Event-Driven iPaaS

How Dell Boomi and Solace enable modern data integration and data movement across the distributed enterprise

A Joint Solution Brief





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Introduction

Companies of all kinds are pursuing their unique form of digital transformation—whether through incorporating AI, mobile computing, IoT or a hybrid cloud strategy. To digitally transform is to improve situational awareness and operational agility, often for the sake of building deeper, more personalized relationships with customers.

These benefits don't come easy though, and the vast majority of business leaders who try to pursue them report that they failed to achieve their goals. Digital transformation drives an astronomical increase in the number of systems and devices you need to integrate, and the amount of information flowing between them. Simply put, enterprises pursue such transformations because their current architecture and infrastructure either can't keep up or won't be able to at scale.

One key to success is evolving your architecture and business processes from request/reply, pointto-point interactions, toward enabling the free and efficient flow of events across your distributed enterprise. Another key success factor: consuming integration as a service (aka Integration Platform as a Service, or iPaaS) for enhanced flexibility, ease of use and cost savings.

Dell Boomi provides an industry-leading, cloudnative and low-code iPaaS that enables fast and easy application and data integration, orchestration, and transformation. Solace PubSub+ is an enterprisegrade advanced event broker that provides a fast, robust and secure data transport layer, enabling events to move freely and easily across the distributed enterprise, as they occur.

Together, Dell Boomi and Solace PubSub+ provide a cloud-native, event-driven and IoT-enabled data integration platform for large-scale enterprise deployments. It's a mouthful, but every capability mentioned is integral to the long-term success of enterprise digital transformation.

This paper will explain why and how.

Six Core Integration Challenges Enterprises Need to Overcome to Achieve Digital Transformation

For companies with fairly simple, low-volume, nonreal-time integration requirements, a simple hub and spoke, request/reply-based integration model like this might work just fine:



But companies with complex IT systems that are distributed across data centers and geographies, link a large number of applications and connected devices, and serve multiple lines of business, demand more sophisticated systems.

Here are six core challenges you're likely to face as you work to integrate large-scale enterprise deployments:

1. Enabling continuous integration of cloudbased services

Application sprawl and business silos are common roadblocks. Avoiding them means enabling the continuous integration of the many cloud-based services and systems your business depends on to connect applications, data, processes and people. This includes marketing automation systems such as Marketo and Pardot, customer relationship management (CRM) software such as Salesforce and HubSpot, and help desk apps such as Jira and Zendesk.

Manually coded interfaces are not sustainable when you're integrating such systems, so you need



a strategy to decouple and continuously manage connections between these applications.

2. Integrating across globally-distributed data centers and LOBs

Every enterprise is creating new cloud services, and many are migrating some of their legacy estate to the cloud. But traditional enterprise stacks are still in place, which means many large enterprises are still working with a legacy enterprise service bus (ESB) and have multiple data centers distributed around the world. How do you connect and move data across all of that? How do you optimize for speed and reliability across long-haul links? And how do you orchestrate and transform data such that multiple different systems receive the same master data change?

3. Achieving uniform connectivity and response times

As your digital transformation unfolds, the number and variety of apps, systems, devices and "things" that you'll want to integrate will multiply.

Incorporating IoT into business processes and decision/support systems is important today, and it will be essential in the very near future. But IoT integration is tricky for two reasons.

First, IoT devices tend to come in bigger numbers than applications, tens of millions in many cases. As you have more and more devices connecting to your system, and as you have increasing amounts of data flowing through your system, you need a way to give access of that data to already integrated systems and applications, without slowing down the system. Challenges like this necessitate sophisticated means of shock absorption, aggregation, routing, filtration, fan-out.Second, IoT devices exhibit very different characteristics and behaviors than applications, including not being on or connected all the time, and requiring very low power/bandwidth communications. Many dictate the use of specialized APIs and communications protocols such as MQTT and Paho, which you will need to bridge with legacy APIs and protocols.

Advanced cloud-native services that allow modern enterprises to tap into the power of AI and machine learning will also be important integrations moving forward, but to realize the full potential of these services you'll need to make them as accessible to your business as they would be if they were running in your data center. How do you manage that?

And many enterprises are deploying modern microservices for increased agility, service simplicity, service decoupling, and for the ability to react (to



events) in real-time. Because they're small and single purpose, microservices are often connected via asynchronous messaging patterns such as pub/ sub for efficient service orchestration. But many web apps rely on RESTful communication over HTTP. This can make it challenging to integrate cloud-native microservices with RESTful applications.

4. Enabling robust and secure data movement

You may be deploying messaging technology alongside your ESB on premises, and grown to appreciate and depend on the robustness and rich data movement capabilities of messaging middleware, capabilities like burst-handling, fine-grained scaling, high availability, disaster recovery, WAN optimization, guaranteed delivery and governance.

As your enterprise becomes more distributed, and you start thinking about moving more of your apps an infrastructure to the cloud, how do you maintain and extend these capabilities beyond your on-prem environments?

5. Enabling event-driven applications and architectures

You've likely been hearing a lot about 'events' and event-driven architectures, and you're probably turning towards these concepts if not fully embracing them as part of your digital transformation. If you're not, you should be; modern IT is quickly shifting from data-centric to event-centric architectures and thinking.

In a piece from Gartner titled, Top 10 Strategic Technology Trends for 2018: Event-Driven Model, the authors state that by 2022, event-sourced, real-time situational awareness will be a required characteristic for 70% of new digital business solutions, and 80% of new business ecosystems will require support for event processing.

At a high level, event-driven architectures enable applications and microservices in a given system to produce, consume and react to events, ideally as they occur. It's an architecture enabled by the publish/ subscribe messaging pattern, and event brokers. Producer and subscriber applications connect to the event broker, and as producer applications generate events they are sent to the event broker where they are routed to applications that have subscribed to them.

Sounds straightforward, right? But how do you achieve this when you've got applications and microservices and legacy apps running in different public and private clouds and geographic regions and availability zones? What you're trying to achieve is to enable events to flow freely and easily between producer and consumer applications located in different environments without any producer application having to know anything about any subscribing application.

That's a tall order.

6. Enabling citizen integrators

As the number of cloud services your company relies on to facilitate business activities climbs, you'll need to enable more and more people to execute and manage integrations. "Citizen integrators" is a term you've probably come across in analyst briefings and presentation decks. How do you make your integration environment accessible and user-friendly while everything under the hood seems to be getting more complex?

That was not an exhaustive list of integration challenges you may face in you work to transform your digital enterprise, but those are probably the most exhausting challenges to think about—the big rocks that are likely to keep you up at night. Thankfully, this is a solution brief.

Below we'll outline the components of a solution to these challenges. It's a solution based on the use of an iPaaS, an event-driven architecture, and an advanced event broker.

Enter the iPaaS

Companies of all sizes are using iPaaS solutions to integrate a wide variety of on-premises and cloudnative applications, which generally encompasses the following functions:

- adapters that enable connectivity via a variety of open and proprietary APIs and protocols;
- transformation of payloads so systems can send and consume information in familiar formats;



- orchestration of processes and transactions that span multiple applications; and,
- the real-time distribution of events and information via messaging and/or streaming.

Relative to on-premises-based integration solutions such as ESBs, cloud-based integration platforms as a service promise improvements in speed, flexibility, ease of use and cost savings.

Concerning the challenges laid out above, a modern iPaaS will be equipped to help you solve (1) continuous integration of cloud-based services, some of (3) achieving uniform connectivity and (6) enabling citizen integrators.

But finding the right integration partner can prove challenging. Many legacy vendors offer cloud-washed options—claiming full cloud capabilities while still using on-premises software that cannot deliver the full benefits of a true cloud platform.

To unlock the full potential of cloud-based integration, an iPaaS solution must be cloud-native, open, lowcode and provide a unified platform of capabilities that address the full scope of integration challenges facing today's digital businesses. Dell Boomi provides such a platform.

Dell Boomi Overview

Dell Boomi (Boomi), an independent business unit of Dell, is the leading provider of a unified platform to build The Connected Business, from cloud integration to workflow automation. In 2008, Boomi pioneered the integration cloud market, and for more than a decade the Boomi Integration Cloud has played a critical role in helping businesses make the most of their cloud transformation journey.

Boomi Integration, the industry-leading platform as a service (iPaaS) provides a cloud-native, high productivity integration solution that cost-effectively supports all your application data integration needs, across your hybrid IT landscape.

Cloud-Native

Boomi's true cloud-native platform is built on a multitenant, distributed architecture. This is how you deliver the full benefits of the cloud.

Open

An integration cloud is the core technology for connecting any and all applications and data. Implicit in this role is that an integration cloud is open and vendor-neutral.

Low-Code

In many regards, low-code is perhaps the essential capability of a modern integration cloud. There are certainly other options out there—tons of old legacy ESBs and new ESBs such MuleSoft. The difference between them and Boomi, from what our shared customers tell us, is speed.

This is the core requirement of today's digital businesses. If you can't move fast, you will fail.

Unified

Core integration (connecting applications to other applications) is where it all starts for the Boomi Integration Cloud. But merely connecting siloed cloud or on-prem data isn't enough; you need to manage your data quality and synchronization among applications.

So Boomi developed their Master Data Hub to ensure the "golden record" of information across the enterprise. And they added API design and management along with B2B management capabilities to help their customers provide rapid access to data for employees and partners. More recently, they've created Boomi Flow to bring people into the integration equation and complete the full end-toend workflow.

Boomi helps organizations accelerate business agility by connecting data, applications and people to run faster and smarter. Visit boomi.com for more information.

Enter the Advanced Event Broker

Event brokers are the modern version of messaging middleware. To some extent, your enterprise likely still utilizes a legacy ESB on-prem to manage data integration, orchestration and transformation. That ESB (IBM WebSphere, TIBCO, etc.) is probably paired with a robust messaging layer (IBM MQ, TIBCO EMS, etc.) that supports a variety of messaging patterns such as queuing and publish/subscribe.



But legacy messaging technology is not geared to support the variety of events produced by modern cloud applications, cloud services, and the internet of things, nor is the technology cloud-native. It can also be exorbitantly expensive and utilize proprietary APIs, both of which contribute to vendor lock-in.

Event brokers are purposely designed to deal with event-driven applications and architectures. At the most basic level, event brokers support publish/ subscribe messaging. Advanced event brokers are designed to support event-driven applications and architectures in complex and distributed systems, with the same or better performance enterprises are used to experiencing from their on-premises-based messaging technology.

Regarding the integration challenges outlined above, a sophisticated event broker can help you solve for (2) integrating across globally-distributed data centers and LOBs, (3) achieving uniform connectivity and response times, (4) enabling robust and secure data movement and (5) enabling event-driven applications and architectures.

But, as suggested by the basic/advanced event broker distinction above, not all event brokers are created equal.

To help you overcome the integration challenges listed above, you'll want an advanced event broker that supports a variety of open protocols and APIs, can be deployed in all your environments (on-prem and in the clouds), and that provides enterprise-grade speed, reliability and security. Solace PubSub+ is such an event broker.

Solace PubSub+ Overview

Solace PubSub+ is an advanced event broker, with industry leading technology that has been tried and tested by global enterprises facing some of the most challenging and mission-critical data movement use cases in the world. Solace technology is in nine of the top 12 global investment banks. It's trusted by top American and Indian Telco's. It's used by global automakers for connected car initiatives, and it supports smart cities and air traffic management around the world.

PubSub+ is an advanced event broker that meets the diverse needs of enterprise, IoT and mobile applications across hybrid and multi-cloud environments.

Open

PubSub+ supports multiple open protocols and APIs, including AMQP, MQTT, JMS and WebSocket in addition to REST/HTTP, providing enterprises with unparalleled integration flexibility as their digital transformation unfolds, and helping them avoid vendor and technology lock-in. With its single technology core and multi-protocol edge, PubSub+ supports uniform and easy connectivity for applications written in different languages and using different protocols.

Deploy anywhere, manage in the cloud

PubSub+ can be run natively in public clouds (AWS, GCP, Azure), private clouds (Pivotal Cloud Foundry, Red Hat OpenShift) and in your data center, as software, as a service or as an appliance. PubSub+ can be life-cycle managed, provisioned, monitored and upgraded from a single pane of glass in the cloud.

Enterprise-grade

PubSub+ provides enterprise-grade speed, robustness, reliability and security. Core features and capabilities include low latency, high availability, fault tolerance, governance, security, scalability, WAN optimization, burst-handling, filtering and replay.

Solace helps power the event-driven enterprise by enabling the free and easy flow of events across **every environment and component of the digital** enterprise. Learn more at <u>solace.com</u>.

Joint Solution: Dell Boomi + Solace PubSub+

Together, Dell Boomi and Solace PubSub+ provide the enterprise-grade, event-driven and IoT-enabled iPaaS your enterprise needs to realize its best digital transformation.

To summarize the synergies between the two technologies, Dell Boomi is a cloud-native iPaaS that simplifies front-end data integration, orchestration and transformation, and Solace PubSub+ is an advanced event broker that enables the intelligent distribution of event notifications (and other information) between applications and devices across diverse environments.



"ESBs, iPaaS's, IoT and event-driven IT are all converging, and enterprises are transforming to enable and respond to this convergence, with hybrid and multicloud architectures. Boomi and Solace are the perfect journey partners for these transformations, combining to provide the world's first cloud native, event-driven and enterprise-grade integration platform."

-Denis King, Chief Operating Officer, Solace

Together, Boomi and PubSub+ provide for:

• Cloud-native modernization of legacy ESB with a cloud-native approach

With Boomi and PubSub+, enterprises have all the technological features and capabilities they need to cap their legacy estate, and grow their cloud native estate. Boomi provides the cloud-native platform for integration, orchestration and data transformation, and PubSub+ provides a cloud-native and enterprise-grade platform for event distribution across the distributed enterprise.

Both technologies run in any cloud and on premise, and because they support any protocol/application connector, you can run your applications wherever you need to, and not worry about how they will communicate with applications throughout your distributed enterprise.

"With Dell Boomi's market leading iPaaS and Solace's PubSub+ Event Mesh enterprises can create the escape velocity needed to leave behind legacy ESBs and deliver on innovation."

-John DiStasio, Sr Director, Global Technologies, Dell Boomi

• Enterprise-grade data integration and event distribution

With PubSub+ as the data movement backbone for Boomi Integration, enterprises receive enterprisegrade performance, robustness and security, with support for:

- Low latency
- High availability
- Disaster recovery
- Elastic scalability
- Guaranteed delivery

- WAN optimization
- Burst-handling
- Fan-in and fan-out
- Asynchronous and synchronous data flow
- Store and forward
- A consistent application experience across the enterprise

In a multi-ESB/API Gateway deployment, PubSub+ serves as the standards-based messaging layer that connects ESBs, API Gateways and App Servers without any bridges.

• Future-proofing for IoT, mobile, ML streaming and hybrid connectivity

Together, Boomi and PubSub+ provide a scalable solution for all your IoT integration needs. Boomi provides all the APIs and integrations you need to connect assets to your infrastructure. PubSub+ supports popular protocols such as MQTT, AMQP, JMS, REST and WebSocket, along with diverse message exchange patterns such as pub/sub, queuing, request/reply and streaming, so you can connect and move data between anything, however you'd like.

Both Boomi and Solace are constantly investing in new integration and data movement capabilities, including support for new standard protocols and APIs, so you don't have to. As new patterns, protocols and applications emerge, they can be quickly and easily connected to the agile infrastructure you've created with Boomi and PubSub+.

• Performance, scale and simplicity that is second to none

Noalternative solution can match the performance (data movement speed, reliability and security), scalability and simplicity of the joint PubSub+ and Boomi offering. In addition to providing the enterprise grade data movement features outlined above, PubSub+ event brokers can be easily and automatically scaled (horizontally and vertically) in any environment to meet any data movement demand.



How it works

Option A (Enterprises)

You can deploy Solace PubSub+ event brokers into each of your environments, on-prem and in the cloud, and then connect them to create an event mesh that will intelligently, automatically and securely transmit events between producer and subscriber applications, wherever they exist on the mesh. Applications, services and systems connect to their nearest Solace PubSub+ event broker, where they publish and subscribe to events. The event mesh will then broadcast events as they are produced (by any application in the system) to any and all applications that subscribe to them via a topic subscription.

With this architecture, WAN network hops are spanned from PubSub+ instance to PubSub+ instance using Solace's proprietary SMF wireline protocol and WAN-optimized TCP stack, ensuring optimal network utilization. Publisher and subscriber clients can connect to the mesh using the protocol and API of their choice, including open standards such as JMS, MQTT, AMQP, or REST.

Option B (Any business)

In both cases, Boomi Atoms serve as intelligent endpoints, providing data integration services like content transformation, content-based routing and application connectivity (on-prem, custom cloud apps, and SaaS). And Boomi, of course, communicates with Solace using any number of protocols, including JMS, Java, REST and MQTT.

Case Study: Consumer Products Company

One of the world's leading consumer products companies wanted to reduce costs and improve corporate agility by consolidating over 60 data centers around the world into just 15 by migrating applications and workloads to the cloud.

They have relied on TIBCO BusinessWorks as an on-premises enterprise service bus to integrate applications, and TIBCO Enterprise Message Service for routing, transportation and persistence of information between a powerful SAP ERP system and a plethora of supporting 3rd party applications.





To meet their goal of migrating workloads from data centers to the cloud, the company selected Dell Boomi to provide integration capabilities such as routing, transformation, orchestration and error handling, all of which Boomi provides for both onpremises and cloud-native systems. From there the company needed a way to connect the different service endpoints that would exist in their new architecture. Generally speaking, they needed to overcome many of the challenges described above:

- They needed to establish extremely reliable event-driven communications real-time between systems running in a variety of environments, cloud and on-premises commonly called hybrid cloud and multi-cloud architecture. Complicating this hybrid cloud connectivity was the reality that the number of producers of data is unknown and constantly changing, as is the number of consumers of data, which can include cloud and on-prem destinations like AWS S3, Hadoop, Postgres and SAP.
- They needed to integrate legacy applications with IoT devices and microservices, and do so in a way that enabled gradual migration both from their data center to the cloud, and from batch-based to event-driven.
- They needed to ensure rapid, reliable, . guaranteed delivery over very long distances (the Internet and private WANs), factoring for

long and less consistent round-trip times, less predictable availability, and the need to minimize and optimize bandwidth.

Using the combination of Dell Boomi and Solace PubSub+, the company was able to synchronize a Master Data Management (MDM) system across two public clouds (AWS and Azure) and an on-premises system of record as diagrammed below.

Given this architecture and associated operational requirements, they needed the SAP MDM system to be able to distribute data to downstream SaaS applications. And as more and more applications were being spun up in the cloud, they needed the ability to easily fan-out data to many new destinations.

They utilized an event-driven architecture and the publish/subscribe exchange pattern to decouple senders and receivers, allowing for the rapid subscription-based addition of new destinations.

The consumer products company needed to give applications and devices the ability to send and receive messages using IMS and REST, both of which are supported by Solace PubSub+. And because the company plans to use this same infrastructure as the foundation of an IoT platform, they needed support for MQTT too, which PubSub+ also supports.



For the company, data is acquired from sensors on factory floors collecting information such as temperature and running time. From there it's sent to AWS for analytics/analysis and then sent back for action to be taken. Thanks to the event-driven architecture Solace PubSub+ enables, devices only need to publish data to a local Solace node. From there, AWS analytics can consume it locally in the cloud either via subscriptions or a RESTful push.

The company is now looking to build a global event mesh on this same infrastructure so they can publish in one region and fan-out to all the others.

This could very well be a many-to-many data exchange, made easy with Boomi providing integration and application services and Solace ensuring the real-time guaranteed delivery.

While a current Managed File Transfer solution can provide the data movement, it does not offer the granularity, self-routing, protocol independence of Solace/Boomi implementation. Bidirectional data delivery, which Solace PubSub+ natively supports, would need to be coded into MFT-style solutions.

Conclusion

As made clear by the example above, pursuing a digital transformation can both solve immediate challenges and allow enterprise leaders to cast their gaze toward the future.

This shift in mindset is what Gartner Research Fellow Yefim Natis refers to as "event thinking," and it's critical for enabling modern data integration and data movement across distributed enterprises.

Dell Boomi pioneered the integration cloud market and remains at the forefront of the iPaaS industry. Solace pioneered mission critical messaging for the most demanding use cases in the world, and it now leads the market for cloud native messaging technology. Both companies have been "event thinking" decades before the term came into existence, and they are committed to providing a joint solution that fuses the best of their capabilities.

The days of lock-in are over. The event-driven future demands openness and collaboration among iPaaS and advanced event broker vendors. Dell Boomi and Solace PubSub+ are leading the way. You can too.

