An intelligent automation platform that combines self-service integration and real-time orchestration services coupled with predictive analytics aligns with the urgency of being faster and more insightful than competitors with no or only minimal help from developers.

Intelligent Automation Focusing on Real-Time Insights Drives Competitive Advantage

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Introduction

During the depth of the pandemic, businesses that operated at a faster clock speed than their competitors generally outperformed them. In effect, they were able to monetize their speed of operations. Speed to market in delivering new capabilities, speed gained by standardizing and orchestrating distributed processes and speed to insight by being best at utilizing predictive analytics all accelerated an organization's ability to take advantage of opportunities.

As we all experience new challenges as a fallout from the massive disruption caused by COVID-19, teams are rapidly shifting some types of digital enablement from the sole province of professional developers to non-technical subject matter experts and business teams who can use their expertise and insight coupled with next generation intelligent automation platforms that are geared toward business user digital enablement.

Self-service integration and orchestration services are a key component of the overall changeover to business user digital enablement. They provide connectivity for the exchange of data and services across a decentralized architecture and support real-time and near-real-time transactional and analytic requirements for experiential engagements, decision making, and automation. And there is a whole class of services that can used by end users to design and implement integration and orchestration with no or only minimal help from developers.

Intelligent automation platforms geared toward business users also support the configuration and training of prediction models that may be offered by an organization's data scientist team or third-party algorithms that can then be trained by business users using the organization's transaction data.

Managing a single process across multiple clouds is changing integration and orchestration requirements substantially as businesses focus on automation and faster business cycles. Common design patterns illustrate how integration needs are evolving that require a broader set of capabilities:

> » Cross-application orchestration of project and team activities

AT A GLANCE

KEY TAKEAWAYS

» Leveraging data collected in near-real-time as applications are being integrated and combining with ML models provides a new source of highly contextual recommendations.

» This new style of no-code, ML-based intelligent automation offers an opportunity for business users team to work together design insights driven solutions for competitive advantage.

» Training and leveraging machine learning models for predictive insights that can be used in production

» Automating Low-Value Activities Performed by High-Cost Workers

» Converging predictive analytics with data workloads

Cross-Application Orchestration of Project and Team Activities

Teams work together on activities and projects. Teams typically are organized into roles and are assigned project or activity responsibilities based on their roles. Activities are often performed in separate applications even when those activities are related.

Project managers or administrators traditionally manually coordinate key areas such as the tasks, task order, deadlines, problem identification, data sharing, and performance monitoring. To save costs, support staffs are shrinking or being eliminated entirely, leaving teams to manually perform tasks on a self-service basis.

Teams normally try to address this challenge by implementing business process management to coordinate the tasks. However, this type of automation requires implementation help from developers. With the IT organization under pressure to cut costs while taking on new strategic projects involving innovation, there are no resources to handle tactical custom process automation requests.

As a result, business teams must work faster with less support and using applications that are uncoordinated. This situation creates demand for simple, visual tools that can be used on a self-service basis to design the project or activity workflow that must be executed to manage the work. Orchestration becomes the digital administrator and includes task identification, task completion, rules and conditions, and shared data and content assets.

This type of automation requires a connectivity and orchestration solution capable of:

» Visual design to define the tasks required to complete a repetitive project or set of activities, such as a marketing campaign or talent recruitment

» Connectivity to application endpoints

» Collection of data that tracks performance metrics and costs, as well as data assets that are shared across the set of applications

Training and Leveraging Machine Learning Models for Predictive Insights

PIF designs and supplies the models in the predictive engines, which include conversion propensity, revenue generation, lifetime value (LTV), exception management, anomaly detection and reconciliation. Each of these models is configured by a business user or data analyst to enable the models to become dynamically responsive to the questions being asked. The training data come from two sources – the underlying data in applications that are connected to the solution and from benchmark data developed by Put It Forward, which aggregate and produce composites of cross company data to counter bias. Data consumed into the model can either come from a position at rest within a source system or it can be in motion as it's flowing through an integration pipeline.

How the predictive insights go from development (the insight phase) to production is through a step function within an orchestration stream or flow. In the conversion propensity model, for example, a new lead is run through the model and the outcome data is then directed back into the orchestration flow where rules determine next steps. Steps examples include have someone call them, send a high value piece of content or offer a retention incentive.

The predictive insights work by continuously sampling the data as its flowing between systems and on data that is at rest.

A business user has two ways to work with the results – they can select "send to" which connects with a step in an orchestration flow within PIF or they can download the entire raw data set that can then can be uploaded into other PIF orchestration steps.

Automating Low-Value Activities Performed by High-Cost Workers

Individual workers are frequently asked to manually work in uncoordinated processes that are both mandatory and could be improved with automation. When such work is performed by a high-cost employee, the effort is wasteful. Business travel offers a classic example of this problem, where there are multiple tasks across a set of applications that involve bookings, booking costs, travel, expense reporting, reimbursements, and policies that comply with internal rules and tax regulations.

An emerging design pattern orchestrates processes performed by an individual worker with the goal of using events and APIs to automate tasks. When a user needs to interact with an app, the interaction is triggered and delivered as an interactive form or link to an email or to the notification stream of a mobile app.

This type of automation requires an integration solution that enables:

» Visual design that defines the process and tasks

» Connectivity to application endpoints used in the process

» A stateful data object that defines all automated and manual tasks, tracks them as they are completed, and triggers the timing and delivery of each next task

» Forms or links to the application delivered into an email or notification stream

Converging Predictive Analytics with Transactions-Based Workloads

Integration used to be divided into two types: application integration software that processes transactions and connects applications together in near-real-time, and data movement and integration software that schedules the delivery of data to a database, data warehouse, or data lake to support descriptive analytics or to train artificial intelligence (AI) models.

The delivery of business transactions and insights is converging into a common architecture sharing common software assets, especially for initiatives supporting DX.

When new data is delivered and processed continuously in near-real-time, businesses can take advantage of the insights gained from the faster speeds.

The sheer diversity of applications that require high-speed connection across internal and cloud locations poses challenges to integration teams, and most teams have become good at batch synchronization of data between diverse
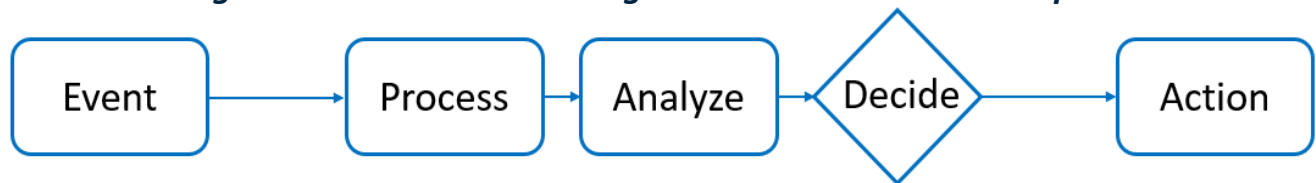
locations and to centralized data warehouses, customer data platforms, and marketing data platforms. But speeding up insights offers teams greater opportunities to respond to those insights that are not available by using scheduled batch delivery. The newer requirements need high-speed coordination across diverse locations to support connected processes, digital experiences, and digital services, posing new challenges to the handling of processing speeds, reducing latency and, in some cases, processing volumes.

In these newer applications, the value is in capturing and collecting data as events and managing the data inline with the runtime of the designed experience. Examples include monitoring actions on an ecommerce site to continuously improve recommendations, triggering an offer when a customer checks into a hotel, or evaluating the sentiment of someone calling in for customer care. These use cases employ predictive analytics in combination with rules and optimization software to make decisions and automate responses as well as augmenting how workers communicate with customers.

The new requirements also involve managing situational awareness by maintaining instances of a prospect or customer while a session, promotion, journey, or cross-channel shopping is active. In these scenarios, the results may be delivered into a data store, but more importantly, the output is always used to update in-memory data instances that are shared across teams and automated processes.

Figure 1 shows an example of the cycle of receiving new data and responding it, including ingesting new data, processing it, applying AI, and then applying decision logic to determine whether an action is warranted. If so, instructions are sent to a system that manages the response. Many of these use cases must deliver a response in milliseconds, and to do that requires a fast and responsive data architecture.

FIGURE 1: *Adding Prediction and Decision Stages to an Event-Driven Data Pipeline*

Source: IDC, 2021

These architectures may be built totally by an enterprise or executed using a set of packaged applications. For example, a social analytics package may receive data from the Twitter Firehouse to perform sentiment analysis. Decision and optimization may be performed in a marketing application that determines the best offer or executes a customer journey. Execution of the decision is also handled in those same applications. Connectivity solutions in these cases must support event-driven styles of communications across applications.

Integration Must Also Connect and Deliver Events from Ecosystem Partners

Businesses are also re-thinking their alliances with partners around how they jointly add value to a customer relationship. It isn't uncommon for one business to cooperate with others around shared goals with their customers and prospects. For example:

» Banks form partnerships with service providers as part of credit card loyalty programs

» Hotels work with restaurants and entertainment venues to enrich and optimize a guest's experience

» Insurers work with travel and entertainment businesses to provide greater value

» Retailers and ecommerce services work more directly with manufacturers on logistics and fulfillment and with providers of installation services to ensure greater availability of good and better service to customers

These relationships mean integration teams must learn how to connect to partner applications and manage the data collected in the same near-real-time cycles. In some cases, the data flows are also transient, such as managing acknowledgements and maintaining situational awareness of commitments and offers. In other cases, APIs are created or implemented to capture results and move them into data stores that manage conversion rates and other measures of success from the alliance partner.

Traditional integration software must be augmented to form a collection of technologies, tools, and services that work together. This software must holistically meet end-to-end connectivity, integration, and access requirements across an enterprise's ecosystem of cloud and non-cloud applications in addition to the applications of its partners and alliances.

## New Requirements of Integration and Orchestration Software

Traditional integration must be extended by embedding more deeply into a process tier that connects applications together to execute projects, activities, and processes. In this tier, integration and orchestration is used to capture new data, trigger new tasks, establish policies, manage the state of shared data assets, and unify applications to allow teams or individuals to work toward a common goal regardless of which application performs the work. Integration and orchestration services also must be able to:

» Operate in a decentralized, multivendor, multipartner, and multicloud architecture

» Support event-driven, reactive design in addition to request-response patterns

» Speed up cycle times by re-orienting toward real-time and near-real-time execution

» Manage the coordination of data streaming into both inline data and AI models

» Increase automation

» Embed and improve security

» Support diverse roles, including partners, third-party developers, non-integration specialists, data scientists, business analysts, and end users

» Provide visual design capabilities to business users that need to define how to work across applications

All these capabilities (shown in Figure 2) are part of a larger DX platform.

Figure 2: *Integration Services Supporting Digital Transformation*
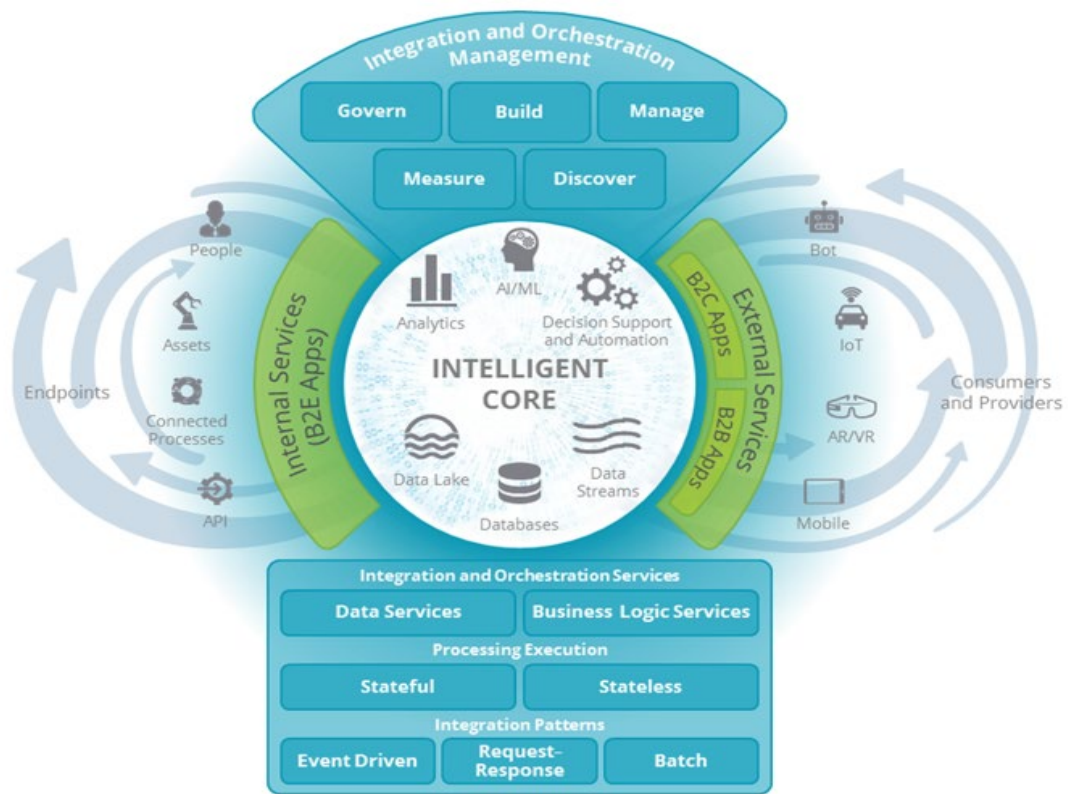
Source: IDC, 2021

Stateful Elements of a Microservices Architecture

Beyond extending and modernizing integration capabilities to better support successful capture and use of transient data and execute tasks, there is a new requirement to support different types of stateful processing. This can involve multiple structures. One is stateful process, where there is real-time understanding of the current stage of an orchestration or process. On the inbound side of data ingestion, state is supported by queues and topics to manage incoming data prior to and after processing to ensure data that was sent was received, that no data is lost while waiting to be processed, and to gain access to the data used across applications. This is true for both analytics and transaction processing.

Stateful data objects are also required to speed up and provide better control for accessing data needed to execute a short- or long-running process or journey. Managed inline with the processing, the data objects may include the most up-

to-date information about a prospect or customer and related activities that are required to trigger a promotion, support a customer call or customer self-service, and enable other activities that require situational awareness.

For condition-based monitoring, there is a need to evaluate each new data event against a set of conditions that trigger a response as warranted. This evaluation can be used to trigger a promotional offer; it can also trigger a trouble ticket if equipment is about to fail in an Internet of Things (IoT) use case. The evaluation can also be used operationally to compare how well customer experience metrics are working. For example, determining whether an order will be delivered on time may trigger a prediction about customer churn and an optimization to determine the next best action to prevent churn.

Data often comes from diverse locations, and depending on cycle times and data volumes, the stateful business object may be constructed using data virtualization technology or may involve moving the data to a cached in-memory object.

Managing state is complementary to stateless processing. Stateless (ephemeral) processing tends toward event models that do not require state to be persisted between interactions or leaves the management of state to the appropriate stateful option.

In stateless processing, the endpoints managed across the DX platform generate events that are received into a queue, an API gateway, or delivered to an API. The queue or request triggers stateless processing of the event. Microservices and events are key examples of reactive components used for stateless execution.

Pipeline is an ephemeral design pattern that executes microservices statelessly, where an event triggers a call to the API of a microservice and posts the output to the next microservice, triggering processing and output and so on, until the pipeline has finished processing. Stateless processing provides significant advantages in decentralized systems because services can run autonomously, have less dependency on computing resources, are easier to manage when exceptions occur, and tend to be faster and scale better.

For DX use cases, stateful and stateless processing often work in combination.
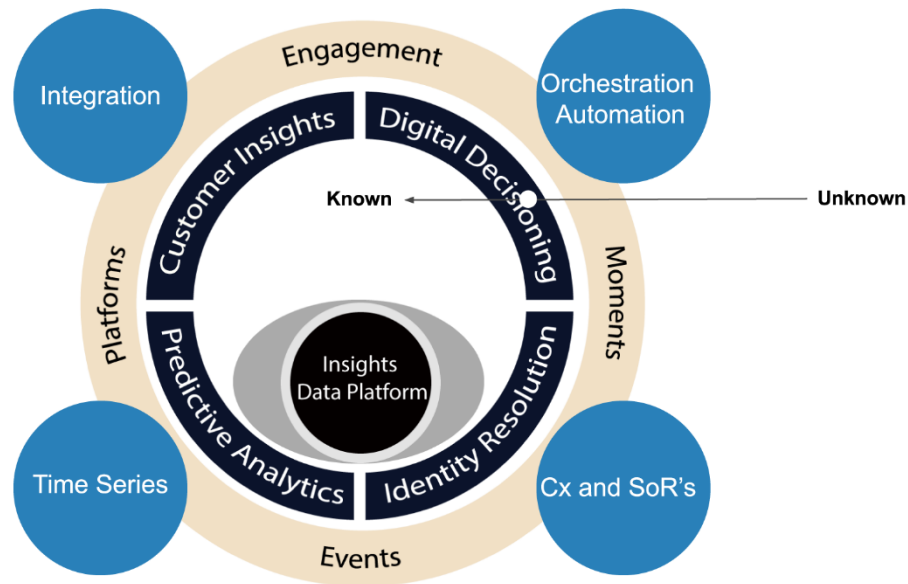
Considering Put It Forward

Put It Forward was founded in 2010 with its first in the market product in 2014 focused on the needs of enterprises trying to connect SaaS applications. The company provides an intelligent automation platform with more than 300 out-of-the-box end-to-end integration connections, orchestration services with a library of pre-built models and predictive analytics products. This bridges integration with incite between common SaaS, on-premise applications and partners with together.

Put It Forward has more than 100 customers and hundreds of deployments. Key technology partners include Adobe, Oracle, Qualtrics, Salesforce, Sitecore, Snowflake and SugarCRM, . The company reports experiencing rapid growth of between 50%-200% per year.

As shown in Figure 3, Put It Forward offers a comprehensive capability set needed for the modern digital enterprise to succeed. Value from data requires and involves more than just simple powerful integration – it must create it in any context.

Figure 3: *PIF's Insight-Centric View*

Key aspects of the Put It Forward platform include:

» Enabling iPaaS connectivity and orchestration and event-driven delivery of data between the endpoints of SaaS and enterprise applications

» Developing and using of AI models in production for process insights

» Supporting data virtualization, which provides situational awareness without the need to move underlying data stored in different endpoints

» Providing inline, in-memory stateful data objects used to keep track of data needed for insights and to execute business logic

» Creating and managing the continuous, event-driven delivery of data as well as batch-oriented scheduled delivery

» Providing a secure visual development environment that supports high productivity development by professional developers and enables business teams to build their own automation and workflow for task execution across applications (see Figure 4).

Figure 4: *PIF Platform Builder, Events and AI/ML Insights with Prediction*
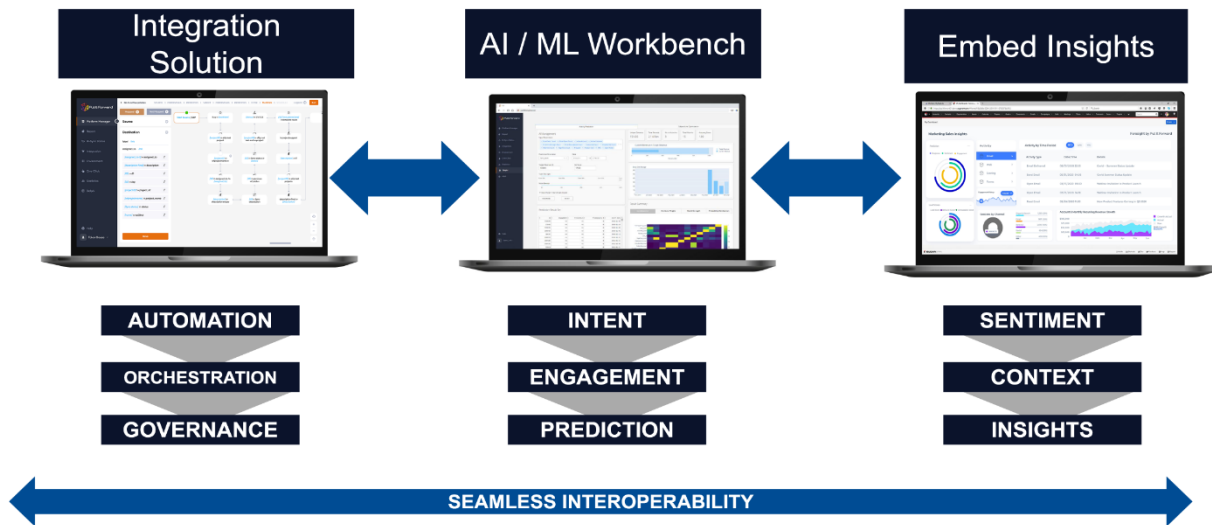
Source: Put It Forward, 2021

There are a few unusual elements in the platform that support ease of development two of which are as follows. The first is the use of an object graph. Developers often use Unified Modeling Language (UML) to model the relationships between classes of data. Object graphs extend this modeling by relating the instances of the UML diagram. The relationships of data thus can be modeled graphically, and in runtime, those graphs are kept up to date with the data flowing into the system. Since no distinctions exist between a transactional workload and an analytical one, any entity – customer, value metric, KPI, state machine, digital thing – can be modeled and kept up to date in Put It Forward without requiring SQL skills.

The second unusual capability is the end-to-end nature of how two or more applications are connected. The capabilities of each application are visually presented, and teams can select each element and bring it into the designer. For example, a marketing app that collects leads and contacts and manages campaigns can connect and share data with a marketing analytics application, providing a simpler way to assess a campaign's performance. Temporal state engines are also part of the environment,

An application that manages projects, tasks, activities, and reporting can connect with the marketing campaign application, merging process automation with the steps of a campaign.

Challenges

Business teams use Put It Forward's intelligent automation capabilities to build automation and self-service orchestration capabilities. The Put It Forward platform essentially becomes the enablement backbone of solution development focused on:

- » Orchestrating the flow of work between applications

- » Leveraging the existing applications to execute the work

- » Utilizing relevant data in near-real-time for predictive analytics to support decision making.

These differences make it challenging for IT organizations to evaluate Put It Forward against what they know about the use of process-centric platforms and robotic process automation or to compare against integration platforms. Many of the intelligent automation platforms focus on use of natural language processing and computer vision AI technologies to support end user productivity through unstructured and semi-structured content processing. While there are process platforms that harness data with predictive analytics to make recommendations, integration-focused platforms do not offer this capability. That means Put It Forward is directionally ahead of the market. Put It Forward's partnership model with application providers should make it easier to accept the platform's capabilities as a trusted overlay mechanism to connect and orchestrate across applications and support high-speed and contextual decision making.

Conclusion

As organization compete by leveraging speed, constructing recommendations in ecommerce and next best actions in customer support, actionable insights have to be based on data collected in near-real-time. Marketing teams focusing on deep levels of personalization that are highly contextual to a prospect and situation have a significant advantage when they utilize platforms capable of high-speed updating of virtualized, in-memory instances as de facto design.

Enterprises that thrive in the digital era will be those that are able to connect insights with applications (sales apps, marketing apps, and others) to speed up the value gained from responding correctly to predictions, improving efficiencies, reducing data errors, and minimizing costs while enabling the goal of having fully integrated and synchronized information flow across business processes -- all at the rate of speed required to compete.

New integration and orchestration services coupled with prediction models are key to enabling such connectivity, process, and data flow. These services provide a key component of the overall DX platform required for today's digital business.

> *New orchestration services and predictive analytics capabilities... provide a key component of the overall DX platform required for today's digital business*

About the Analyst

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