convertiGo

The definitive guide for Low Code & No Code Mobile and Web Application Development

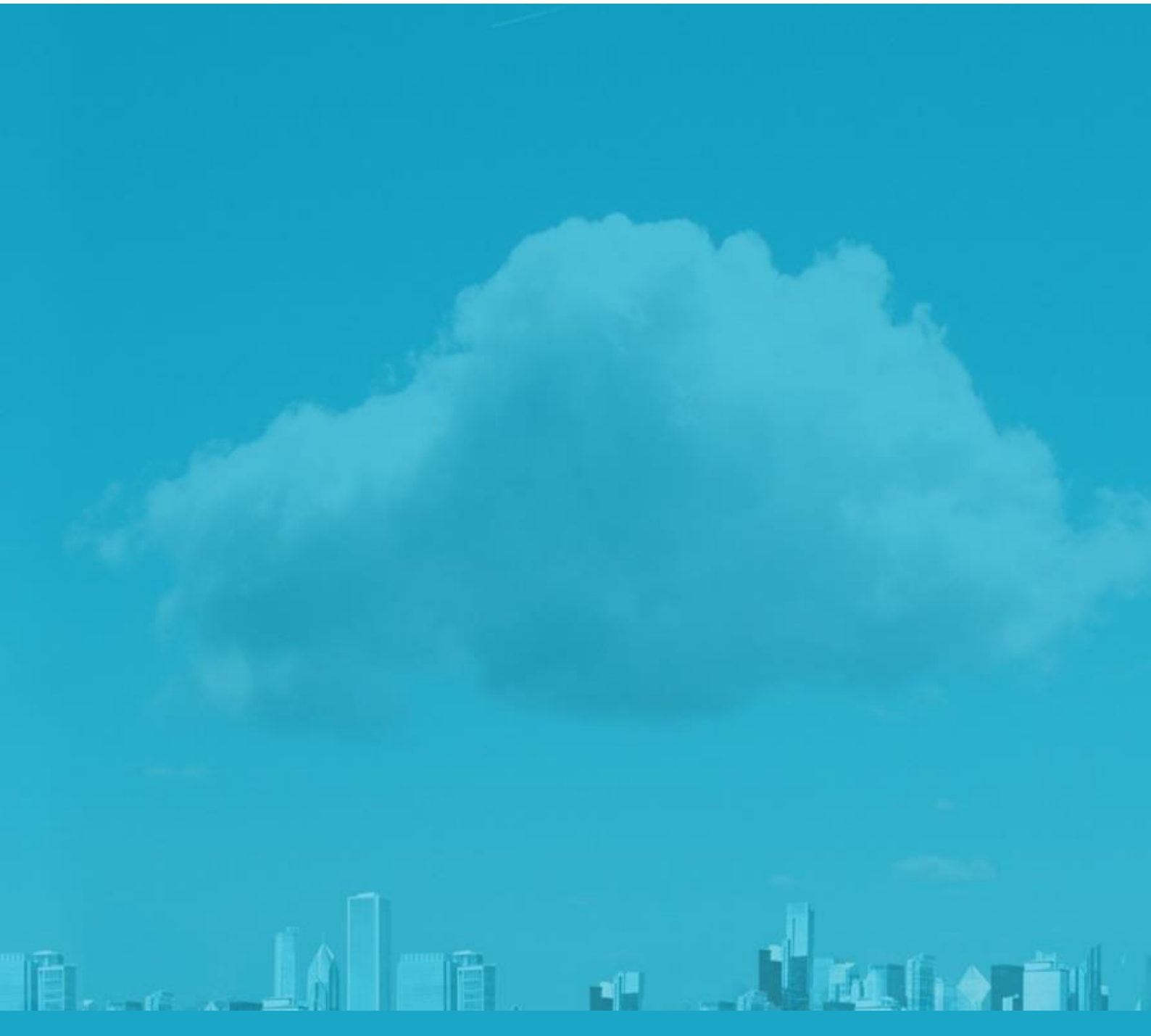


Table of contents

New devices, new usages, new business requirements… Enterprise IT teams are facing constant new challenges to design, develop, deploy, distribute and manage a portfolio of numerous B2E or B2C mobile and web applications!

Such complex and moving context makes specific developments hazardous, expensive and time consuming.

In most Enterprises, CIOs are facing Line of Businesses always asking for new applications and usages, while they must preserve his global information system architecture's integrity and security.

Automated production 100% dedicated to mobility allows speedy developments and instant ROI, especially when it comes to launching or managing numerous apps. Mutualized developments using prebuilt components, processes, tests and templates ensure cost effective and reliable production and reduce time to market for new mobile applications and frequent updates.

Low Code Development Platforms industrializes new mobile & Web applications production or transforms existing enterprise business applications. It ensures that customers have the appropriate enterprise grade security, governance and performances and delivers standardized rich user experience leveraging any device features.

Introduction to Low-Code

Quite unknown a few years ago in the world of web and mobile development, the Low-code is gaining ground and aims to be a major player in the development world in the coming years.

But some may still ask the (legitimate) question of : What is "Low-Code" ?

It is a way to develop and design software applications faster and simpler, significantly reducing the amount of code to write yourself. Several positive points about this new system: It allows experienced developers to increase their performance by not neglecting the quality of their productions and allows "beginners" developers to create applications more simply and intuitively. Indeed, by using visual modeling through a graphical interface, configuring and building applications has never been more accessible.

To take a slightly more explicit example, let's take the building case, we can build brick by brick or in a more efficient way using standard components, but nevertheless customizable. All within automated processes, allowing a shorter delivery time for the products, without altering their quality.

Low-code platforms allow you to avoid repetitive tasks, to focus on the key parts of your application, and increase your productivity. In addition, they rely on standard market technologies, which has two advantages. On the one hand, it allows you to rely on standard components, on the other hand, it allows you to create components for specific needs tailored to your business.

Low Code: What is it exactly ?

Many developers in the software world rely on different libraries, Api's that will allow them to focus on THE added value they can bring to the application.

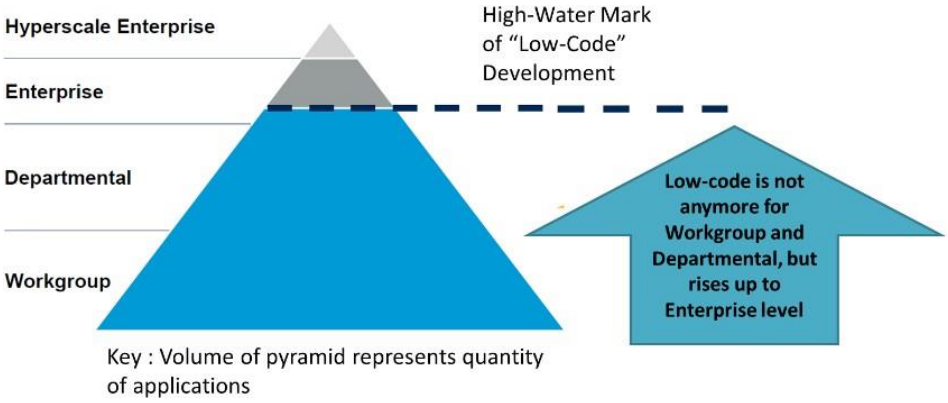
Low-code will allow these developers to offer tools that help them visually build complete applications, using the "drag and drop" method, which will allow a better overall vision of the application's construction and a time's optimization, thus reducing considerably the number of lines of code to be written. That means being more productive while having an equally optimal quality.

Low-code development platforms can be divided into 3 main areas:

- First, there is a visual development environment, where we will be able to define the user interface thanks to drag and drop, to be able to add actions, animations. This is what will create the base of the application, both visually and functionally. It is even possible to add your own hand-code to add custom features

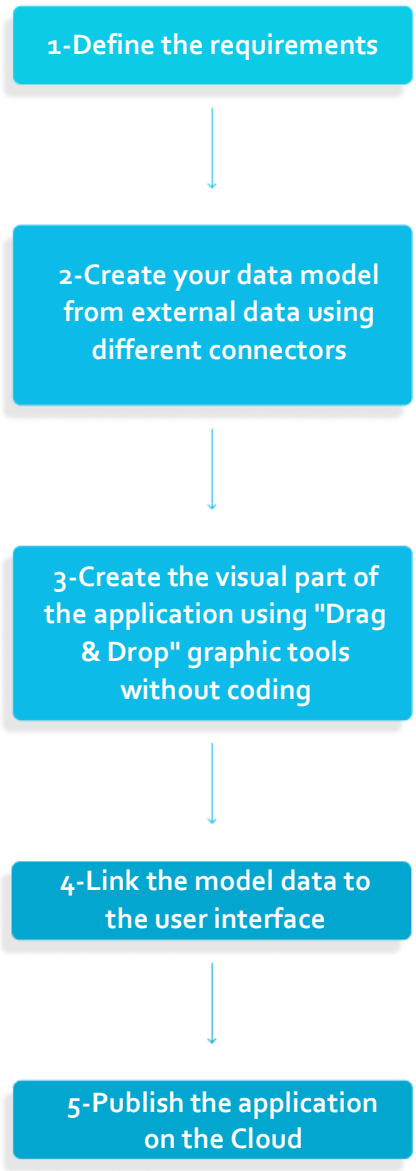
- Then there are the connectors that allow us to extract data from scattered sources. The Convertigo platform has many such as SAP, Web Services, Nosql, Salesforce, Twitter, Linkedin and Office365, and others...

- Finally, there are automated tools that will build the application, dump it, maintain his organization, test the final version for the user, etc...



Classic Code versus Low-Code

LOW-CODE DEVELOPMENT :



Introduction to No Code

Nowadays, enterprises are seeking to digitalize their process easily and quickly, but they don't necessarily have qualified employees to achieve that.

Based on these observations, a new app development model has been built:

No-Code applications development platforms.

These platforms are useful to create small apps without coding even one line. That means that no technical skills are required to use it. Obviously, a No-Code platform has limited capabilities compared to a Low-Code platform or classic development, even if more and more complete No-Code platforms are emerging.

Moreover, these platforms simplify the digitalization process of an enterprise due to the simple and intuitive understanding of the tools, that permit to a "citizen developer" to use it.

But what can we concretely do with these platforms?

No-code platforms principally provide:

- Forms
- Web Apps

No-Code platforms principally use Drag&Drop components to build your application visually, an easy UI creation.

No-Code tools are very trendy for a few years now to increase enterprises productions by creating applications faster, easier and cheaper.

However, No-Code platforms must be able to integrate into enterprise data security standards.

Architecture of a Low Code Platform

A low code application platform (LCAP) differs from a simple application development

tool by providing all the components needed to build, run, manage and connect mobile applications to the existing Enterprise Information system.

A LCAP should include the following capabilities:

- back end connectors to enable mobile apps to connect to the enterprise databases and business applications.
- service orchestrator to enable back end data to be aggregated, filtered and combined to provide a mobile friendly service API. The orchestrator can also augment existing backend application with mobile specific capabilities such as push notifications or locator services.
- Cross platform UI development tools to build mobile user interfaces able to run on multiple devices operating systems such as Apple iOS, Google Android or PWAs (Progressive Web Apps)

More advanced Mobile application development platforms provide additional features such as:

- Cache Manager to cache on the server side some data avoiding getting it each time from the backend connectors.
- Identity manager to be able to authenticate mobile users and to check their rights from an Enterprise user management system or from an identity federation.
- Offline data synchronization enabling mobile users work on local data when the network is not available and still be able to sync back this data to the backend systems when the network is restored.
- Security managers to encrypt sensible data on the network or on the mobile device.
- Mobile application SDKs to be able to integrate other third-party mobile UI development tools
- Integration with Analytics engines to provide insights for line of businesses, system administrators and mobile developers.
- Audit management to provide security officers to track back any mobile transaction made on the enterprise information system.

Convertigo Low Code Platform is the first open source mobile platform to provide a complete "FullStack" combined end to end from backend enablement to mobile and WEB UI development tools.

The platform is composed of several components, the Convertigo Server, Studio and Third-party SDKs.

Design and build Mobile services

Any enterprise application needs services to interact with the enterprise data. Services are usually built on top of existing backend services provided by ESBs or other SOA based architecture or can be developed from scratch using the Convertigo NoSQL backend storage engine.

A mobile application running on a device will interact with mobile services using standard protocols based on HTTP/HTTPS JSON or XML format.

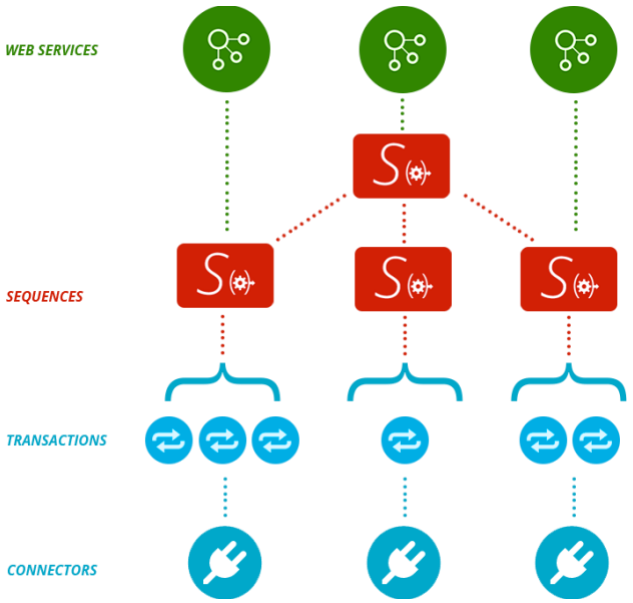
Services can be defined from a bottom up approach (Where the service model is defined by the service developer) or from a top/down approach where the service model is defined by the Mobile UI developer.

A very common situation is that existing Enterprise services are not designed for mobility or web design, or even not designed for the mobile business rules.

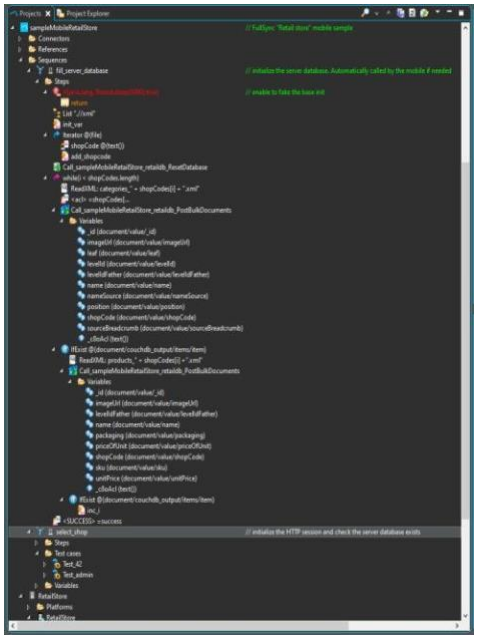
Convertigo Platform components addresses these requirementswith:

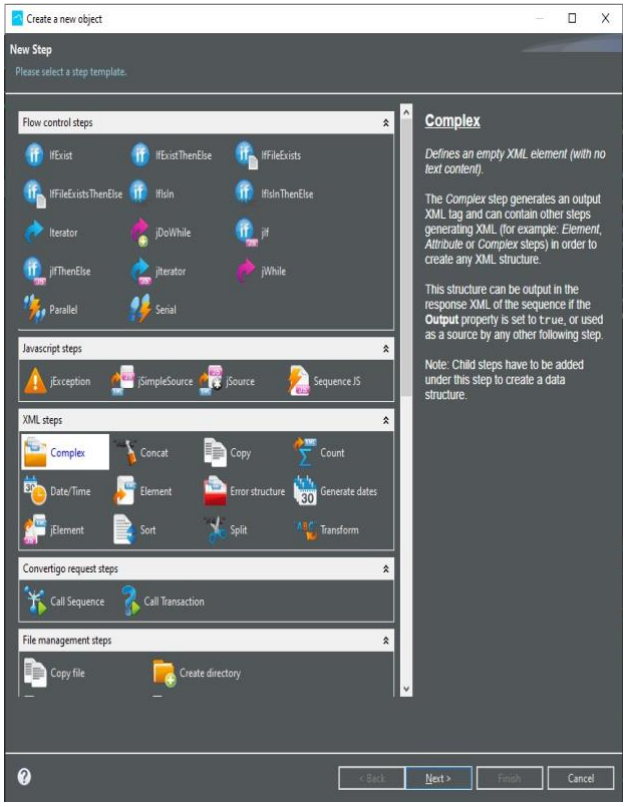
- Protocol transformation enabling transformation of existing internal services including SOAP, SAP BAPIs, REST/XML, SQL, NoSQL to mobile friendly REST/JSON mobile services.
- Data filtering to expose only needed data model to mobile devices from existing "heavy" internal services
- Business logic augmentation to enhance existing internal services for mobile processes, or to build from scratch new mobile services directly from a SQL or NoSQL data repository.

Convertigo mobile services are built using a very powerful concept called "Sequences", basically defining all the "Steps"needed to get the data, transform it, handle itwith business rules and return it to the mobiledevice.



Building Sequences does not require programming in a specific language and is simply based on Low Code object configuration using the Convertigo Studio GUI.





Convertigo uses a library of predefined Steps to handle most of the requirements for backend service programming

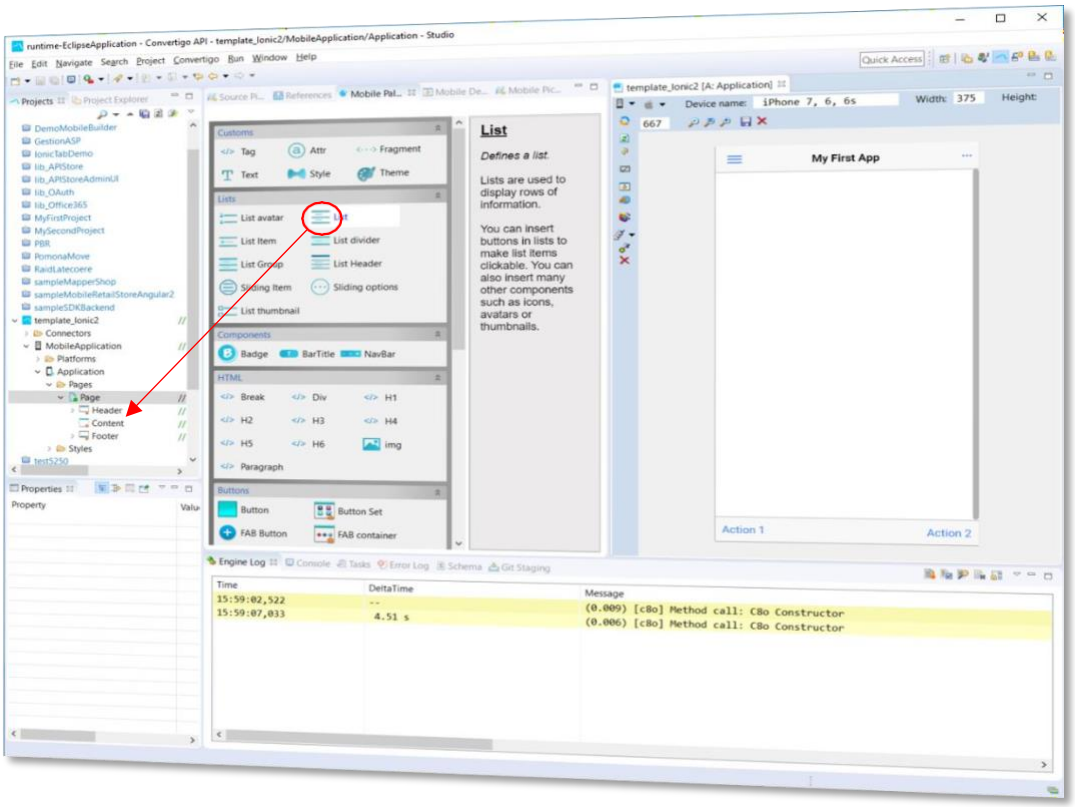
Sequences can also be enhanced by using Special "Javascript" Steps able to perform complex business logic. These steps can even call some custom Java classes.

With all these capabilities, the mobile service developer using Sequences, will develop the services significantly faster and will reduce maintenance costs compared to classic programming using PHP, Java or C#.

Convertigo Low Code studio

Convertigo Platform features amodule bringing Low Code Front End capabilities to Convertigo Studio.

Convertigo Low Code studio uses a graphical user interface builder able to build, in a few minutes, ready-to-deploy applications leveraging the full power of Convertigo backend.



This studio module brings a "Application" object in project tree under the "MobileApplication" object.

This object is representing the graphical UI displayed on the right pane.

To build an application, the user just drags & drops mobile components from the mobile palette to the correct location in the Application tree.

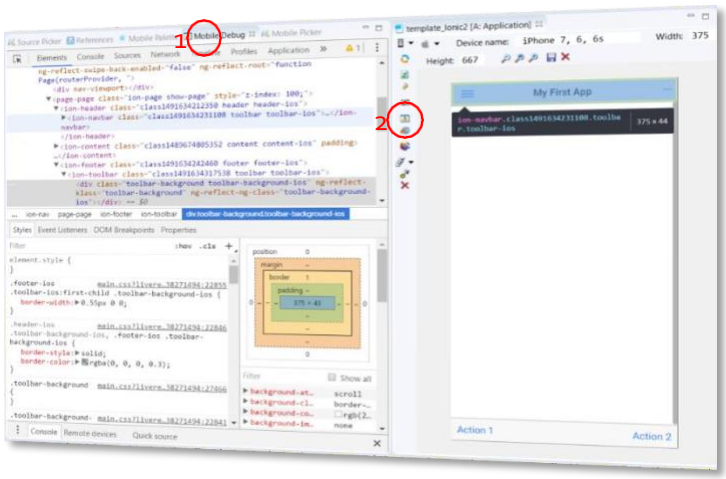
The right pane will automatically reflect the changes in real time showing the user what the app will look like.

Convertigo Low Code studio includes a 100%visual debugger able to monitor and debugyour mobile apps.

This debugger has roughly the same features and usage than the Google Chrome debugger.

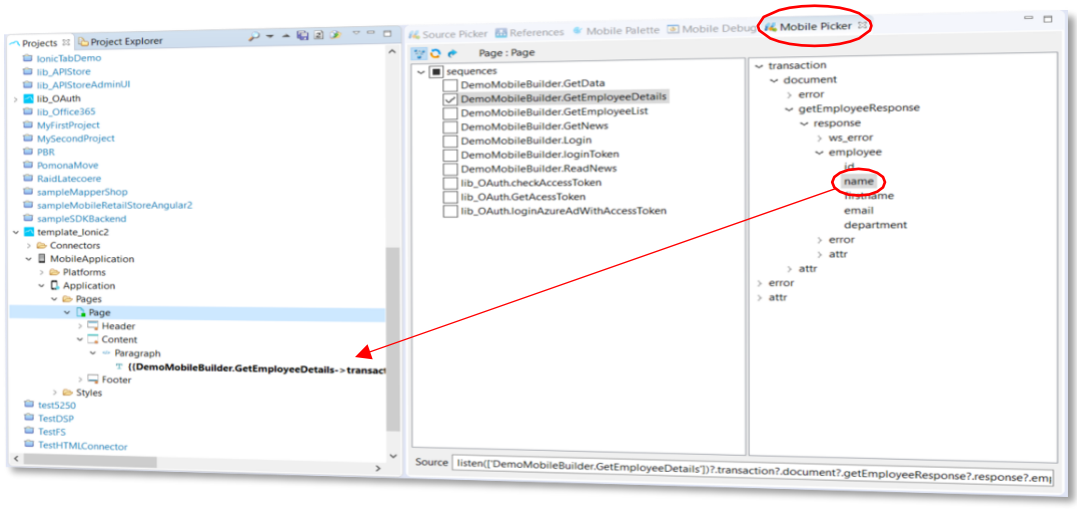
To activate it, just click on the mobile debug tab (1) and click the debugger icon (2)

The tool can be used to adjust styles, margins, and components placements precisely. Therefore, unlike other Low-Code Front-end platforms, Convertigo can beused to create tailored applications.

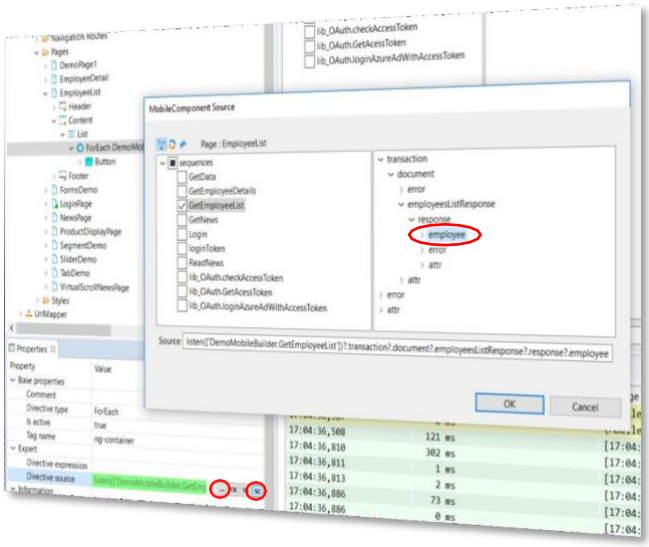


Data binding makes mobile applications able to display data from the backend services. With Convertigo this is done by a simple Drag & Drop!

Data can be linked inbound and outbound without writing any line of code.
This can be done by using the "Mobile Picker" tool. This picker displays all the Sequences available for your project and for each of these Sequence the data model returned.



Collection binding will make all the mobile components repeated for each data occurrence. This is useful to display a list of items.



Sometimes, Sequence returned data must be bound to a collection. For example, when you want to display a list of items.

Use the "ForEach" Directive Component by drag & dropping it in a mobile "list" component. Then, configure the "Directive source" property by clicking the "SC" toggle and the "..." button.

Finally, select the target Sequence and the recurring data field and click "ok"

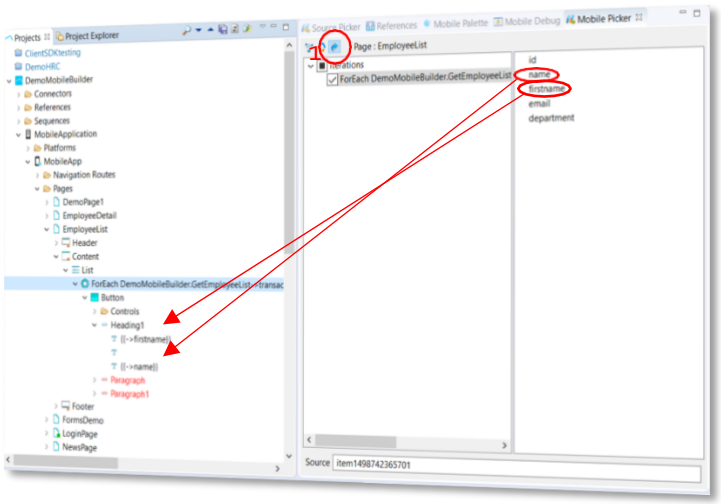
In this example, the "Button" component will be repeated for each "employee".

Bind data from each occurrence of a collection in a few clicks!

Most of the time, each occurrence of an item should display some data from this occurrence. Binding data from the collection directive will enable lists to do so.

Use the mobile picker in "collection" mode by clicking the "Iterator" (1) button. This will display all the collection iterators in your page.

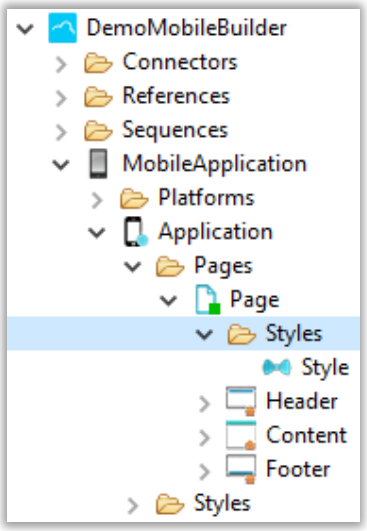
Then, select the collection you want and the field you want in the collection and simply drag & drop it to one of your mobile components in the list.

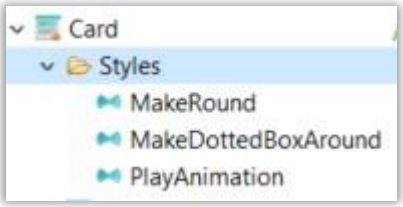


Convertigo Low Code studio applications can beeasily styled as they are based on the powerful Ionic framework.

You can use the "Style" component to apply styles to a specific mobile component, globally to a whole page or even more globally to the entire app!

Dragging & Dropping the "Style" component from the mobile palette on the project "Application" component will create a style for the whole app.



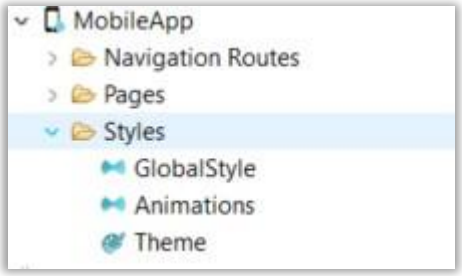


In the same way, dropping it on a component will only apply style to this component.

And dropping it on a page will apply style to the whole page.

Double clicking on a style will open the Style editor where you can write some CSS compliant directives.

The style editor supports CSS typing completion to assist you writing style directives



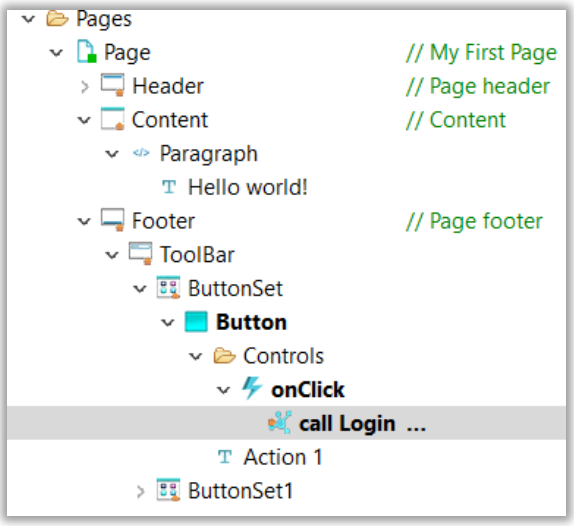
You can also use the Theme component to apply a Color theme to your app by dragging & dropping it from the mobile palette on the "Application" component in the project tree view.

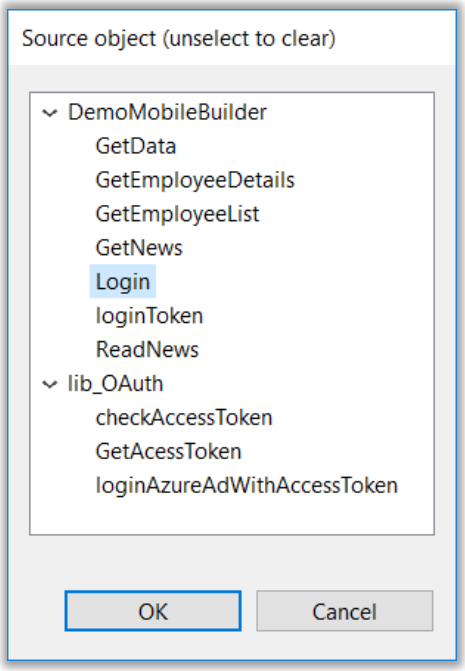
Themes can be edited by double-clicking on them.

Any mobile component can handle events. Just drag & drop the "event" component from the mobile palette to a component in the project tree view. The event will be placed in the "control" folder

Events can be "onClick", "onSwipe" or any of the standard Ionic events defined in the framework.

Then, to execute an action when the event is triggered just drag & drop an action component such as "CallSequence" or "CustomAction" on the event





One of the most common actions is to call a Sequence when an event occurs. Use the "CallSequence" action component to do this.

Configure the "target" property of this component to choose the sequence to be called when the event is triggered.

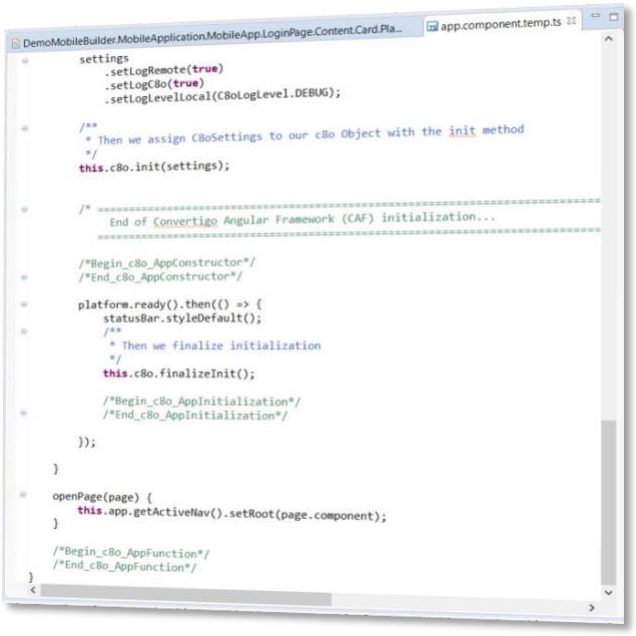
You can also use the "onSubmit" event to handle a form submission. In this case, drag & drop the event "form" component in the project tree.

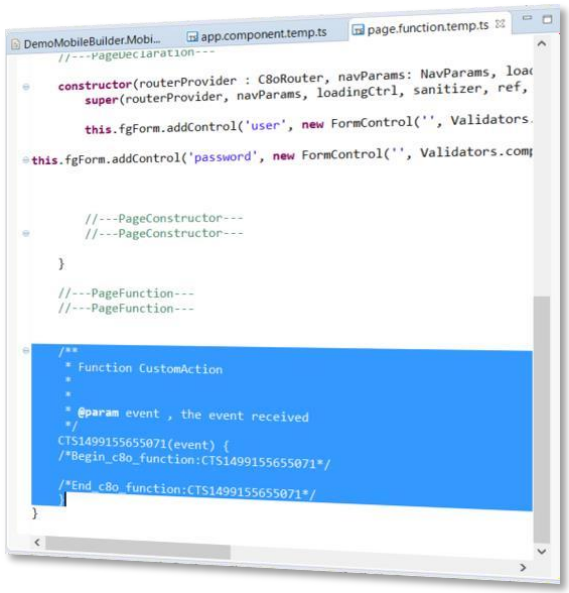
Although Low-Code Front end technology helps in writing mobile applications in a few clicks, you might want to write your own custom code to perform some bespoke processing in your app.

Convertigo enables this by letting you write some TypeScript code at theapplication level or at a specific page level.

To write code at the application level, right-click on the application object and select the "Edit application class" menu.

In the same way, right click on a page component and select "Edit page class" will let you edit code in a page class.





Write your TypeScript code between the /* begin_c8oXXX */ and the /* end_c8oXXX */ comments. This code will be saved in the application or the page component.

Convertigo Low Code studio TypeScript editorsupports syntax coloring and code assist completion.

You can also write TypeScript custom code for a "CustomAction" component. To do this, drag & drop the "CustomAction" component on an "Event" component. Then, double click on the Custom action to open the Custom action editor.

Publish Back End Services

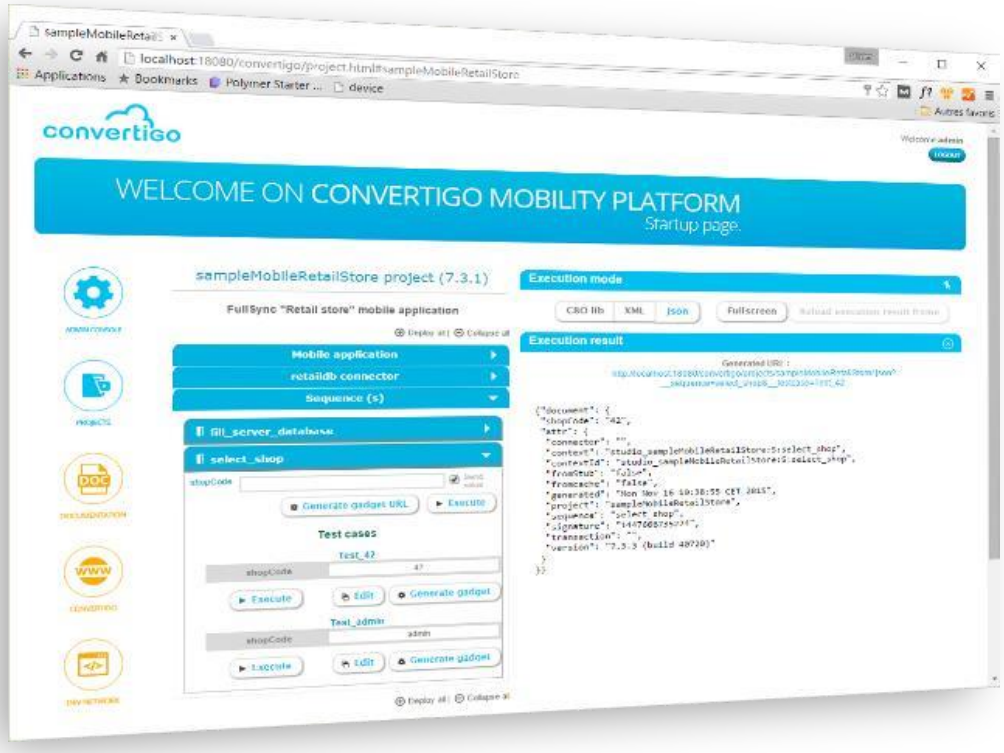
Once the services are developed, they can be deployed on Q&A or Production servers in a simple click. All the service definitions will be packaged as a .CAR file and deployed on the server.

Mobile developers and testers will be able to access the services through the Convertigo test platform portal.

This portal enables users to browse the different projects and services, read documentation about them, and test a service using the built-in Convertigo test cases. The portal will show a service result in JSON or XML format.

A mobile service can be published in 3 modes:

- Private will make this service only available to other services running on the platform. Mobile applications will not be able to call this service.
- Hidden will make this available to the mobile apps but not visible in the test platform portal.
- Public will make the service available for mobile apps and visible in the test platform portal.



Connecting to backend data

Although applications can use newly created databases, in most cases, Enterprises already has some data in existing databases or backend applications. The goal of a platform is to be able to access data via the standard protocols so that mobile users can work on it, display it and modifying it.

One gold rule in system architecture is that data should never be modified directly on databases but always through the service layer (when they are available) executing business rules.

Convertigo Low Code platform can create back-ends or connect to any existing Enterprise backend through its large set of connectors. Most of these connectors will access the services layer of backend applications but the platform can also access data layers directly if needed.

Service layer connectors are:

- SOAP 1.1/1.2 connector to connect to any existing SOAP web service provided by an ESB or any other Web Service provider. Convertigo SOAP supports WSDL import and will generate automatically in the Studio all the transactions and schemas for a given web service. Convertigo SOAP connector also supports MTOM attachments to exchange data with ECMs.
- REST jSON/XML connector to connect and exchange data with any REST web service in jSON or XML format. Convertigo REST connectors supports oAuth authentication and can import a REST web service definition in YAML format to generate automatically in the Studio all the transactions and schemas for a given web service.
- SAP BAPI connector will allow Convertigo to exchange data directly with any SAP NetWeaver system including SAP ERPs (ECC 6.x). Convertigo features a BAPI browser able to search in an SAP system the needed BAPIs and to import them in one click in Convertigo Studio. When imported, it will create automatically SAP transactions with all the needed schema data models.

Data layer connectors are:

- SQL data sources to connect to any SQL based database. Convertigo supports any database as long as they provide a JDBC driver. By default, the platform is shipped with MariaDB (MySQL), DB2, DB2/400, and SQL server drivers, but any other JDBC driver can be also configured.

  Data access can be done directly through JDBC or by using the application server's JNDI data sources. Of course, Convertigo may access SQL stored procedures to execute business logic in the databases.

- NoSQL databases connector can be used to read and write data from these BigData document-oriented databases. Convertigo supports Apache CouchDB NoSQL databases.

- Plain Files can be also used as data sources. Convertigo supports CSV, XML and Excel files.

- RSS/ATOM/OData feeds can also be accessed through Convertigo HTTP connector.

RPA Connectors

This is the real world! Enterprises are still using legacy systems to run some precious business applications. Even if system architects plan to get rid of them, these applications are still in the landscape and must take part to of the digital Enterprise.

Rewriting these applications in modern languages to have them exchange data in today's standard protocols would be overpriced.

Convertigo Low Code Platform addresses this need by providing two exclusive connectors:

- Javelin connector enables the platform to connect to any legacy IBM AS/400, iSeries system and exchange data using the TN5250 protocols through the application's user interface. This way, all the data read or modified in the legacy app is done through the app's existing business logic preserving data integrity and business rules.

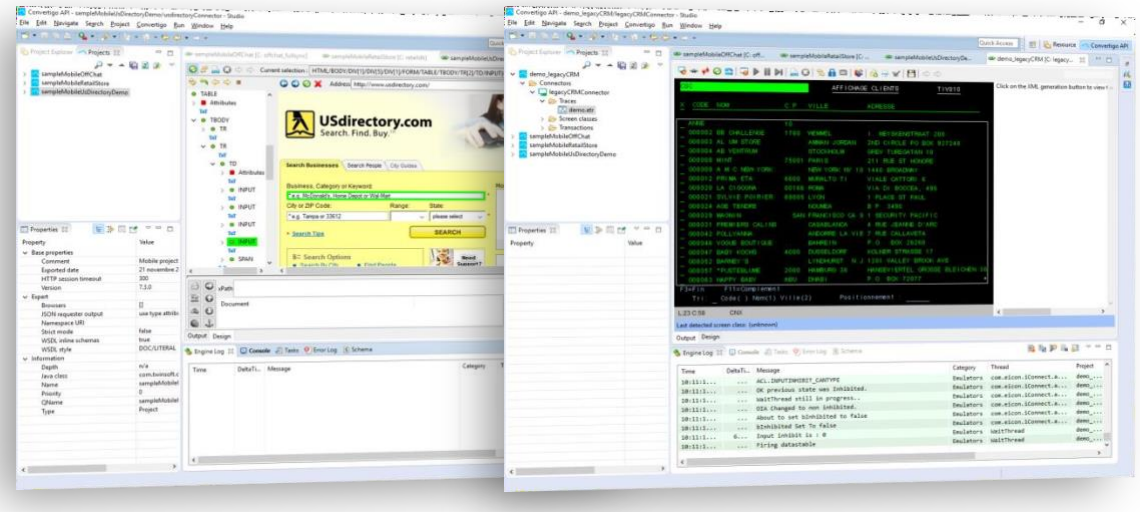
  Javelin connector also supports in the same way IBM z/OS Mainframe systems accessing apps using the TN3270E protocols.

- Web HTML connector can connect to any existing web-based application and to exchange data through its WEB UI. The platform uses a powerful parsing engine based on Mozilla's XUL technology to parse and execute web pages code to generate a normalized DOM (Document Object Model).This way, extracting data from the page is easy using the built-in out of the box extraction rules.

  The connector is also able to interact with the web UI by clicking on buttons, filling text fields and submitting forms to push data back to the target web application.

These two connectors are completely integrated in Convertigo Studio and can be programmed by using a visual point and click interface.

This way, the platform can "mobilize" any existing Legacy or Web UI application seamlessly without changing one line of code!



App Security

As by definition, mobility implies that some enterprise data will be brought out of the Enterprises; an Enterprise Platform must have security capabilities to secure dataand processes.

These capabilities are:

- User authentication to be sure to know who is the user accessing the enterprise data.
- Access control to control what part of the data should be seen for this particular mobile user.
- Protocol encryption to prevent network spies to read data coming or going to the mobile devices
- Mobile device data encryption to prevent attackers to read data on devices if they are lost or stolen.

Convertigo Low Code Platform brings to developers out of the box components to handle these capabilities:

- User authentication is supported by using a local user database or LDAP as most Enterprises will prefer to use their own identity servers such as Active Directory or any LDAP based server. Convertigo can also use federated identity frameworks providing SSO services such as SAML or oAuth.

- Access control is done by creating a security context before any other mobile service can be used. This security context will be established with a "login" service checking the mobile user identity and deciding if or not he is entitled to open the security context.

- Protocol encryption is based on TLS 1.2 encryption and supports client and server certificates.
- Identity manager to handle for one unique mobile identity several different credentials to access back end system.
- Mobile SDKs provides to mobile developers all the necessary toolbox to encrypt and decrypt data from local databases.

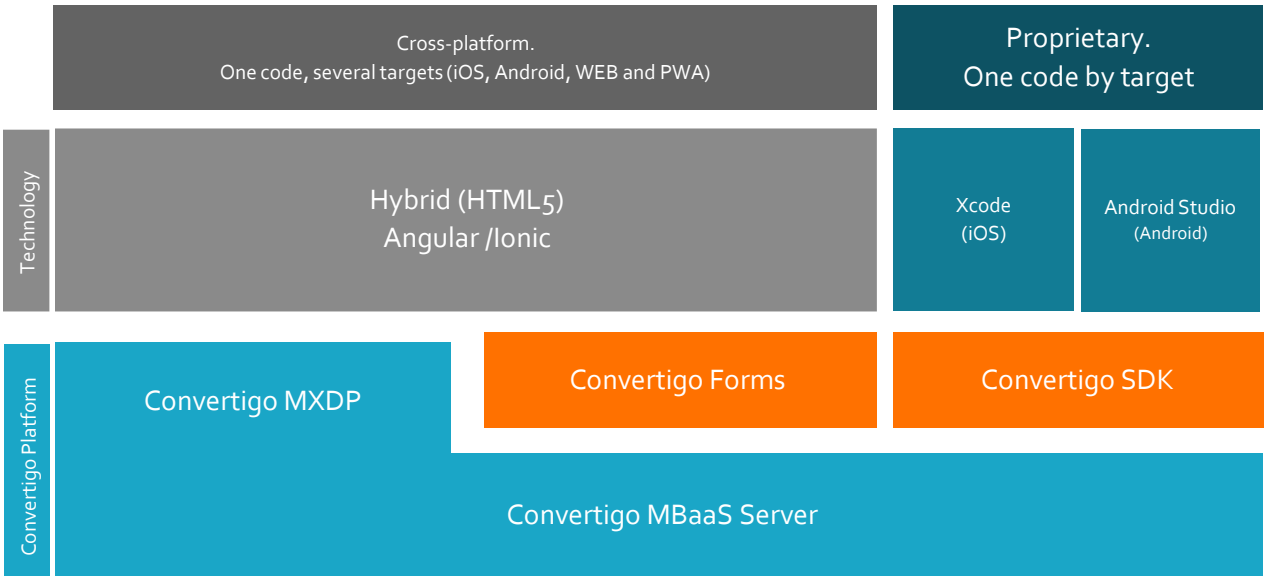
Design and build Mobile & Web UIs

An Enterprise mobile platform needs to include tools to design and build mobile user interfaces (UI). There are several technologies available today to build such mobile UI applications:

- Native apps are coded using the native language to a platform. For example, Objective C or Swift for iOS, Java/kotlin for Android.
- Hybrid apps are using HTML5 technology to provide user interfaces mixed with some platform native code providing access to specific mobile capabilities such as GPS, Sensors, Camera, Phonebook or network.

Convertigo platform supports all these technologies providing an outstanding openness for building mobile UI apps.

Comparing different mobile UI development technologies and Integration with Convertigo Low Code Platform



Convertigo has in its built-in MXDP (Multi eXperience Development Platform) a complete Hybrid engine based on Apache Cordova supporting iOS, Android, WEB and PWAs (Progressive Web Apps)

- Mobile UIs built with Convertigo Hybrid engine can leverage the complete Cordova plugin library and be integrated with the latest UI frameworks such as AngularJS or Polymer.
- Convertigo Hybrid engine also comes with an out of the box UI framework extending Angular with a strong data binding framework called CAF (Convertigo Angular Framework) . CAF is much simpler to use than other frameworks, providing a fast learning curve to developers.
- Flash Update makes it possible to update applications on devices without having to rebuild them and to deploy them. Each time an app is started on the device its version is compared to the server version and a differential update occurs if needed.
- Convertigo Studio IDE will help the UI Programmers by providing Low Code UI Drag & Drop and Automatic Angular / Ionic Code generation
- Convertigo Hybrid Engine supports cloud build (building UI apps remotely on the cloud) or local build (Building with locally installed Cordova SDKs).

- Convertigo Hybrid apps can benefit from all the backend services provided by Convertigo, including all the offline data capabilities.

Convertigo also supports Native apps by providing a Client SDK. This SDK is available for iOS, Android and .NET. Convertigo Client SDK is also available for Xamarin cross compiler technologies. Convertigo Client SDK provides these capabilities:

- iOS, Android native mobile apps can use Objective C or Swift programming language(iOS), Java / Kotlin / flutter (Android) to call data services from Convertigo. They will benefit from all the back end mobile services including offline data.

- Convertigo SDK is fully integrated in in Xcode as a Framework via CocoaPods and in Android Studio as a Gradle dependency

Offline data capabilities

One of the greatest challenges for mobiles apps is that they must be able to work with data even if there is no network. We call this offline data.

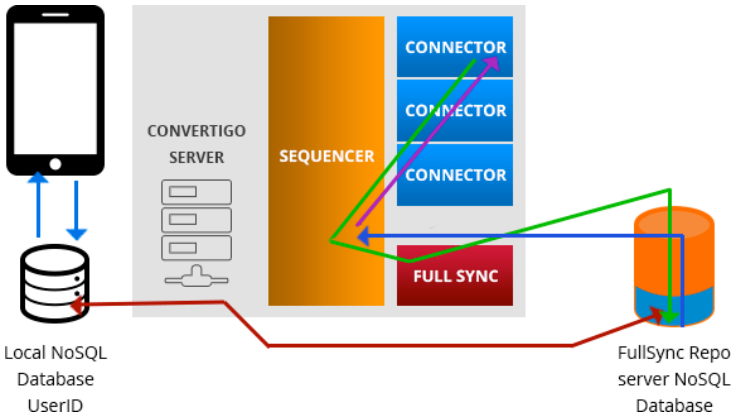
Platforms must provide mechanisms to provide out of the box offline data capabilities to applications developed with the platform. This way any mobile app will inherit these capabilities without requiring a strong development effort.

Convertigo Platform providespowerful offline capabilities with two features:

- Local cache is automatically caching server data in a local mobile database. The programmer can define the time to live and the cache policy (Server first or Local database first)
- FullSync provides a complete synchronization process between data on the mobile device and data in the back-end services. FullSync enables scenarios where the mobile user can read and write business data even when the network is not available. As soon as the network is brought back the data sync process will occur and the local modified data will be updated on the backend side seamlessly.

FullSync technology is based on NoSQL databases on the mobile client side and on the server side. The databases can sync differentially by transferring only changed data since a previous sync.

They can also have a continuous sync mode so that data is synced in real time as long as the network is available.



1. **Sequence** pulls data out from the back end from a back-end connector, and pushes it to a Full Sync database tagged with a target UserID
2. **Data gets replicated** to the mobile devices only for this UserID
3. **User Interacts locally** with the mobile NoSQL database
4. **Any modifications are replicated back** to the Full Sync database
5. **Data modifications in Full Sync database triggers** update sequences to the backend

Large file transfer for offline mode

In many mobile processes occurring for example in manufacturing, Enterprises are facing usage of large files on their mobile devices. These files can be documents such as PDFs or even some media files such as MPEG videos.

In an Offline mode, users still want to use these files and of course streaming will not be possible. Therefore these files must be transferred on the mobile devices easily so that they can be used offline.

Convertigo Platform addresses thisneed by providing a powerful file Transfer mechanism based on FullSync technology.

Basically, Convertigo can get a file from any ECM (Enterprise Control Manager) and transfer it to one or several mobile devices. The transfer is done in chunks so that if a file is not transferred totally when the network breaks, only non-transferred contents will be retransmitted. File transfers are done as backgrounds tasks as long as the Mobile Application is running.

Convertigo provides these capabilities out of the box as an SDK API that can be used on Android and iOS devices.

Push notifications

In the mobility space, push notifications are one of the most interesting features brought by mobile platforms such as iOS or Android.

With push notifications, mobile users can receive alerts and data even when the mobile device in sleep or locked mode. Push notifications can be received even if no mobile applications are running.

In most cases Push notifications are based on Device Tokens, a unique identifier generated by the Push provider and managed by a backend third party server.

They are several types of push notifications:

- APNS (Apple Push Notification Services) is a service of Apple Computer to push data to iOS devices.
- GCM (Google Cloud Messaging) is a service from Google to push data to multiple devices including Android Devices.
- Some proprietary in-app push services to push directly some data within an app.

Convertigo provides all the necessary components to handle APNS and GCM push notifications:

- Full Hybrid support for iOS and Android with a Cordova plugin to enable Mobile UI apps to receive APNS or GCM push notifications
- Server-Side Device token registry to manage APNS and GCM device tokens.
- An "agnostic" Push notification Step that can be used in any sequence to push data to mobile devices whatever the mobile platform they are running on (iOS, Android).

Globally, Convertigo provides out of the box push notification mechanisms to help developers to setup push notifications in their apps reducing development time and maintenance costs.

Deploying mobile applications

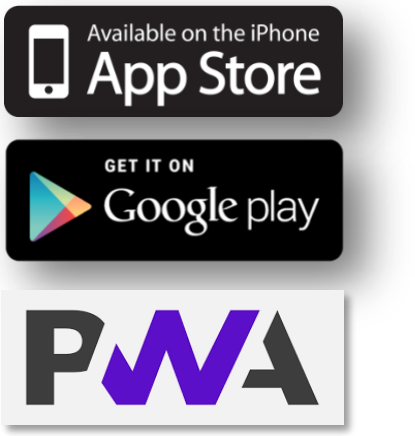
Having mobile applications developed is fine, but how can Enterprises deploy them to users?

They may be several categories of users described here:

- B2C users are the company consumer users, for example people using a mobile m-Commerce application or mobile travel application. These users will use the application from a public app store such as Apple's App Store, Google Play on their own devices.
- B2B users are the company partners. For example, insurance brokers or car dealers. This population will use the company apps on their own devices or on devices controlled by the company. They will install them from a public store as seen above or from the company private store.
- B2E users are the company employees. They can be blue collars such as warehouse managers or white collars such as any employee using an Enterprise HR mobile application. B2E users can use the company mobile apps on their own devices (BYOD) or use them on some special heavy-duty device. In most cases, apps will be installed from private stores.
- Testing panel users are using the apps in development phase before they are officially published to a store.

Convertigo Low Code Platform addresses these needs in several ways:

- Public Store compatibility enables all applications developed with the platform to be deployed on such app stores. Hybrid Cloud builds and local builds supports App signing for distribution or AdHoc deployments. The same with native builds.
- Private Store compatibility enables all Application developed to be deployed to most of the existing third-party private stores and MDMs (Mobile Device Management).
- PWAs. The Low Code platform supports Progressive Web apps, and these are the best way to deploy apps to enterprise users as no MDM or Store are required!



Continuous Integration

Modern software development should be based on agile methods and continuous integration (CI). CI makes it possible to develop software and having tests executed in continuous mode each time a developer commits code in the source repository. This if often called TDD (Test Driven Development)

An Enterprise mobile platform should provide CI capabilities and be integrated with SCM (Source Control Management).

Convertigo Platform is designed tobe integrated in such environments by providing the following capabilities:

- SCM integration with most of standard SCM systems such as GIT, SVN, TVS and many others. SCM integration is done through Eclipse Studio plugins. By default, Convertigo Studio is shipped with a pre- installed GIT support but any other SCM plugins can be installed.

  Convertigo projects are based on standard YAML files and other text-based resources so they can be easily committed to SCM repositories. There are no binary files required for Convertigo projects.

- Test cases provide for each mobile service a set of request input variables so that a service can be executed in a particular test case. Test cases are very useful for developers as they can easily test their Sequences. Test cases are also very useful for continuous integration as seen further on.

- Circle CI integration enables Convertigo projects to be completely integrated in continuous integration processes

GitHub Actions

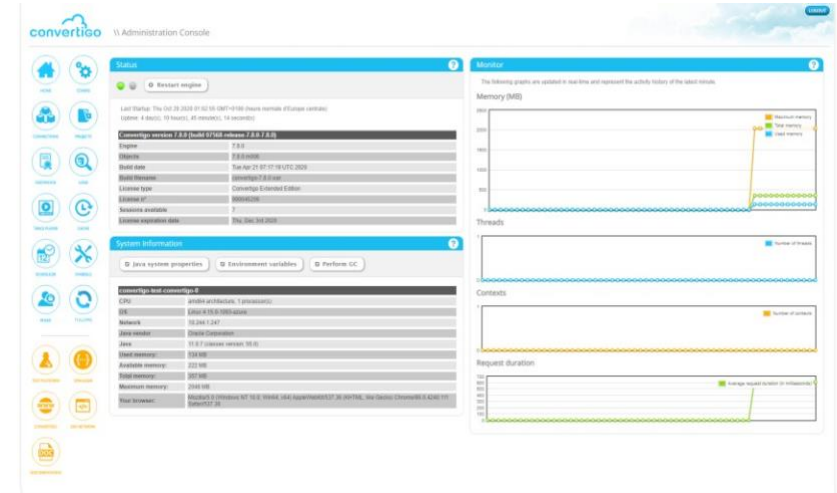
Configuration and monitoring

An Enterprise platform is not just a framework. Platforms must have configuration consoles, monitoring tools, log management and can be integrated in Enterprise's management systems.

This is why Convertigo Plaltform comes with a complete set of administrationtools and interfaces to provide the best manageability to system operators.

Convertigo console is a web-based application providing these capabilities:

- Server activity monitoring will show in real time the number of contexts open, the number of simultaneous requests passing through the server, and the average request duration. This givesin one glance a complete overview of a server's health.
- Configuration parameters will help the system operator to configure different platform's components such as logs, Proxys, Cache and many others. Most of these configuration parameters are taken in account in real time.
- Log manager will enable developers or system operators to browse logs, archive them, and even see these logs in real time mode. The log manager also has strong filtering capabilities enabling to filter out the traffic for a particular device for example.
- Certificate manager will enable sysops to manage all the SSL certificates used in Web Services and connectors. The Convertigo server supports clientand server certificates.
- Convertigo Scheduler is a built-in scheduler able to trigger any Sequence at a given time. This component provides a key capability for most of mobile processes, especially for loading FullSync database from backend Data.
- Symbols Management is a very useful capability able to define symbols used by projects for specific environment configurations such as Q&A, Pre-Prod or Production. This way, the project can be developed with agnostic symbols, taking their real values when deployed on the target environments.



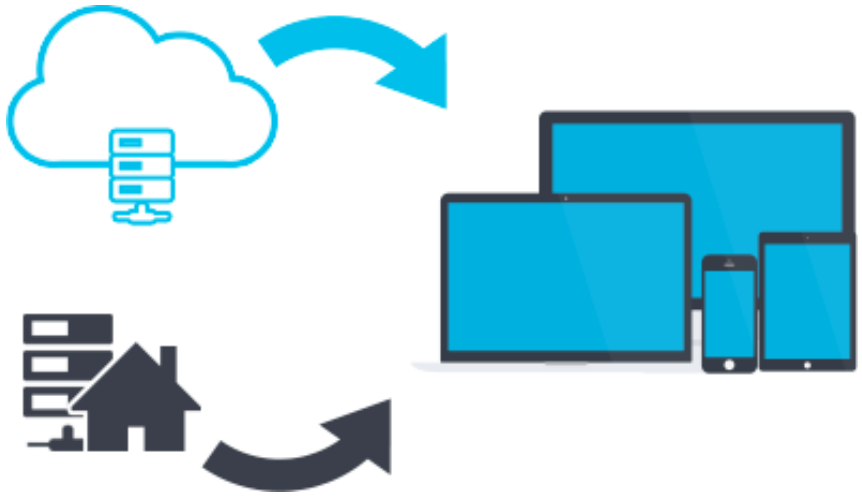
Cloud or On Premises

When it comes to server installation, Enterprises have the choice of using their own infrastructure "On premises" or using cloud service to run a platform.

Convertigo Platform can be used in 3 different configurations:

- On Premises, the platform is installed ona virtualized or physical server farm running Linux or Windows. The Enterprise is responsible for setting up the Firewalls, DMZ and load balancers leading Mobile traffic to Convertigo servers. Usually this is done by using Apache reverse proxys, but this can be done with any other technology including appliances.
- Convertigo for Azure is a preconfigured Convertigo server ready to use onthe Microsoft Azure Market Place for enterprises. This makes possible to use a "Microsoft Centric" stack composed of Xamarin for front end, and Convertigo running on Azure for backend.
- Convertigo for AWS is a preconfigured Convertigo server ready to use onthe Amazon Market Place for enterprises. This one clicks turnkey Amazon instance can be also integrated in the Enterprise Private network using Amazon's VPC and VPN capabilities.

Convertigo Servers are Java based and run on most Java application servers such as Tomcat, jBoss, WebSphere or WebLogic.



Convertigo No Code studio

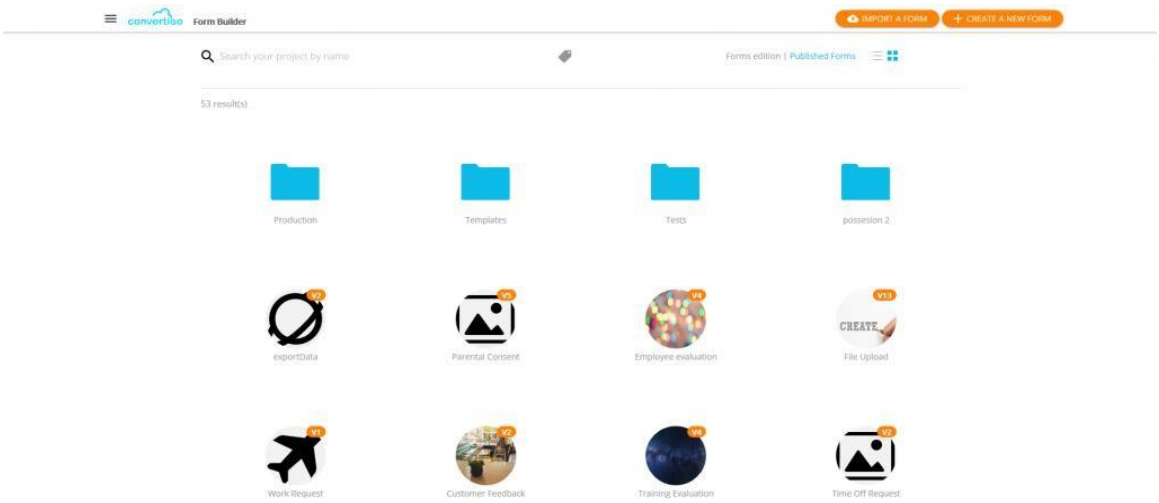
From No-Code to Low- code to Pro Code. The Convertigo Platform supports a complete set of tools to accelerate creation of mobile desktop and progressive web apps.

Considering that 70% of mobile B2E applications are simple data entry form based and that Business owners know exactly what they want, having developers lose their time and Enterprise's money to develop complex apps is nonsense.

Therefore, Convertigo Platform provides a Module targeting Business developers having no technical skills to build data entry forms with a No Code approach.

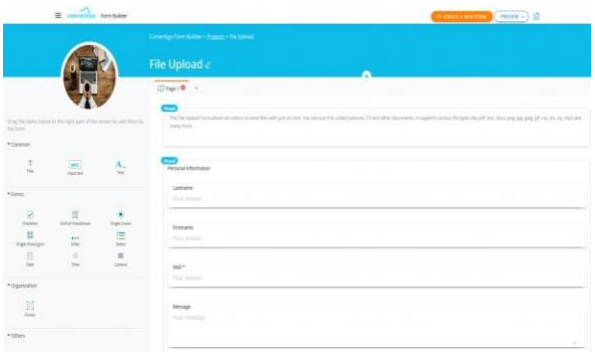
Introducing Convertigo No Code studio

It is an additional module installedas a standard Convertigo Application in on Convertigo Server platform.
This studio is packages as standard ". CAR" project and provides both the web based form builder Studio and the Form Player.



Form selector

Each form can be deleted, edited or visualized as a grid view



Forms can be designed by anyone using a web browser and require no technical skills. Once designed, the forms can be used on any type of devices:

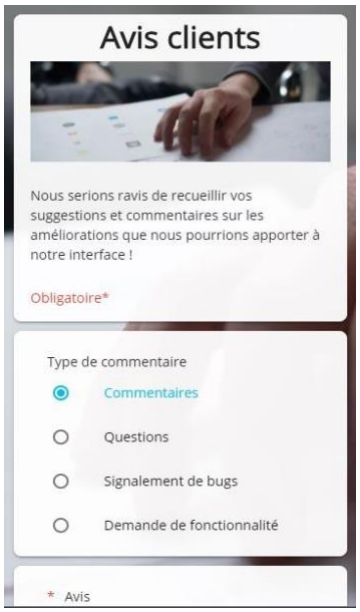
- Mobile Android Devices
- Mobile iOS Devices (iPhone & iPad)
- Desktop PCs & Macs & Linux

New forms can be deployed instantly without requiring to re install the mobile apps.

Editing and Creating forms

Anyone can create or modify / copy existing forms using the from editor running in a simple web browser.

Once created or modified, the form will be instantly available for users on their device.



Why is Convertigo No Code studio different?

Many Form builder products are available on the market but Convertigo differentiates by several key factors:

- **Built-In Offline support:**

  Convertigo No Code studio is built using theConvertigo Platform itself! Thus, benefiting from all Offline Full Sync technology.

  You can display, fill in forms, submit them all offline! When the network comes back your data will be synced to the backend repository.

- **Runs On-Premises or on the cloud:**

  Many enterprises are reluctant to have their data stored on public clouds and prefer to operate the platform on their own. This is what you can do with Convertigo! You may find that users in your Enterprise already started some forms using some other cloud technology. With Convertigo you provide the same service but in a secured and controlled way.

- **Convertigo No Code studio are Low Code studio components**

  Imagine you can combine Zero-Code and Low-Code! This is what you can do with Convertigo. Any Convertigo Form is a Component you use in your Low Code studio apps!

  And more, modifications of the forms can be done by citizen users and not necessary by Low Code developers.

- **Convertigo No Code studio apps can be realindependent Mobile apps:**

  Instead of having one generic "player" app able to provide multi forms, such many other vendors, Convertigo No Code studio is able tobuild independent apps for each form withtheir own icon and splash screen for startup.

  This way, the apps can be deployed on the devices using the standard MDM technology that enterprise use to deploy their apps.

- **Convertigo No Code studio can be integrated withthird party authentications**

  Many enterprises need their users to be authenticated by their existing mechanism. This can be some Azure AD, Google Accounts, OpenID or on premises Windows Active Directory.

  Convertigo is natively integratedwith all the authentication schemes.

Analytics

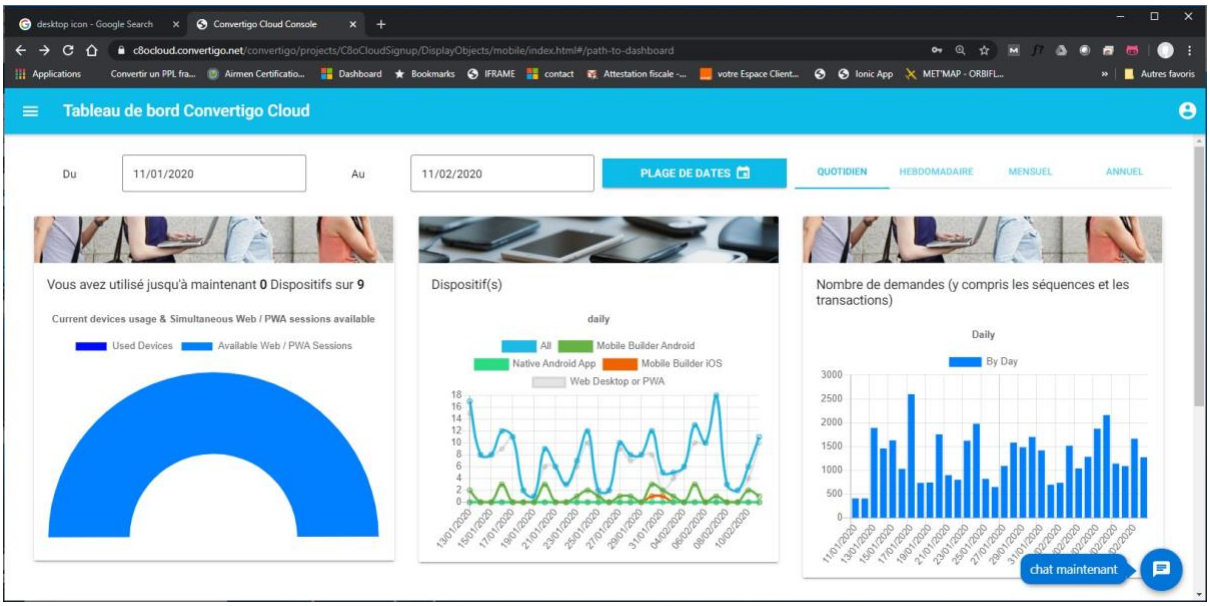
As the platform is the only entry point for all mobile applications, its obvious analytics could be handled by it automatically.

Analytics can help lines of business to understand how applications are used. Analytics can also help Enterprise central IT departments to allocate operating costs among several business units.

Convertigo Platform supports two analytics systems. The both systems can be configured to work at the same time:

- Google Analytics (GA) is supported by having (if configured) the platform reporting to GA automatically any executed Sequence (Mobile Service) or Transaction (Call to a backend server) as an Analytics Event. This will have GA be able to display all these events in the graphical Analytics console.

- Analytics databases can be (If configured) any type of SQL database (MySQL, PostgreSQL, SQL Server, Oracle, IBM DB2..) receiving for each Sequence or Transaction execution a new line in the "Ticket" table.



Product line

Convertigo addresses companies from small individual developers to very large Enterprises, with a ramp up product line.

- The "Indie" developers or Universities will love the unsupported free Community Edition able to build Mobile apps and deploy them on our free trial cloud.

- Enterprises always need to connect their mobiles apps to their enterprises data to provide the user with valuable business information.
  Convertigo Server connects to the existing Enterprise's data and provide the data in the correct format for mobile devices, thus saving the bandwidth for 4G/5G networks.

- The "citizen" developers who wants to create easily some small apps not using technical skills, will like our No Code studio to simplify the data exchange inside an enterprise. That kind of app can be available on all devices like tablet, iOS/Android smartphone and PC. Convertigo No Code studio guarantee the sovereignty of your data. The tool will perfectly synchronize with your corporate software.

- The Low Code studio is mainly for Fullstack developers, to create Low-Code fullstack web and mobile apps, connected to enterprises da

Conclusion

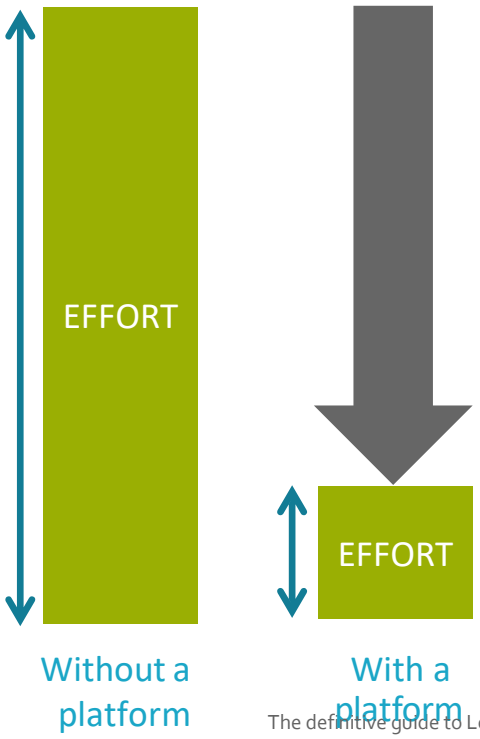
Low Code platforms are key components of the Digital Enterprise. These platforms enable companies to gain in agility, to reduce development and maintenance costs, to preserve system integrity and to gain in security.

With the new requirements of the digital world, Enterprises will be facing numerous applications developments and will widen the gap between the needs and their development and integrations capabilities.

Convertigo offers with its Low Code platform all the required components to make Enterprises access the Digital world for their customers, their employees and their partners with controlled costs and project timings.

Using Convertigo Low Code Platform will avoid having the same services to be redeveloped each time Enterprises need a new mobile or web application, thus reducing development costs and technical debt.

Convertigo Open Source technology provides Enterprises flexibility, openness, auditability, security and avoids vendor locking for a reasonable cost compared to "Do It Yourself" solutions.



About Convertigo

Convertigo is a privately held company recognized as a "pure player" in the enterprise Mobility market and the first software vendor to distribute its cloud based or On Premises Low Code Development Platform (LCAP) as Open Source.

Convertigo is delivering a secured and scalable disruptive all-in-one solution integrating rapid cross platform mobile development tools and a powerful back end technology covering challenging backend enablement,featuring a middleware optimized for mobility.

With more than 150.000 installations of its community edition, Convertigo technologies have a proven track record with secured and scalable implementations deployed in global fortune 500 companies in EMEA and North America.

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