TIBCO BW6 and MuleSoft Anypoint Platform:

Considerations for the migration

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1 Introduction

After a long and successful journey for TIBCO BusinessWorks 5 (BW5) in the area of enterprise application integration, the next major version of the product, TIBCO BusinessWorks 6 (BW6) was unveiled. It was a purpose-driven release, with a focus on enabling teams to develop cloud-native applications. It came with many architectural changes to the way the product was built, and in many ways, it seemed like a newer product rather than a version upgrade.

In this paper, we shall discuss the emergence of TIBCO BusinessWorks 6 and compare it with the MuleSoft Anypoint platform that has grown from a contender into a leader over the past decade. The paper would cover the product capabilities and adoption from customers in the areas of API design, implementation, deployment, and management.

2 Considerations

There are a few prominent considerations when determining the Integration tool of choice. Here are some that customers are looking for, at the onset.

- *Design tools:* A platform that allows for easy design of APIs, standards-based and integrates well with the implementation platform.

- *Implementation:* The ease of building APIs with rich functionality to implement various activities of integration (e.g., aggregation) keeps the code simple and organized. Support for Sync and Async patterns of integration.

- *Runtime environment, Microservices, Deployment:* The runtime environment setup; the ease of deploying APIs as cloud-native applications; microservices.

- *API Gateway:* An API Gateway that allows for internal and external consumers to subscribe and re-use APIs.

- *Monitoring and Management:* The aggregation of usage statistics and alerts on a centralized dashboard is essential for operations teams for the smooth running of businesses.

- *Developer Community:* A large open developer community helps with exchange of ideas and problem resolution is an added advantage. It can be a knowledge hub for teams to collaborate, learn and contribute.

TIBCO BusinessWorks 6 (or TIBCO BusinessWorks Container Edition), is not an iPaaS solution, but allows for packaging services into containers that may be deployed as micro-services on cloud. TIBCO offers TIBCO Cloud Integration (TCI) that is an iPaaS platform. Services that are built through TIBCO BW6 may be containerized and deployed on the TCI platform. Although this paper compares the differences in capabilities between TIBCO BW6 and MuleSoft platform, references are added to TCI wherever it was deemed necessary based on the context.

2.1 Design Tools

For API providers and consumers, it is essential to arrive at a consensus on the API contract before the implementation has started. Readying the contract beforehand helps avoid multiple implementation iterations, which can be time-consuming and expensive. When the contract is ready and agreed upon, the implementation can follow.

Both TIBCO and MuleSoft propose design-first methodology that helps build the prototype for an API and allows the consumers to test it.

MuleSoft Anypoint Platform comes with *Design Center*, that provides a platform to build API specifications. API specification can be created through reusable components that can be within the specification folders or imported from *Anypoint Exchange* (a marketplace that can host reusable assets). Anypoint Exchange provides a window into organizational assets and allows for discovery, subscription, and reuse of assets. In the case of building API specifications, certain common policies (for example, OAuth implementation) may be added to reusable components called traits and imported and reused across multiple API specifications within the Organization.

TIBCO BW6 does not include a platform for building an API spec, but this is provided as part of TIBCO Mashery which is another tool in the TIBCO suite of products. TIBCO Mashery provides an easy-to-use UI to build specifications, however, it does not integrate with any marketplace that may enable reuse of common assets.

2.2 Implementation

2.2.1 Core Integration Functionality

Integration services handle activities such as data transformation, aggregation, service orchestration, and many other control flows to accomplish service goals. A developer-friendly tool helps with providing out-of-box processors or activities for such functionality. Such handy features help developers focus on the overall API process flows rather than spend time on building blocks such as iterations, control flow, etc.

General Activities

Both MuleSoft and TIBCO provide a good number of *palettes* or *plugins*, that contain easy to implement functionality with regards to file handling, flow control features such as iterations, logic-based controls, and event-based triggers to capture incoming messages, files, or time-based schedules. It allows support for synchronous and asynchronous processes of events.

Both TIBCO and MuleSoft provide features to orchestrate process flows through request-response activities for a variety of endpoints such as API-invocation, SOAP services, databases, etc.

Connectors

A critical consideration for any integration tool is the number of adapters or connectors that are available to use. The adapters are out-of-box software that are programmed to interface with an external system. For example, if an enterprise uses SAP as their ERP implementation, and needs its integration tool to get or post regular updates from the ERP, then having an out-of-box built connector helps with quicker development and eventually faster time-to-market. It helps with developers being able to work at a

higher-level of abstraction and worry about the overall service goals than spending the effort on building a connectivity solution for the ERP.

Both TIBCO and MuleSoft provide a large set of connectors/adapters for a variety of commonly used external systems. However, the way these connectors are made available is different.

In the case of TIBCO BW6, a plugin software is used, that would be installed on the developer's machine. This installation allows for the TIBCO BW6 studio to access the functionality provided by the connector/adapter. If TIBCO BW6 runtime is being used for running the integration software (Based on the runtime that is being used in the enterprise, this plugin may need to be installed on the TIBCO BW6 runtime as well. In the case of TIBCO BW CE (Container Edition), the plugin software would be packaged into the container image, so there would not be a need for any other installation for the runtime environment.

As part of MuleSoft Anypoint platform, the *Exchange* provides a window into the various types of assets – ones that are available within the enterprise and those that are publicly available. The connector may be easily added into the integration project through the Exchange (accessible from the Studio environment), and the appropriate functionality from the connector may be used out-of-box as shown in the screenshots below.
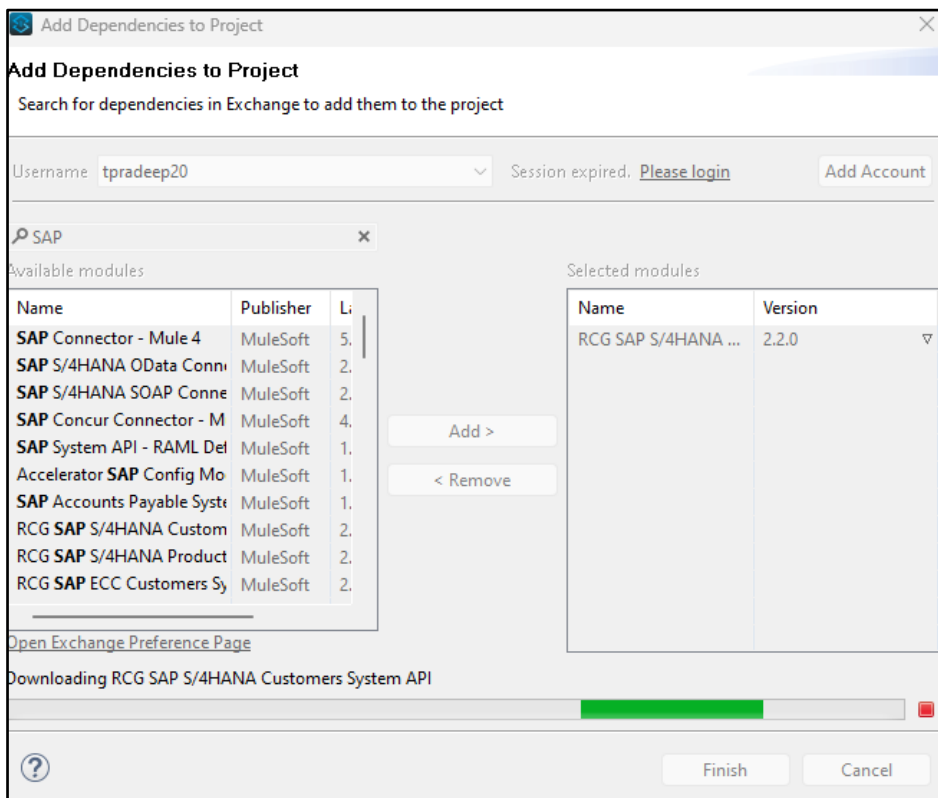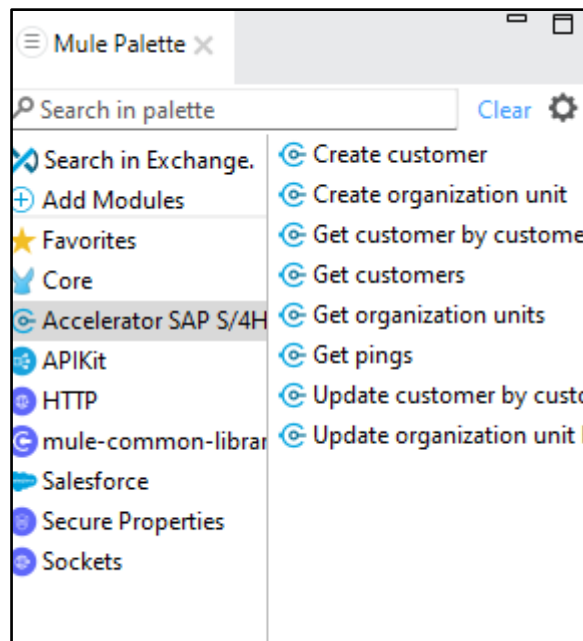

Figure 1 Downloading a Connector

Figure 2 Out-of-box functionality from the connector

2.2.2   Data Transformation

Data transformation is an essential phase of any integration service. As the service potentially interacts with multiple systems, and each system may have its own data format to comply with, in order to invoke the appropriate service, it becomes critical that an integration tool provides an easy-to-use way of data transformation.

TIBCO provides appropriate *activities* for parsing, rendering, and transforming data, to and from various data formats. Developers may use these activities to deal with delimited or fixed-format data or XML data. There are plugins available to handle formats from Cobol Copybooks as well.

One of the highlights of data transformation through MuleSoft is the use of a powerful transformation language called DataWeave. The current version, DataWeave 2.0, has many built-in functions to handle various MIME-formats for transformation. There is a long list of supported formats that includes JSON, XML, Java objects, YAML, etc. What would be an elaborate set of steps for data transformation in any integration platform, may be achieved instead through a single line code in the DWL scripts. The full list of supported formats can be found at https://docs.mulesoft.com/dataweave/latest/dataweave-formats. The list here would explain the ease and saved efforts in data transformation through MuleSoft.

The DataWeave Language scripts (or DWL scripts) may be built and stored separately into a different package within the Mule project. These scripts may be referred to from within the appropriate process flow. The separation of the scripts from the process flow helps in reuse of the transformation logic at multiple points within the project. These scripts may also be added to common libraries that may be imported and utilized across multiple Mule projects.

Also of note is the fact that DataWeave language is given away as open-source software. More info: https://blogs.mulesoft.com/news/dataweave/

2.3 Runtime Environment

As a prelude to the topic, it is important to note that TIBCO BW6 or BWCE is a tool that allows for containerizing integration services that are built using TIBCO BW. However, the management of the runtime environment falls outside the scope of TIBCO BWCE. MuleSoft, on the other hand, provides an integrated Anypoint Platform that provides access to a *Control Plane* to design services, and a *Runtime Plane* to deploy services.

Among the many advantages of microservices, it is the flexibility that allows scaling-up or scaling-down that is the most prominent. As long as the services are designed to be stateless, one can configure them to be scaled based on the expected traffic and throughput needs. Also, scalability is one of the fundamental properties of a cloud-native application.

The following sections cover how the runtime components, the applications, are deployed and the role that TIBCO or MuleSoft platforms play in getting the services (microservices) into the runtime plane.

2.3.1 TIBCO Runtime and Deployment

TIBCO BW6 RUNTIME

An enterprise may choose to deploy TIBCO BW6 applications into a runtime environment provided by TIBCO BW6. The BW6 runtime is a proprietary runtime provided by TIBCO that is installed on-prem and managed by operations teams skilled with TIBCO runtime administration. TIBCO provides multiple options to deploy into BW6 Runtime.

- Eclipse-based TIBCO BW6 designer – A user can deploy an application directly into TIBCO BW6 Runtime
- bwadmin Command Line Interface (CLI) – A CLI is provided by TIBCO that can take the deployable artifact and configuration as inputs and deploy into the runtime TIBCO BW6 domain.
- TIBCO Enterprise Administrator – TIBCO Runtime domain may be manually integrated with Administrator that provides an Admin UI, through which a step-by-step deployment may be performed.

It is noteworthy that all the components needed to deploy a TIBCO BW6 application, such as Enterprise Administrator, related plugins, BW6 Runtime should be installed and managed onprem. These activities pose a considerable amount of overhead for the operations team that maintain the software. Furthermore, the BW6 environment does not provide a cloud-based deployment.

TIBCO BWCE – CLOUD-BASED RUNTIME

TIBCO BWCE, provides a way of containerizing integration services built in TIBCO. After the container image is ready, the Operations team may take over for deployment. In this case, the runtime environment for deploying the TIBCO applications is outside the scope of TIBCO BWCE. The environment would be managed separately by enterprise infrastructure and operations teams. The runtime environment may be implemented on a private or public cloud. For example, a container image generated using TIBCO BWCE may be instantiated in a local docker environment, or on a Kubernetes cluster or a Kubernetes cluster managed by Red Hat OpenShift. Based on the runtime environment that is chosen by the infrastructure team to run the applications, the deployments are managed accordingly.

2.3.2 Mule Runtime and Deployment

A deployment of Mule service, on the other hand, is facilitated by the Anypoint Platform. MuleSoft platform manages the runtime plane where Mule services are deployed. The applications may be deployed in one of the multiple ways –

- Anypoint Studio can be used to deploy directly from the design-time IDE to the runtime plane.
- Anypoint Runtime Manager provides a user interface that allows for uploading the deployable package, assigning resources, application configuration and deployment.
- Anypoint Platform also provides a Command Line Interface (CLI), that may be used to deploy the package into Mule Runtime environment.
- Finally, a Mule Maven plugin is available that may be used to configure the deployment settings and automated for deployment through CICD pipelines.

MuleSoft provides an integrated runtime plane that is managed by MuleSoft Anypoint Platform that needs no installation, however, if a customer choose to have the runtime plane on their datacenter, then there is an option to install Anypoint Runtime Fabric. The Anypoint Runtime Fabric connects with Mule Managed Control Plane and provides the same platform interface that seamlessly integrates control plane and runtime plane as in the case of Mule managed runtime (CloudHub).

2.4 API Gateway

An API Gateway acts as a window through which access to organizational assets is managed. The Gateway may act as an interface for both internal and external users in an enterprise. Some of the most common features of an API Gateway are –

- Security – Access Management, Encryption, DoS, etc.
- Access Policies including rate limiting, tiered subscriptions, etc.
- Observability – Dashboard for metrics, insights, and notifications
- Support for OpenAPI Standards

Note that TIBCO Mashery is the API Gateway solution from TIBCO. It should be noted that this is a separate offering from TIBCO that is different from TIBCO BusinessWorks, whereas, MuleSoft integrates the API Gateway functionality into MuleSoft Anypoint Platform. However, TIBCO Cloud Integration (TCI) is an integrated iPaaS platform from TIBCO that integrates with TIBCO Mashery as a cloud platform. In this section, we'll discuss the offerings provided by TIBCO Mashery and compare them with MuleSoft API Gateway that is part of Anypoint Platform.

2.4.1 TIBCO Mashery

TIBCO provides Mashery as the API Gateway solution. TIBCO Mashery comes in two forms, *TIBCO Mashery-local* (on-prem) and *TIBCO Cloud Mashery* (SaaS solution).

TIBCO Mashery local may be installed on cluster managed by Kubernetes or Docker Swarm in either single zone or multi-zone topologies. Each of the Mashery components are instantiated from respective docker images. The installation may be done on customers' private cloud or on a VPC provided by cloud vendors such as AWS, Azure, or GCP. The installation, configuration, and maintenance of Mashery components is an elaborate process that needs coordination between infrastructure and TIBCO Mashery experts.

TIBCO Cloud Mashery (also referred to as TIBCO Cloud API Management) is a solution that allows for all the features of on-prem version and comes with the ready-to-use platform.

2.4.2 Mule API Management

Whether the runtime plane is hosted on CloudHub (Mule provided Runtime) or on the customer data center, Anypoint Platform provides the same experience to manage APIs. It helps avoid the overhead of installation, configuration, and maintenance of the software. The control plane contains *Anypoint Management Center* that helps with configuration and deployment of APIs.

ANYPOINT API MANGER is part of the Anypoint Platform that provides a set of screens to manage APIs. It allows to create and attach policies such as rate-limiting, manage API access, etc.

ANYPOINT FLEX GATEWAY provides enterprise-level security irrespective of where the APIs are running. It extends the ability to cover for APIs that are running outside of Anypoint Platform's runtime plane. This helps with centralizing the management of APIs across the organization.

ANYPOINT API COMMUNITY MANAGER allows to create and customize API developer portals based on customers' needs.

MULE API GOVERNANCE provides templates for validation of best practices including security, naming, etc. The out-of-box Governance templates may be installed and used to maintain the uniformity of APIs across the organization.

2.5 Monitoring and Management

TIBCO BW6 or CE is primarily used to package applications into containers, and the BW tool itself does not provide any monitoring or management capabilities. In most cases, the enterprises that maintain the cloud environment (private or public) build monitoring capabilities on top of their applications. These monitoring tools fall outside the scope of TIBCO environment. Any specific needs such as alerts and notifications are configured by Teams handling the operations. However, TIBCO Cloud Integration (TCI) provides a mechanism to configure a unified view of all the BW applications running in the enterprise cloud (private or public cloud). A software program called *Hybrid Agent* is deployed in a sidecar architecture along with the BW containers. These agents capture the metrics from the BW container and store them into a database. These metrics are carried into the TCI UI through a *tibtunnel*, that provides a view into the BW applications in runtime.

Monitoring and management of applications is integrated into MuleSoft Anypoint Platform. The information about the applications is aggregated and presented on Anypoint Monitoring built-in dashboard. There are options to build customized dashboards and to configure alerts for any specific events. The platform also provides REST APIs to read this data from a third-party consumer.

2.6 Developer Community

An active developer community helps enterprises in understanding, sharing knowledge and resolving issues. Integration tools connect with many different applications and datastores, so it is important to have a platform that brings the developers and product owners together. These platforms help in identifying the issues that the developers are facing and also provide recommendations to resolve. At a broader level, these platforms help product owners understand the needs of developers and complete their feedback loop to make adjustments accordingly.

MuleSoft actively promotes leaders from various organizations to arrange for regular regional technical meetups, recognizes leaders and promotes collaboration. Open platforms such as https://help.mulesoft.com allow for anyone to register and be part of knowledge sharing, etc. MuleSoft also provides a trial version of the platform for anyone to register and use it, along with free developer courses to get started.

Contributors

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About ProwessSoft

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