



Enterprise Integration

Driving growth, efficiency and agility
of your organisation



In today's rapidly evolving business landscape, organisations are racing to become technology-driven to accelerate innovation and drive sustainable growth. Businesses that fail to turbo-charge their digital ecosystem, risk falling behind their competitors.

According to the recent **PwC CEO survey** of 4,410 business leaders, 84% of regional CEOs are expected to invest in automation processes and systems in 2023, while 66% will be deploying new technology, such as cloud, AI & other advanced tech in the next 12 months.

Many organisations are, in fact, relying on Enterprise Integration Platforms (EIP) as their businesses grow, departments expand, digital systems upgrade and data repositories increase. An EIP is a software solution that enables businesses to connect and integrate different systems and applications, allowing for seamless data exchange and process automation. The flexibility and scalability of an EIP makes it a valuable tool for businesses of all sizes and industries as it enables flow of data and information across different departments, systems, and locations, resulting in improved efficiency, productivity, and cost savings.

Introduction

How can an enterprise integration platform benefit your organisation? (1/2)

Five key factors to consider



Connectivity

01

Connecting an organisation's systems, from legacy through modern applications: Many businesses still have legacy systems in use that are no longer supported by vendors. These systems often contain important data and information that the business relies on, but they are not compatible with modern applications. An EIP can bridge the gap between these systems and modern applications, allowing the business to continue using their legacy systems while also taking advantage of the latest technology. Let us look at some examples:

Cloud Integration:

As more and more businesses migrate to the cloud, an EIP can be used to integrate cloud-based systems and applications with on-premise systems. This can include integrating cloud-based Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), and other enterprise systems, as well as integrating cloud-based services such as storage, analytics, and machine learning.

Mobile Integration:

An EIP can also be used to integrate mobile applications with enterprise systems, facilitating seamless information exchange. This includes integrating mobile apps with back-end systems as well as integrating mobile apps with cloud-based services.

API Management:

An EIP can also be used to manage Application Programming Interface (APIs), which are used to connect different systems and applications. This can include creating and managing APIs, as well as monitoring and analysing their usage and performance.



Automation

02

Automating business processes: An EIP can help automate business processes by connecting different systems and applications to automate tasks and workflows. This can save time and reduce risk of errors, resulting in improved efficiency and productivity. For example, an EIP can be used to automate order processing, where orders are automatically sent from the e-commerce platform to the inventory system, and then to the shipping system.



Real-time data

03

Integrating data real-time: An EIP can provide real-time data integration, allowing businesses to access and analyse data in real-time. This includes integrating data from ERP, CRM, and other enterprise systems, as well as from external sources such as social media, IoT devices and cloud services, facilitating better decision making, improved operations and enhanced business intelligence capabilities. For example, an EIP can be used to connect a manufacturing system to an ERP system, allowing the business to monitor production in real-time and adjust operations as needed. By doing so, EIPs standardise and transform data, ensuring that it is accurate and consistent across systems.



How can an enterprise integration platform benefit your organisation? (2/2)

Five key factors to consider



Bridging locations

04

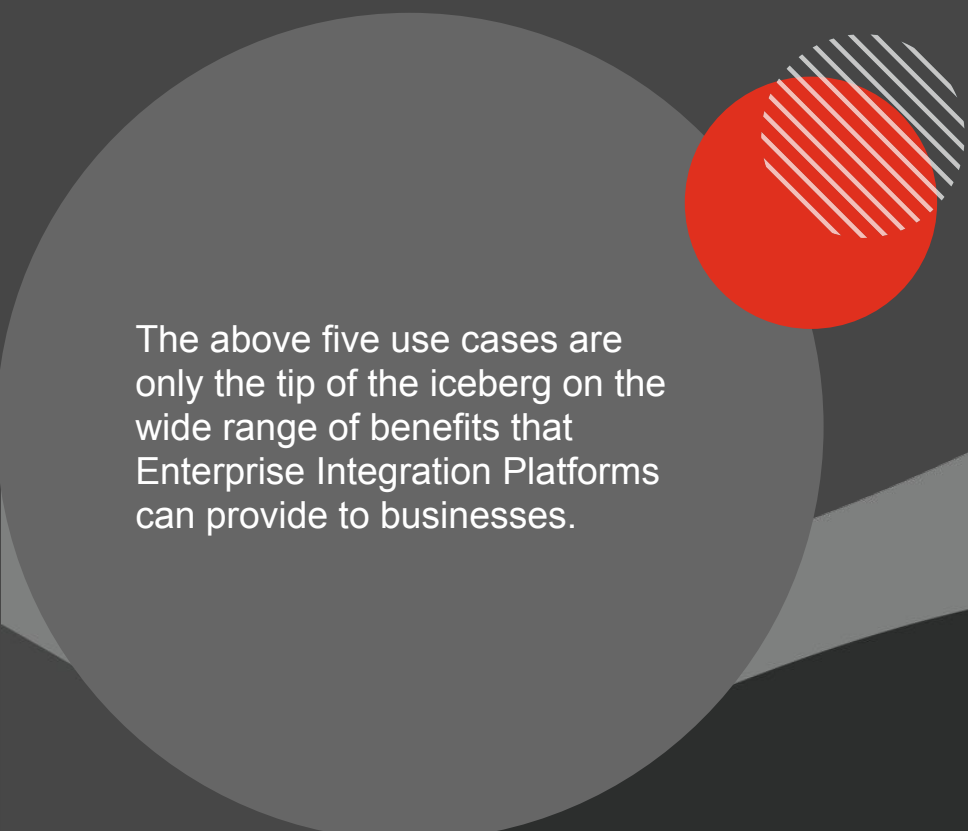
Connecting multiple locations: An EIP can be used to connect different locations, allowing businesses to share data and information across different sites. This can improve communication and collaboration, resulting in better decision-making and improved operations. For example, an EIP can be used to connect a retail store in one location to a warehouse in another, allowing the store to access real-time inventory information.



Enhanced customer experience

05

Improving customer service: Enterprise integration platforms enhance customer experiences through holistic understanding, personalization, timely information, and exceptional interactions across touchpoints. Customers get real-time updates and make informed decisions while representatives are able to service clients efficiently and quickly and thus improving satisfaction and eliminating the frustration caused by outdated information.



The above five use cases are only the tip of the iceberg on the wide range of benefits that Enterprise Integration Platforms can provide to businesses.

What to consider when selecting an Enterprise Integration Platform

Scalability:

Consider the size and growth potential of your organisation when selecting a tool. Certain integration tools are better suited for small or medium-sized businesses, while others can handle the needs of large enterprises. The platform should be able to take a large volume of data and transactions and scale up or down as needed.

Security:

Your chosen tool must have robust security features to protect your organisation's sensitive data. It must support encryption, access controls, and other security measures to keep your data and transactions safe and secure, particularly those that are sensitive.

Monitoring and management:

The platform should provide tools for monitoring, troubleshooting, and managing the integration process, including real-time visibility and analytics.

Flexibility:

The platform should be able to handle different types of data and integration scenarios, such as batch processing, real-time streaming, and event-driven integration.

Connectivity:

Ensure the tool you choose is compatible with your current systems and applications. Some devices may work better with specific platforms than others, making it prudent to find one that will integrate seamlessly with your existing technology stack. The platform should support protocols and interfaces, including REST, SOAP, Kafka and RabbitMQ, to ensure seamless integration with different systems and applications.

Community and support:

Consider EIPs with large communities of users and developers. It helps organisations access a wide range of resources, including documentation, tutorials, and forums where they can ask questions and get help. It will also make it easier for organisations to adopt and implement their selected EIP tool. Also, watch out for the company or organisation that is maintaining the tool- their reputation and support can give you an idea about the reliability and long-term support.

Reliability:

The platform should be easily available and have failover capabilities to ensure that data and transactions are processed without interruption.

Pricing:

The platform should be cost-effective and not require significant upfront investment or ongoing maintenance costs.



What to consider when selecting an Enterprise Integration Platform

Functionality:

Determine the specific features and capabilities you need in an integration tool, such as data mapping, transformation and routing. Look for a tool that offers the functionality you need to meet your organisation's specific requirements.

Integrating with other tools:

Keep an eye out for a platform that would integrate with other tools, such as data visualisation, analytics, and reporting, to provide a complete data management and integration solution.

Cloud-based vs. On-premise:

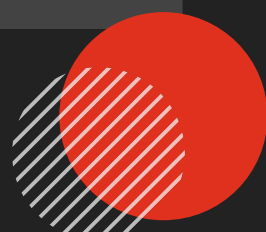
The platform should be deployable in ~~both~~ cloud-based and on-premise options, depending on the organisation's preference and requirements.



ESB vs. Mesh Models

When contemplating the integration needs of your enterprise, two architectural models come to mind: the Enterprise Service Bus (ESB) and Mesh Services (Microservices). For decades, companies have employed the ESB to link applications together, often monolithically, with all necessary services housed within the application. However, Mesh Services have emerged as the new frontier as cloud services and modular microservices proliferate.

	Enterprise Service Bus (ESB)	Mesh Services (Microservices)
Definition	<p>ESB can be considered of as a centralised, standardised hub that acts as a conduit for data to flow in, be transformed and then flow out, enabling seamless communication between various applications and services.</p> <p>By establishing data connections between monolithic applications, ESBs provide users with a host of pre-built software adapters.</p> <p>Their engine basically constructs a communication bus between different applications, allowing each system to connect to the bus and share data and communications.</p>	<p>Microservices is an architectural design that combines service components into modular units, allowing for flexibility and scalability. Each Microservice operates independently, free from dependencies on other microservices. They can be easily added in and out of applications as needed, providing a dynamic and adaptable system.</p> <p>Microservices adopt the use of containers to establish a flexible and distributed system that eliminates the bottleneck of a central database.</p> <p>You can think of Microservices as a paradigm shift in the realm of cloud-native architecture, where a single application is composed of multiple autonomous components or services.</p>
Architecture	<p>ESB is a product of the pre-cloud, legacy system era, developed to integrate systems. However, its design may prove less agile and time-consuming than a microservices architecture approach. While the centralised hub of an ESB can simplify the troubleshooting process, it can also pose a single point of failure for the entire enterprise. A failure in the ESB may result in a larger problem to resolve; therefore it is essential to consider fault tolerance when utilising ESB in today's era of cloud-based systems.</p>	<p>The microservices architecture, a collection of specialised services assembled by development teams to form an application's functionality, continues to evolve and improve. Decoupling these services brings advantages, such as increased agility, scalability, and responsiveness to the ever-changing organisational needs.</p> <p>Microservices are particularly adept at handling streaming services, easily incorporating new features, integrating IoT devices, and securely managing cloud data.</p>
Pros	<ul style="list-style-type: none">• It not only simplifies deployment but also serves as a point of governance and monitoring, providing greater oversight and control over service usage and statistics• With its built-in service routing and orchestration capabilities, ESB streamlines the process of deploying and managing applications• Allow teams to deploy using CI/CD pipelines• The centralised hub concept for integrating various services and applications, allows for easy reuse and connectivity• Supports a multitude of transport protocols like MQTT, AMQP, & HTTPS	<ul style="list-style-type: none">• The business side won't need to wait until all teams have completed their development/deployment of microservices• Microservices enable the scaling of individual components independently without the need to scale the entire application• Additionally, Microservices also simplify the process of implementing continuous delivery by reducing dependencies between services, resulting in faster deployment• Microservices provide DevOps teams the flexibility to employ diverse stacks and programming languages on different components This allows them to quickly add new features or functionalities without affecting the whole application, thereby promoting an agile development approach
Cons	<ul style="list-style-type: none">• The BUS is a single point of failure• Scalability is an issue• New connections are not seamless• Setting up ESB servers and VPNs would come at an additional cost	<ul style="list-style-type: none">• Complex as one service affects multiple applications• Debugging challenges• Converting legacy to microservices is complex• The success of microservices entirely depends on the network communication between them



Contact us



Jan Gloncak

Partner, Data and Analytics, Digital Services
PwC Middle East
jan.gloncak@pwc.com



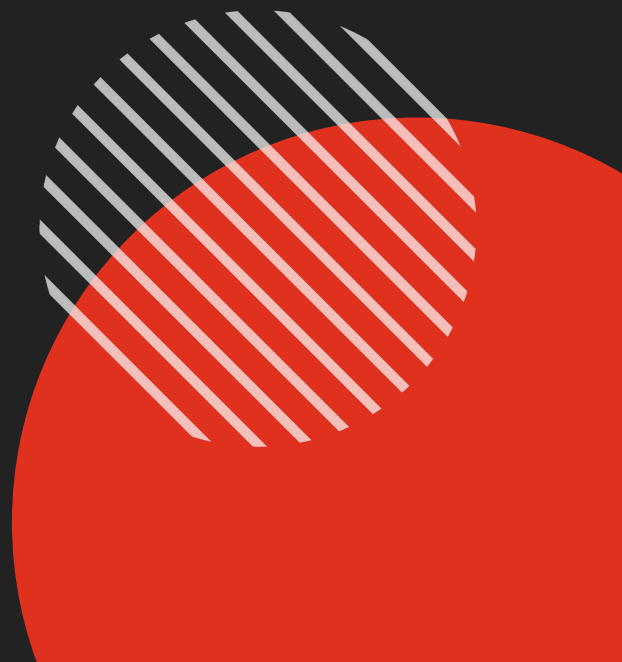
Akif Kamal

Partner, Technology Consulting
PwC Middle East
akif.kamal@pwc.com



Amin Beydoun

Manager, Digital Services
PwC Middle East
amin.beydoun@pwc.com





About PwC

At PwC, our purpose is to build trust in society and solve important problems. We're a network of firms in 152 countries with over 328,000 people who are committed to delivering quality in assurance, advisory and tax services. Find out more and tell us what matters to you by visiting us at www.pwc.com.

Established in the Middle East for 40 years, PwC has 24 offices across 12 countries in the region with around 10,300 people. (www.pwc.com/me).

PwC refers to the PwC network and/or one or more of its member firms, each of which is a separate legal entity. Please see www.pwc.com/structure for further details.

© 2023 PwC. All rights reserved