Steps to implement WSO2 in your company

CHAKRAY

Content

1. Step by step implementation of WSO2 in your company

Digital Transformation is an imminent reality. Evolution is essential for companies to maintain their business, and the main features of company evolution are flexibility and speed.Working with a large number of isolated systems and applications is a problem for users. This is why company integration and connectivity are the essential to evolve within the market.

It is for this reason that the WSO2 Integration suite includes a set of company integration products in a single package that drives digital transformation through connectivity.

According to IT Central Station, WSO2 Carbon is the second most preferred infrastructure by the users of this review website.

This is the core infrastructure used to develop WSO2 products.

Welcome, Freedom! WSO2 is a 100% open-source platform that lets us design service-oriented architectures (SOA). They allow services to be built, APIs to be documented for development teams, routing and publishing, traffic monitoring, access securing, load balancing and service monetization report generation, and facilitate the integration with mobile devices.

The purpose of this eBook is for you to **be able to identify your real needs so as to have the ability to choose the most effective solution.** We will go over the features of WSO2, the steps to implement it, other alternatives on the market, the criteria to choose your product and examples of companies that have already implemented WSO2.

2. Do I need WSO2 in my company?

There are several factors that lead companies to have the need to implement WSO2. Nowadays, companies that work with multiple systems have them hosted in one or more platforms with **little to no interaction between them.** This leads the execution of business processes, which are mostly performed manually, to result in a negative impact on the company's agility, efficiency, effectiveness and operational costs.

In order to compete in the market, companies need to improve their processes and automate them, thereby boosting their performance and lowering process operation and system maintenance costs. Even though business processes are supported by applications, many of which are hosted on the cloud, a need exists to take a step beyond in relation to the execution of these systems.

There are two aspects that need to be optimal in a company: flexibility and speed.

This landscape of ever-changing markets, competitiveness and immediate customer requirements increases the pressure on information technology departments. As a result, there are to aspects that need to be optimal: flexibility and speed.

Major companies have already adopted service-oriented architectures (SOA) as a strategy to comply with the two aspects mentioned above.

2.1 Help! Too many applications and services

If every time you monitor your systems you find that there are applications that see little use, or services that are not taken advantage of, which hinder the company's effectiveness, you may be facing an integration problem. If we add ShadowIT on top of this, which are those applications and services that are used by employees but that the IT department is not aware of, **we then find ourselves before a serious problem.** Monitoring and control become unpredictable, which directly affects the business.

The breadth of the problem may be slightly controlled at first, but this will eventually bring greater problems. **The use of many uncommunicated systems results in operational issues** and an inbox filled with problems and questions to address in the least possible time. Many of these questions will be related to the nonexistent connectivity between systems.

Monitoring and control become unpredictable in an environment that has too many uncommunicated applications and services.

In able to address these system communication issues, we should implement an effective solution, both in relation to costs and to the ease of implementation. This means **automatic communication processes in order to improve the user experience and the management of the IT team.** And this is made possible by performing functional integrations that ensure that the flow of information is correct and that it accomplishes its purpose.

3. From the need to an effective solution: WSO2 Enterprise Integrator

In order to solve the system connectivity and communication issue, there are suites that provide a technological solution to accommodate interconnected digital transformation tools.

WSO2 **Enterprise Integrator** is an effective solution for this – a suite that integrates all of WSO2 company integration products and technologies. WSO2 is based on Apache Tomcat, the main software used as a basis in business servers.

The wide range of WSO2 products enables system architects and developers to select the relevant bits required to build their solution architecture.

In essence, it is a **service integration bus** that facilitates the integration of multiple protocols, formats and transport types in the context of message exchange. It has a component that allows REST / SOAP services to be exposed based on diverse data sources.

In addition, it has a key component that comes with the platform for managing and automating processes, and it is a business process engine. It also has a message broker that allows for the implementation of queues and topics for publishing and/or obtaining data asynchronously.

One of the most valued features is that all components are ready to be implemented in development and high-availability environments out of the box.

WSO2 addresses the real need of architects and developers when it comes to finding out which products should be selected. In addition, based on the experience accrued by WSO2 Enterprise Integrator developers to encourage the digital transformation of companies, the use of common patterns is required, which are reflected in five fields: Company Integration, API management, Internet of Things, Security and Smart Analysis.

3.1 Three reasons to integrate your business services

You might be thinking, do I really need this platform? We want to give you three fundamental reasons why you should perform this integration:

1. **Key Challenges**
   Clients, partners and providers all expect to have a fast, efficient access to the requested information. Each company project requires the integration of several systems, such as SaaS applications, back-end, and data feed. An organization does not need to develop applications, but it does need to integrate data and applications in order to establish a unified information process.

2. **Performance**
   By using an easy-to-use, API-centered integration platform that is ready for business actions, each project is able to create high-performance environments. This enables integration costs to be reduced, the interoperation via inherited systems, scaling the service message traffic, improve the governance practices and expose the APIs to external partners and mobile applications.

3. **Connectivity**
   Company integration offers several opportunities for improvement to the organization:

- It allows for multiple connections
- It democratizes the integrations themselves and increases their quality
- The infrastructure is tailored to the needs of each project
- Ability to deliver high-performance, high-availability services with elastic scalability and a solid stability.

Below we will describe ach of the architectural components included in a system such as WSO2, which includes the business service BUS, API management, governance registry, business activities monitoring, message mediators and identity services.

4. Components of the WSO2 platform

As already discussed, the WSO2 suite is an Open Source platform that focused on the design and implementation on service-oriented architectures (SOA). With it we can address the actions in the lifecycle of a service-based development project. More specifically, WSO2 Enterprise Integrator has contains components for the integration of data, services and application hosting, messaging, business processes, analysis and tools. It can also install connectors so that external systems and services can stay connected.

The features included in WSO2 Enterprise Integrator are as follows:

4.1 BUS

Enterprise Service Bus (ESB) functionality, a middleware component that enables the integration of various applications through a messaging system based on synchronization standards and services.

4.2 Business Processes

Business process support and optimization system to accelerate deployments. It allows for the design, execution, monitoring and optimization of processes with the purpose of boosting productivity. It is worth mentioning that these processes are managed through the implementation of market standards and trends, such as BPM, BPMN and BPEL.

4.3 Messaging broker

A feature that allows for the storage and recovery of messages using the concept of queues, publication and subscription, among others. It is recommended for integration sceneries with guaranteed deliveries and asynchronous Enterprise Integration Patterns (EIP).

This component supports the MQTT protocol, which can extend the messaging to IoT, enabling devices and remote sensors to be connected, as well as machine-to-machine (M2M) communications.

4.4 Analytics

The performance and mediation flows can be tracked and monitored. Dashboards related to monitoring needs can also be designed.

4.5 WSO2 products for digital integration and transformation

In addition to Enterprise Integrator, the following **WSO2 products** provide these features to support digital integration and transformation processes:

WSO2 Enterprise Service Bus

Manages the coordination of services and the access to resources within our business processes. This product is essential for the integration of all products of the platform.

WSO2 Data Analytics Server

This product allows for the management of reports containing platform information. Includes the design of custom dashboards and the exposure of information to Business Intelligence Systems.

Business Process Server (WSO2 BPS)

A program that supports business process management, the implementation of flows within a SOA and long-running business processes for the entire company.

WSO2 Message Broker (WSO2 MB)

This product supports the MQTT protocol, which can extend IoT messaging, enabling devices and remote sensors to be connected, and allowing machine to machine (M2M) communications. This communication mediation has the ability to be scaled up to many servers in a cluster.

WSO2 API Manager

Solution for the publication of first-party APIs to other systems. This guarantees the safety of the information and integration times are reduced.

WSO2 Identity Server

The identity and management of credentials and access protocols are centralized at a single location. In this way, all authentication servers connect through this central component and work as one. Identity Server also facilitates the implementation of uniform authentication, authorization, single sign-on, role-based access control processes and attributes, among others.

WSO2 Data Services Server

Allows for the encapsulation of resources such as file systems or databases within an API. For example, you may build a query API based on a group of Excel files.

WSO2 IoT Server

Facilitates the integration and management of connected devices, belonging to the group of Internet of Things, from the WSO2 platform.

WSO2 Microservices Framework for Java (MSF4J)

This Framework generates and executes microservices with a high performance. According to Óscar Sanz Sebastián, from the specialized Enmilocalfunciona.io blog, this product has a superior performance compared to other similar frameworks, which allows for an optimization in the use of resources.

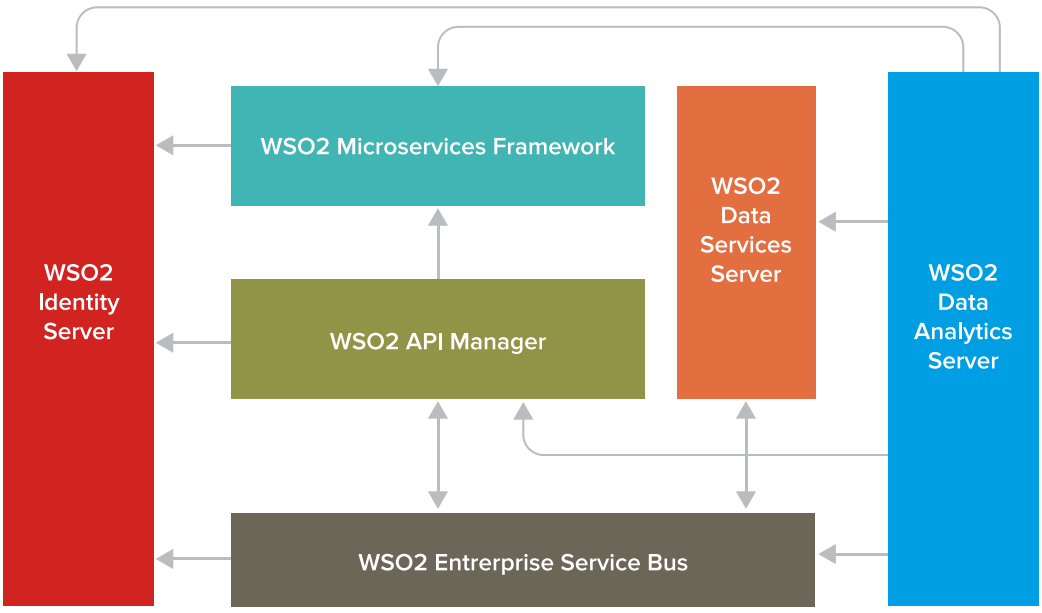


Image 1: WSO2 Architecture

5. What you need to know to implement WSO2 Enterprise Integrator in your company

The use of WSO2 Enterprise Integrator (WSO2 EI) profiles implies a flexible system that accommodates the needs of each company. WSO2's integration stack facilitates the addressing of the needs of the company throughout time and through the incorporation of diverse groups of functionalities encapsulated as profiles.

Among the features we have discussed in previous sections, the integration layer is the main feature. This platform is packed to be used based on profiles, and therefore, an integration profile composed of ESB + DSS is essential. The integration profile is essential because it is the one that enables the integration layer for the exchange of messages, protocols and formats.

5.1 What do you need to implement WSO2 in your company?

Equipment

For a development environment you will need 10GB of free disk space, 2GB of available RAM and 2 CPUs. You also need to install a Java Virtual Machine as a minimum requirement.

Time

It varies depending on the needs and capabilities of each company. In a development environment the implementation can be accomplished in a few minutes, since it would only imply the deployment of the product.

However, if the product is deployed for a high-availability service, they integrate with existing basic products, such as load balancers, security configurations are adjusted among other aspects; the implementation may take up to a week's worth of work for an expert.

Example

As a practical case of use of WSO2, we can posit a sample scenario provided by WSO2's development company for its implementation. This involves a basic medical attention system that allows patients to do the following:

- Request a list of available physicians based on their specialization
- Schedule an appointment providing personal data, clinic preference, the physician's name and credit card information
- The ability to cancel appointments with predefined conditions, such as that the request is accepted by the healthcare service only if made two days in advance.

The patient's request is processed with WSO2, and it will return the corresponding replies. An MSF4J will be used as the medical attention system's backend and an H2 database as a backend database, which will contain the details of the available physicians to handle the service.

On top of this implementation, WSO2 EI can handle all service calls and handle the payload based on each request. Below we tell you how it accomplishes this:

1. When a patient requests a list of available physicians for a specific specialty, the request is sent to a data service defined in WSO2 EI, which exposes the information on an external database.

2. When the patient schedules an appointment, the request is sent to a REST API configured in WSO2 EI. It processes the request and forwards it to the customer care service of the clinic, which schedules the appointment.

3. The REST API processes the appointment's reply by the customer care service, sends a service call to customer care to obtain the physician's fee and receives a response.

4. The REST API processes the fee response and sends a call to the customer care service to obtain any discount options.

5. Upon responding to these service calls, the REST API calculates the real fee for the patient and creates the request with payment details that will be sent to the healthcare service. This service processes the payment and responds to the REST API.

6. Lastly, the REST API takes the payment response and generates a response that is sent to the patient.

Steps

Now, based on this example, we list the necessary steps to implement the solution using WSO2:

- **Download and configure WSO2 Enterprise Integrator.**
- **Verify the availability of variables: in this case, the physicians.**
  - Configure the backend database
  - Expose the database as a data service
  - Request information about the variables (physicians): by implementing a specific command
- **Start the backend service**
- **For Activity 1: Schedule an appointment**
  - Define the message of the integration sequence
  - Activate the message broker profile
  - Submit an appointment request
- **For Activity 2: Submit appointment cancellation**
  - Configure, define and activate WSO2's business processes (BPMN)
  - Define the appointment cancellation process
  - Cancel the appointment using the BPMN explorer
- **For Activity 3: Analysis and measuring**
  - Configure the publication of statistics
  - Activate the Analytics profile
  - Restart the integration profile
  - Enable statistics in the REST API
  - Submit another appointment request
  - See the changes in the Analytics dashboard

This example **is a practical overview of the implementation of a solution with WSO2** and the actions that need to be performed. You must keep in mind that each business may be unique, and require different steps.

Lastly, when involving an implementation to consolidate an integration layer to be used as part of the data exchange and distribution strategy associated to business processes for an organization, it is necessary for the company's personnel to be trained in the use of the platform. Otherwise, it is worth studying having expert personnel available in order to guarantee the fluidity of the operations of the new platform.

In order to use the WSO2 EI platform, you may use the WSO2 Cloud solution. This is a cost-effective solution involving WSO2 EI's public version and 100% open-source. You can host your integrations on a scalable cloud platform. Additionally, if you are facing development projects, at WSO2 you will have a commercial team that will assist you with the implementation whenever you need it.

6. Decision Criteria and WSO2 Alternatives

If you are looking to implement a platform such as WSO2, you have probably already noticed other brands such as Mule ESB, Oracle SOA Suite or JBoss Enterprise SOA platform. Each of them has its particularities and limitations; however, **WSO2 comes out as the most complete and flexible alternative on the market.**

Unlike other solutions, WSO2 allows any mediation situation to be addressed with concepts such as proxy services or APIs, and has multiple connectors that facilitate the integration with other types of products. Furthermore, since it is 100% open-source, it ensures that the platform is constantly evolving.

Companies such as eBay or Transports from London trust WSO2 to integrate their IT applications.

WSO2 is an ideal middleware to solve large-scale problems, such as the business needs of eBay or Transports from London. Even so, it is recommended to know how to identify the real needs of an organization in order to evaluate which the most adequate products are.

6.1 Criteria matrix for choosing your product

It is important for you to have clear criteria to compare the different types of middleware. In this way, you will generate trust and partiality to know which option is the one that best fits the needs of your company. Based on our experience, we know that the first question that will pop into your head will be whether to choose a proprietary solution or an open-source one. In order to make that decision, we recommend you to apply the following criteria:

Usability: ask yourself about the degree of complexity of the installation, the supplementary tools that you need and the type of usability of the development environment.

Maintainability: how is the product managed? Can you monitor the services by means of a graphical user interface?

Community: Is there content available for the platform? Are there active public forums?

Company support: Here you need to know whether the support service is provided during business hours, if it has a direct line, e-mail, on-site support, etc.

Functionality: types of features provided.

Flexibility: Is it possible to customize the product? Does it meet the company's specific needs?

Expansion ability: What types of standards do the interfaces use? Does it have extensions?

Connectors: Are there available adapters for B2B products such as SAP or Salesforce?

Costs: Calculate the total cost of owning the product: maintenance, necessary auxiliary products, connectors, licenses, etc.

Licenses: Type of license and subscription model. Are updates free? Do they have alternatives when requirements change?

With these criteria, you are ready to prepare a good comparative report for your company's executives and propose the different solutions the market has to offer. Once your research is complete, draw conclusions to estimate which needs your selected platform is addressing.

7. Companies that have implemented WSO2

There are many companies that have already implemented WSO2. Each of them has the need to streamline their inter-system communication processes in different ways.

7.1 eBay

For example, **eBay** is the pioneering internet auctioning portal that implemented WSO2. In order to guarantee a 24/7 service and keep transactions active with no errors, the company implemented a solution using WSO2 ESB in order to perform over a billion transactions per day during peak purchasing hours. According to Abhinac Kumar, eBay's senior system engineering manager, they studied a great number of products on the market and finally opted for the WSO2 platform, with which they have been working for the last 10 years.

eBay implemented WSO2 ESB in order to perform over a billion transactions per day.

Furthermore, the solution they sought had to be scalable and support an increasing traffic load performance.

7.2 StubHub

Another company that uses WSO2 products is **StubHub,** one of the largest online ticket markets in the world, which brings together fans that buy and sell tickets. They have over 25 million users and sell approximately one ticket per second, executing about 300 million SQL queries per day. This company had the need to build a digital ecosystem that connected users, processes and partners.

Their **goal was to expand by starting from the development of an API-centered solution.** In addition, they intended to build a developer community, allowing partners to share contents and services with the StubHub audience. In summary, they needed a scalable, agile system that left room to evolve, managing large volumes of data.

In light of this, they implemented WSO2 API Manager, WSO2 Enterprise Service Bus (WSO2 ESB) and WSO2 Identity Server in order to create APIs in a user interface layer.

StubHub improved its selling times through new and improved user experiences.

Once this architecture was implemented, StubHub improved its selling times through new and improved user experiences. The platform's flexibility allowed for a better service integration, thereby improving the user experience.

7.3 Communications company

At **Chakray** we have implemented robust and scalable architectures with WSO2. This is the case of a major company in the communications sector that had an API exposure with an Oracle OSB solution that used the services exposed in its Corporate Database (Oracle), including tables that allowed consumers to get authenticated in that same database.

The main problem the company had was that this architecture did not allow for escalation in regard to their operations and the design of new services, because they did not have management and API governance capabilities. The solution that was proposed consisted of the definition and deployment of an API Management layer implementation. This architecture also included resources focused on the creation, documentation and socialization of APIs. The same service layout that already existed was used.

By applying this solution, they managed to improve the company system's functionality, allowing them to tackle their API exposure strategy in a robust and scalable manner.

7.4 Integration of over 50 systems in a University

One of the most prestigious universities in the world, with over 20,000 students, had issues with its IT architecture.

At Chakray **we offered a comprehensive solution using Zero and WSO2,** and in three months we were able to integrate over 50 different pieces of software, transforming the structure into a service-oriented architecture.

Throughout the university's lifespan, they had incorporated completely different pieces of software from various providers, which led to a process slowdown, since they were not connected with each other.

The university opted for WSO2 for a number of reasons:

1. It was the best option due to its modular design – a necessary feature for a large number of integrations.

2. WSO2 has the ability to couple with CI, with Zero Solutions and with automation technologies. Thanks to this and to Chakray Solution Accelerator, the implementation times are reduced considerably – a clear need of the institution.

3. The ability to have a hybrid solution – cloud and on-premise – facilitated the project and its flexibility.

Chakray Solution Accelerator, an exclusive solution by Chakray, was a decisive tool in for project, since it allowed the system integration to be as efficient and fast as possible. This solution is designed to build WSO2 platforms based on code, which allows the architecture to be designed and put in a file.

With WSO2 we can integrate systems in record time and comply with all necessary security demands.

8. Conclusions

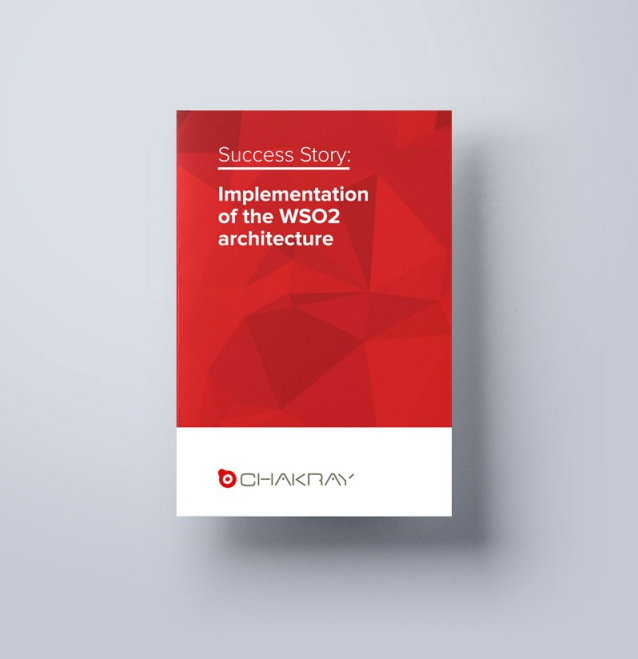
In this eBook we have discussed a middleware developed based on a SOA architecture outlook. An architecture that allows for the functioning of modular business services integrated in a practical way.

WSO2 EI is a complete integration product, and WSO2 ESB is one of its most-used modules to enable the execution of billions of transactions per day.

One of its main advantages is the use of open-source standards. This allows the product to extend and adapt to any business scenario, with no virtual limitations.

WSO2 is relatively unknown; however, WSO2 provides the entire range of components of a SOA suite. As we have seen in previous sections, this platform is easy to install and offers a lightweight development approach.

Lastly, it is important to keep in mind that WSO2 is the only provider that offers a complete set of solutions based on a single codebase and a single development environment. It is for this reason that it allows for an iterative development, starting from the implementation of certain features, to later add more functionalities if so required.



Are you ready to deploy WSO2?

Learn how to implement and customize the WSO2 tool through a practical success story.

White Paper: Implementation of the WSO2 architecture.

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