Integration Platform as a Service: The next generation of ESB, Part 1

A new approach to service delivery for enterprise integration

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Take an in-depth look at Integration Platform as a Service (IPaaS), the next generation of enterprise integration. Part 1 of this two-part series describes the technology and business changes that are driving IPaaS, as well as the capabilities and components that are characteristic of the IPaaS approach to enterprise integration.

Economic challenges continue to drive organizations to reduce costs and improve service quality for enterprise integration services while more effectively managing risks such as service level agreements, high availability, security, and regulatory compliance.

This critical demand is prompting business and IT executives to rethink how they will provide enterprise integration services and determine whether those services will be delivered on premise or from an external cloud service provider.

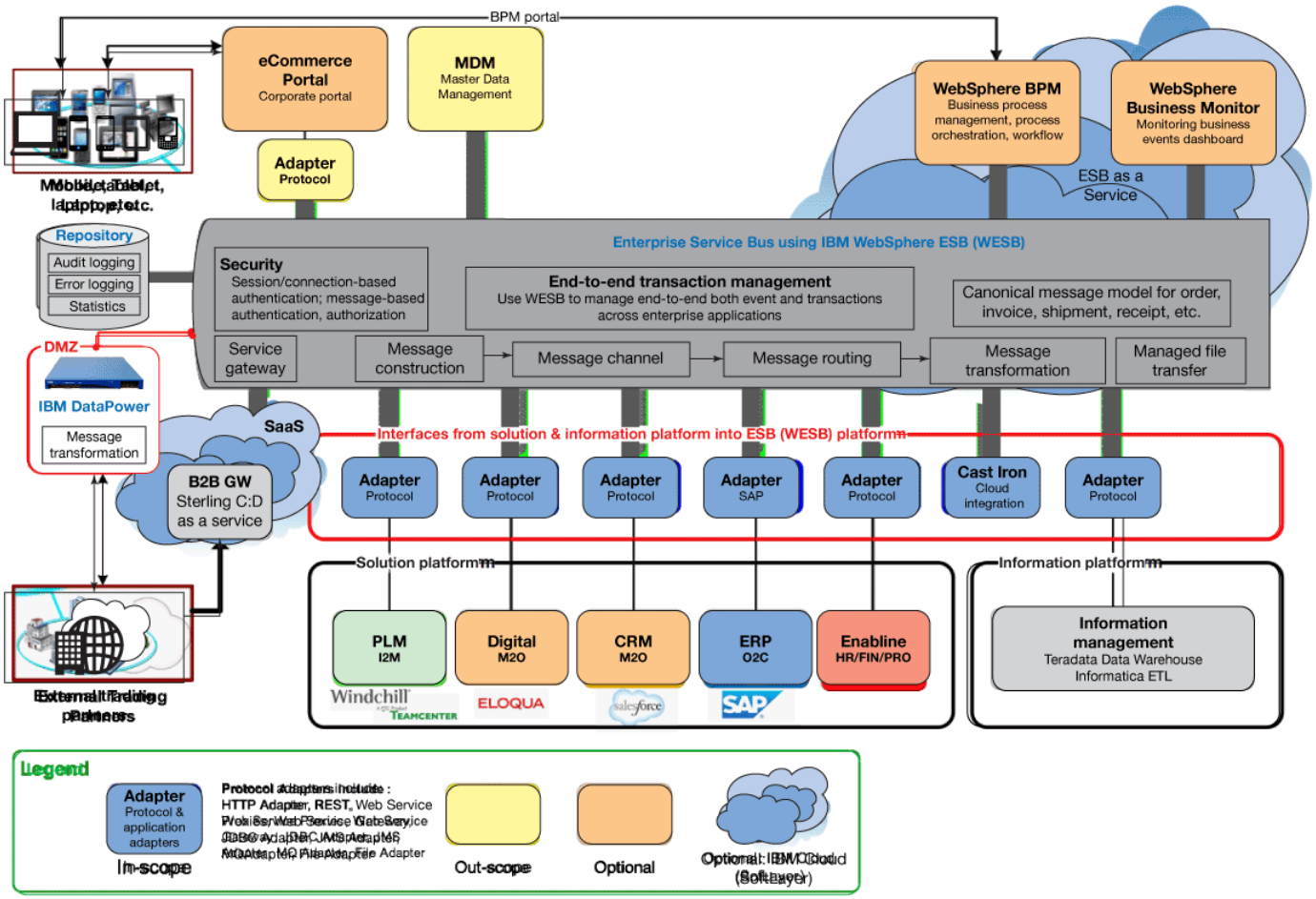
The traditional approach to a new enterprise service bus (ESB) or business process management (BPM) implementation has been to customize a software stack to be installed at an internal data center based upon specific integration requirements. This can be time consuming and costly. If capacity increases or decreases due to merger, acquisition, divestiture, business model changes, or seasonal factors, then the efforts to maintain the integration platform can become a major undertaking for the IT organization. These efforts consume precious resources and divert focus away from the core capabilities of the business — and inspire a new approach to enterprise integration using a cloud-based Integration Platform as a Service (IPaaS).

A holistic view for implementing an IPaaS solution using cloud computing

Cloud computing enables transformations for integration platforms that can make both business and IT leaner, less costly, more agile, and more capable. But in order to properly implement an

IPaaS solution, there are additional considerations that must be addressed. The following figure is an example of an IPaaS reference architecture:

The IPaaS architecture model



This IPaaS architectural model contains multiple components organized into three main layers:

1. **External**: For trading partners, eCommerce, Internet of Things (IoT), mobile devices, etc.(i.e. systems of engagement)
2. **Integration**: Includes ESB, BPM, IBM® WebSphere® Cast Iron, IBM WebSphere Application Server, business activity monitoring (BAM), IBM Sterling Commerce®, and predictive data analytic capability (i.e. systems of interaction)
3. **Internal business application**: Includes product lifecycle management, digital operation, customer relationship management, enterprise resource planning, and data warehouse (i.e. systems of record)

IPaaS typically uses SoftLayer as its cloud-based solution, however the IPaaS model is equally applicable to private cloud, public cloud, or hybrid cloud solutions. The cost for the IPaaS setup and standard operation is derived using a flexible, consumption-based model to calculate a monthly charge. It will reduce any unnecessary usage to a much leaner model — meaning you only pay for the actual usage (pay as you go). We will go into more detail on the cost model later and explore how to achieve the saving using a services catalog to calculate consumption.

ROI is a significant benefit of the IPaaS approach. The initial acquisition costs for hardware and software are amortized into the IPaaS consumption model, along with the run costs associated with platform and application support. An IPaaS approach usually has a break-even point as early as 8 - 10 months, with actual savings occurring within a year.

IPaaS as a cloud-enabled solution for end-to-end enterprise integration requirements

Consider the IPaaS architecture model example shown above. The enterprise integration capabilities for this example extend beyond the traditional SOA concept of the ESB. This is where the "Integration Platform" aspect of IPaaS becomes important. IPaaS allows additional capabilities beyond the ESB to be included in the integration solution. The "as a Service" aspect of IPaaS means that these capabilities can be readily deployed using cloud technology. These additional IPaaS capabilities are already interoperable with each other, and they can be brought on-line quickly, incrementally, and cost effectively.

In this example of an IPaaS architecture model, multiple integration components work together to constitute the IPaaS services. The main components in this particular example are:

- Enterprise service bus (ESB)
- Business process management (BPM)
- Business activity monitoring (BAM)
- Managed file transfer (MFT)
- Cloud Infrastructure as a Service (IaaS and PaaS)

A specific IPaaS implementation can use a different mix of enterprise integration components, depending on what the particular requirements are. For instance, in addition to the components listed above, API Management, Electronic Data Interchange (EDI), and real-time business analytics can be added to provide additional IPaaS capabilities.

For this particular IPaaS example, let's drill down into each of the major components and their enterprise integration capabilities.

ESB

ESB is a software architecture model that's used for designing and implementing communication between mutually interacting applications in a service-oriented architecture (SOA). The ESB helps make communication between applications more agile and flexible.

IBM Integration Bus Advanced is a robust and flexible integration foundation based on ESB technology. It provides connectivity and universal data transformation in heterogeneous IT environments. It enables businesses of any size to eliminate point-to-point connections and batch processing, regardless of platform, protocol, and data format.

Key capabilities:

- Utilizes robust capabilities that address diverse integration requirements to meet the needs of any size project

- Helps your entire organization make smarter business decisions by providing rapid access, visibility, and control over data as it flows through your business applications and systems
- Connects throughout an array of heterogeneous applications and web services, removing the need for complex point-to-point connectivity
- Provides extensive support for Microsoft® applications and services to make the most of your existing Microsoft .NET skills and software investment
- Delivers a standardized, simplified, and flexible integration foundation to help you more quickly and easily support business needs and scale with business growth

Integration Bus Advanced is designed to address this need by providing a platform-neutral ESB that is built for universal connectivity and transformation in heterogeneous IT environments. By enabling you to abstract your data away from protocol and transport specifics, an ESB allows you to separate information distribution from the actual business logic that governs that distribution. This capability, in turn, makes the data centrally available within the ESB, and offers the potential to develop new value-add services that can use your critical data.

Integration Bus Advanced offers the following capabilities for managing diversity:

- Support for diverse data formats
- Support for one-way messaging as well as request-response, aggregation, and publish-subscribe patterns
- Support for point-to-point applications using request-reply or client-server models
- Support for persistent and non-persistent messages
- Support for global transactions (a message flow either completes all or none)
- Content-based routing

In addition, Integration Bus Advanced delivers an integrated set of IBM WebSphere adapters (PeopleSoft, SAP, and Siebel) based on Java™ Connector Architecture (JCA). These adapters are delivered as built-in nodes:

- Application adapters: SAP, Oracle EBS, JDE, Siebel, PeopleSoft
- Technology adapters: JDBC, flat files, FTP, ECM, IBM i, IBM Domino®, email

You can also create custom adapters.

BPM

BPM has been referred to as a holistic management approach to aligning an organization's business processes with the wants and needs of clients. BPM uses a systematic approach to continuously improving business effectiveness and efficiency while striving for innovation, flexibility, and integration with technology. It can therefore be described as a process optimization process.

IBM Business Process Manager is a comprehensive and consumable business process management platform that offers enhanced visibility and management of your business processes. It includes tooling and run time for process design, execution, monitoring, and optimization. It is specifically designed to make it easy for process owners and business users to engage directly in the improvement of their business processes. The main components are as follows:

- **Process Center**: Offers centralized control for governing deployment of process and services to production run time. This scalable repository and control center helps in organizing and managing all process artifacts, applications, and services created as part of a BPM program, and provides deployment visibility and control across all environments. Its shared library of all process assets facilitates drag-and-drop reuse and collaborative and social implementation.
- **Process Server**: Allows for single BPM run time supporting a full range of business processes, service orchestration, and integration. It executes processes consistently, reliably, securely, and with transactional integrity. It is designed to allow for high scalability and availability with extended support for high-volume process automation and high quality of service. It also features rich repair and recoverability capabilities, such as automatic retries, manual repair, compensation, and store and forward. In the Advanced Edition, it also hosts integration designer flows and has enterprise service bus functionality.
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IBM Business Process Manager helps companies dramatically improve operations, empowers business users and gives them direct control of the organizations processes, and enables repeatable success with each new process and BPM program. By utilizing IBM Business Process Manager, clients can vastly improve their ability to change, innovate, and improve organizational decision making regardless of line of business use.

IBM Business Process Manager is fully business process monitoring notation compliant, including the constructs for events. Web-based forms are built in a WYSIWYG coach designer (modeled form definitions are represented internally as XML).

BAM

BAM refers to the aggregation, analysis, and presentation of real-time information about activities inside the organization and involving customers and partners. A business activity can either be a business process that is orchestrated by BPM, or a business process that is a series of activities spanning multiple systems and applications.

Key BAM capabilities:

- Dashboard containing key performance indicators
- Visibility into activities and performance
- Business event correlation
- Ability to connect to existing monitoring environments

MFT

Sterling Connect:Direct® provides security-rich, point-to-point file transfers that can eliminate dependency on unreliable File Transfer Protocol (FTP) transfers. It is optimized for high-volume assured delivery of files within and among enterprises. Sterling Connect:Direct can deliver your files with:

- Predictable, assured file delivery through automated scheduling, checkpoint restart, and automatic recovery

- Security-rich transfers that help keep customer information private and aid regulatory compliance measures
- High performance that can handle your most demanding workloads, from high volumes of small files to multi-gigabyte files

This MFT service is offered by IBM Sterling as a consumption-based service in the cloud. The IPaaS offers the required capabilities to securely and reliably connect to this service.

ESB gateway

IBM WebSphere Cast Iron Cloud integration products enable you to integrate cloud and on-premise applications in days, reduce integration costs, and optimize resources and productivity in Software as a Service and cloud models. They provide a graphical configuration approach — rather than custom coding, on-demand tooling, or traditional middleware — to help you integrate applications quickly and simply. They use pre-configured templates based on common integration scenarios to accelerate integration.

WebSphere Cast Iron Cloud integration products provide several capabilities for near real-time integration: data cleansing and migration, data synchronization and connectivity, workflow and transformation that enable you to orchestrate integration processes across multiple applications. Mash-up capabilities enable you to integrate information from disparate sources and to display it using the native user interface of a cloud application. WebSphere Cast Iron Cloud integration products also support mobile applications by harnessing data and processes from other parts of the enterprise.

Cloud IaaS and PaaS

IBM's IPaaS cloud solution combines the capabilities of five core integration components in SoftLayer — ESB, BPM, BAM, MFT, and ESB gateway — thereby offering simplicity, visibility, governance, and the power of the most comprehensive IPaaS platform without sacrificing capital and resource budgets. Through this service, a company can immediately start recognizing the benefits offered by IBM IPaaS with minimal up-front cost and resource requirements. Furthermore, expert IBM resources handle the scalability and security of the infrastructure.

Conclusion

So far, we explored the technology and business factors that have driven the emergence of IPaaS, along with the capabilities and components that characterize the IPaaS approach to enterprise integration. In Part 2, you'll see the key attributes of IPaaS that distinguish it as a service, and learn why these characteristics make a service approach to enterprise integration so valuable.

Related topics

- IBM Business Process Manager Pattern V8.5.5 documentation
- Integration Patterns
- Integration Throughout and Beyond the Enterprise