

Hybrid cloud integration: Why it's different, how it's done and vendors offering to do it

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Situation analysis

If you rub your eyes and squint, you will notice what looks like a whole new set of silos popping up on today's IT horizon. The proliferation of SaaS services has helped many lines of business and departmental managers to quickly improve operations and lower costs for CRM, HR, marketing automation and ERP, among other applications. But for IT professionals, it's like going back in time. All the work they did for on-premises versions to avoid silos of information, data fragmentation, poor data quality and data duplication; to cleanse, standardize and enrich data; to develop data flows and workflows; and, yes, to integrate everything, must be revisited for each SaaS implementation. The bad news is that it's déjà vu all over again. The good news is that IT professionals get a whole new set of tools to play with. Let's call it job security.

Cloud computing and all its instantiations must now be reconciled with on-premises IT applications and managed within the context of an enterprise's business strategy, processes and operations. This will require IT professionals to rethink how IT strategy can exploit cloud computing to better support the business of an enterprise while lowering costs, effort, resources and risks associated with IT investment. To properly craft an architectural approach to hybrid cloud integration, IT strategists must be aware of the fundamental issues they will encounter.

Hybrid cloud integration architecture defined

The term 'hybrid cloud' has emerged to describe the relationship between any number of cloud computing services with in-place enterprise IT systems. It covers a broad range of scenarios, such as integrations between on-premises applications and data sources, virtualized managed services, services for sensors and mobile devices, and any type of private or public cloud, including IaaS (typically used to avoid capital outlays for servers, storage and networks), PaaS (typically used for

application development and runtime operations) and SaaS (typically an outsourced application such as CRM).

Hybrid cloud integration architecture (HCIA) is a blueprint that outlines and details the goals, policies, practices, techniques and tools needed to bring synergy to on-premises, virtualized, and cloud resources so they operate and adapt as a uniform platform for business operations. To administrators, an HCIA must facilitate the need to port any workload dynamically to where it exploits the greatest economic advantage – across any and all available on-premises, managed service and cloud resources. By economic advantage, we mean the cost, effort and control afforded the respective resource. To the users, access and interaction with the tools and services they need to do their job must be transparent. They need not know or care whether they are using on-premises or cloud resources. They simply need to execute the transactions or analytics for which they are responsible without concern for the accessibility and quality of the data or information they acquire or transact. This means that an HCIA must address issues of data quality and exchange; compliance associated with governance policies and security practices; and orchestration and auditing of data flow, accessibly and use. So what makes cloud integration different from any other type of integration? The short answer is control, or more precisely, the lack thereof. What follows is a slightly longer answer.

Business issues and IT challenges

Traditionally, enterprise integration dealt with issues linking application to application (A2A) or business to business (B2B). A2A integration typically focused on internal systems housed on-premises, often within the same datacenter. Integrators had to deal with issues associated with user authentication and access control, but did not have to deal with issues of security outside the firewall. B2B integration needed to secure data and present it outside the firewall to customers, suppliers, logistics providers and banks. Such parties typically crafted integration policies and service-level agreements (SLAs), and secured the data exchanges using on-premises integration middleware (e.g., ESB, ETL, ELT, EAI, APIs, etc.) or through managed service providers (e.g., EDI, EDIFACT, secure FTP, managed file transfer, PKI, AS2, etc.). Most enterprises today have some form of preexisting middleware used for integration, typically for A2A, and rely on one or more MSPs, typically for B2B.

Middleware technology and managed services offerings were designed and built before the current cloud era. The architectural, technical and control principles for each did not (for the most part) consider operating in a multi-tenant, distributed, virtualized third-party architecture. Folks responsible for A2A integration spent their time addressing issues associated with transaction latency and data quality, and in choosing the most resilient connectors and adapters they could

find or build. They spent little time with security and audit controls, except perhaps for access management. Folks responsible for B2B integration spent their time securing bidirectional data exchange across firewalls, and spent little time considering application integration patterns like content-based routing and decision logic, which is typically addressed in application integration. Neither paradigm was specifically designed to move data across the other, and only a few large vendors had products that crossed these spheres of integration. Cloud computing requires integration specialists to be aware of, and become technically proficient within and across, both domains.

The next integration wave

The first wave of cloud integration addressed issues of how to load data from on-premises applications or databases into the cloud. Data loading tools were used simply to acquire and transport data from an on-premises source to a cloud target. Little effort was made to formally manage data quality as part of the data loading exercise. Control of accessibility and use was entrusted to the SaaS providers, who offered assurance via SLAs that the multi-tenant architecture was secure. This was acceptable to many departmental buyers of SaaS. But when SaaS deployments accelerate, and when cross-functional processes need to exchange data among several disparate on-premises and SaaS offerings, and when other applications are offloaded to PaaS and IaaS clouds, the challenges of enterprise orchestration and control must be addressed.

When thinking in terms of cloud strategy, CIOs are now most concerned with the notion of data governance. Indeed, data governance applies broadly in many IT, business and legal domains, but in the context of cloud computing and hybrid cloud integration, the notion of data governance must address how data transcends ownership boundaries. There needs to be explicit statement and enforcement of security and privacy policies when integrations are built, detailing how data will be transmitted securely, and how tractability and audit trails can be performed when data is sent off-premises. Prior A2A and B2B technologies didn't necessarily have to address this level of granularity and integration focused on access control, authentication, encryption, and nonrepudiation while in transit and upon receipt of data. An HCIA must have similar capabilities and enable visibility and control of what happens when data leaves and enters an environment. The integration technology chosen must be aware of the data movement and how it is being used relative to the parameters set by data governance.

Crafting an HCIA

The integrations themselves, by their very nature, will be distributed, and must run in many places, especially in large decentralized enterprises and when multiple cloud services are deployed (e.g., SaaS, IaaS and PaaS). They must run using the infrastructure chosen by the integration designer.

However, the development and administration environment for integration management should be accessible in one place, centralized to improve execution visibility and overall policy governance. It must standardize services management running across all operating environments. Ideally, HCI administration should be coupled with a data quality management or master data management (MDM) initiative. Proper HCIA technology and practices will tightly couple the two IT domains.

So what will it mean to craft an HCIA going forward? Well, IT architects will be tasked with building out a cloud data management and integration blueprint and supporting governance policies. Here's the déjà vu part: they will be asked to consolidate SaaS silos; avoid data fragmentation; control data quality; prevent data duplication; cleanse, standardize and enrich data; develop data flows and workflows; and integrate everything to make certain that the SaaS, IaaS or PaaS and on-premises systems work in unison to support cross-functional business processes; or, if an on-premises system is to be retired, for the SaaS, IaaS or PaaS to work better, cheaper and faster.

Vendor landscape

It is becoming common for all vendors to simplify their respective offerings and make them available for use by relatively unskilled business users. In general, product strategy is shifting away from having to 'code' an integration to instead 'configure' it using drag-and-drop objects and workflow-oriented workspace canvases. Several vendors will posit that coding skills for integration are not required. Rather, business professionals can perform such design tasks using the new configuration tools. Indeed, a configuration approach to integration design is superior to hand-coding. However, it's typically not quite as simple as most vendors will claim. The skills of a 'business technologist' will likely be called for – business-savvy IT folk or IT-savvy business folk – one that has, at some point, gotten their hands dirty with middleware implementations or hard-code integrations.

The following tables represent a partial list of various hybrid cloud integration vendors organized into four classes: market leaders, innovators, disruptors and emergents. Each table also includes a column that identifies the vendor's product, and a column calling out its pedigree. You will note that the vendor landscape is vast, and each vendor's approach to HCI stems from a pedigree of legacy technologies and services. Other vendors were born in the cloud. We believe it is important to note from where the vendor's offerings came. Some vendors have long offered transactional A2A and B2B technologies either on-premises or as a managed service, and have since adapted them to support emerging cloud architectures. Others were specifically born in the cloud and possess unique approaches to tackling the business and IT challenges noted herein.

Market leaders represent vendors whose technology is widely deployed, and have proven and

demonstrable capabilities. They include:

Market Leaders		
Vendor	Product	Pedigree
Amazon (AWS)	AWS Direct Connect, SQS	Cloud
Axway	API (Vordel) and Integration	Middleware, B2B managed services
IBM	Cast Iron, Sterling Commerce	Middleware, B2B managed services
Informatica	Cloud	Middleware
Information Builders	iWay	Middleware
GXS	Integration Cloud Platform	B2B managed services
Microsoft	Azure Service Bus	Middleware, cloud
Oracle	Fusion Middleware	Middleware
Pervasive	Integration, Business Exchange	Middleware
Red Hat	JBoss Middleware, CloudForms, FuseSource	Open source, middleware, cloud
SAP	Info Exchange OnDemand	Middleware, B2B managed services (Ariba)
SAS Institute	DataFlux	Middleware
Software AG	WebMethods (myChannels)	Middleware
Tibco	Silver Fabric	Middleware
VMware	vCloud Connector	Virtualization

Innovators are vendors that are established and recognized for their competitive advantages. They include:

Innovators		
Vendor	Product	Pedigree
Adeptia	EBIM, B2Bi, ESB, ETL	Middleware
Apigee	Apigee Platform	API management
Dell	Boomi	Cloud
E2Open	Multi-enterprise Integration	B2B managed services
EntropySoft	Content Connectors, Content Hub	Middleware
Fujitsu	Cloud Fusion	Managed services
Intel	Expressway API Manager	API management, SOA governance
IntraLinks	Connect, Integration & APIs	Managed services, cloud
Layer 7 Technologies	API Management Platform	API management, SOA governance
OpenText	Integration Center, InfoFusion	Middleware, cloud
Mashery	API Management Platform	API management
MuleSoft	ESB, CloudHub	Middleware, cloud, API management
Pentaho	Data Integration	Analytics, cloud
Scribe Software	Connectivity	Cloud
SEEBURGER	Business Integration Suite, Cloud	B2B managed services
SnapLogic	Integration Platform	Cloud
Splunk	Enterprise, Hadoop Connect	Cloud
Talend	ESB, Data Integration	Middleware, cloud
Vitria	BusinessWare	Middleware

Disruptors are vendors recognized for their competitive differentiation and their ability to create competitive differentiation for their customers. They include:

Disruptors		
Vendor	Product	Pedigree
Attunity	CloudBeam	Cloud
Composite Software	Data Virtualization Platform	Virtualization
Covisint	Cloud Engagement Platform	B2B manage services
Elemica	QuickLink	B2B managed services
Exostar	B2B Network, Supplier Integration	B2B managed services
Jaspersoft	Data integration ETL	Business intelligence
Jitterbit	Data & Application Integration	Open source, cloud
Kapow Software	Katalyst	Middleware, cloud
Liaison	Integrate	B2B managed services
RightScale	MultiCloud Platform	Cloud
SOA Software	Enterprise API Management	API Management, SOA governance
SPS Commerce	SPSCommerce.net	B2B managed services
Syncsort	DExpress	Data management
WSO2	API Manager	Middleware

Emergents are vendors new to the market, or are recognized for their noteworthy approach and offerings. They include:

Emergents		
Vendor	Product	Pedigree
3scale	API Management Platform	API management
APIphany	API Delivery Platform	API management
Atomikos	Extreme Transaction Processing	Transaction management
Cloudmine	API Management	API management
Cloudsoft	Amp, Monterey	Cloud application management
Cloud Sherpas	Cloud Solutions	Cloud
Cloud Velocity	Cloud Cloning, Migration, Failover	Cloud
Elastic Intelligence	Connection Cloud	Cloud
EXTOL	Integration Studio	B2B managed services
HighJump Software	TrueCommerce	B2B managed services
Iron.io	Cloud MQ	Cloud
Mashape	API Management	API management
Ping Identity	PingFederate	Cloud
Livio	Connect API	Device integration
RedTail Solutions	Cloud-Delivered Managed services	B2B managed services
RunmyProcess	Integration Hub	Cloud business process management
Singly	AppFabric	Cloud
Socrata	API Foundry	API management
Tie Kinetix	Business Integration	B2B managed services

What to expect going forward

It's not likely that a single vendor will satisfy all things integration and data quality management for an enterprise. However, many HCI vendors are indeed adding data quality management, MDM and 'big data' management capabilities to differentiate themselves. As we move into 2013, integration will begin to rival security as the primary barrier to cloud services adoption. SaaS silos will likely proliferate and impede cross-functional business process execution unless an HCIA is established that also calls out guidelines that describe when SaaS offerings should be pursued, standards for vendor selection and the governance issues noted in this report. Cloud application and platform providers will seek more comprehensive integration technologies that can be embedded within

their offerings and exploit the burgeoning use of APIs to simplify and create templates of various integration patterns (e.g., A2A, B2B, A2B, A2Cloud, B2Cloud, Cloud2Cloud, Cloud2Mobile, etc.). We expect demand to increase for cloud-based data quality management, MDM and big-data services, driven by the requirements called for by an HCIA. Enterprises will seek to offload the technical challenges of such services to focus on issues of data governance, configuration approaches to data integration, and the broader issues of streamlining and improving cross-functional business processes across various cloud services and on-premises systems.

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