in a fraction of the time needed by traditional development methods.

Corporations are thus able to optimize processes and to increase the value of collaborative and social business platforms. The previous lack of integration at the user level found in platforms of this type is now remedied quickly and simply with GBS AppDesigner.
About GBS

GROUP Business Software is a leading supplier of solutions and services for the IBM and Microsoft collaboration platforms. With the Competence Centers Security, Modernization, Mobility and Portal & BPM, GBS enables its customers to manage the challenges of today and tomorrow faster, easier and more efficiently. Over 5,000 customers and more than 4 million users worldwide trust in GBS expertise. The company operates in Europe, North America and Asia. The European headquarters is located in Frankfurt/Germany, and the North American headquarters is based in Atlanta.

Further information at www.gbs.com

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