The Business Transformation Payoffs of Cloud Services at Mohawk

As well as reduced costs and increased efficiencies, cloud services can provide business transformation payoffs, as illustrated by the case of Mohawk (formerly Mohawk Paper Mills). Mohawk designed and implemented a cloud integration platform that enabled it to transition its traditional manufacturing business model to become a service-oriented enterprise, with significant payoffs in terms of new sources of revenue and reduced internal operating costs.¹

Collectively, disruptive technologies and market forces have resulted in a significant shift in the structure of many industries, presenting a serious challenge to near-term profitability and long-term viability. Cloud capabilities continue to promise payoffs in reduced costs and increased efficiencies, but in this article, we show they can provide business model transformation opportunities as well.

To date, the focus of much research on cloud computing and cloud services has been on understanding the technology challenges, business opportunities or applications for particular domains.³ Cloud services, however, also offer great new opportunities for small and medium-sized enterprises (SMEs) that lack large IT shops or internal capabilities, as well as larger firms. An early analysis of four SMEs⁴ found that cloud services can offer both economic and business operational value previously denied them. This distinction is important because it shows that cloud services can provide value beyond simple cost avoidance or reduction

¹ Mary Lacity, Jan Damsgaard and Bill Kettinger are the accepting senior editors for this article.
(economic benefits) in the form of operational benefits resulting from the rapid deployment and scalability of services, greater security and resiliency, simplified management and the ability of in-house staff to focus on strategic work.

We illustrate how cloud services can enable business model transformation in an SME by describing the case of Mohawk (formerly Mohawk Paper Mills). Mohawk’s transition toward a service-oriented enterprise, and the ability to quickly form and evolve dynamic partnerships, has resulted in it transforming its business model, providing significant payoffs in terms of operational cost savings and new sources of revenue. Mohawk’s story provides important lessons for CEOs, CIOs and other senior IT executives considering adopting cloud services to enable businesses transformation.5 These lessons arise from four shifts caused by the impact of cloud services at Mohawk:

- From IT provisioning to a business model platform
- From internal integration to partner integration
- From traditional IS design to a mash-up of services
- From intra-organizational trust to inter-organizational trust.

Mohawk’s Transformation Imperative

Mohawk (www.MohawkConnects.com) was founded in 1931 in upstate New York, where the Hudson and Mohawk rivers converge. It evolved as a manufacturer of premium paper products, primarily serving digital print markets in North America. Today, the company is a fourth-generation, family-owned business with 550 employees and annual sales revenues of approximately $300 million. Its IT function comprises the CIO (Paul Stamas) and five employees. Mohawk is highly regarded for its innovative leadership in the pulp and paper industry. The company has been widely recognized for leadership in the use of IT to achieve business objectives.

Significant technology advances and market dynamics are rapidly changing how premium paper products are manufactured, delivered and consumed. Over the last decade, there has been a steady decline in demand for premium paper products, driven by increased global competition, higher energy costs, increased environmental awareness and the digitization of media for consumption on proliferating numbers of web-enabled devices. Collectively, disruptive technologies and unfavorable market forces have resulted in a significant shift in the structure of the paper and printing industry, presenting a serious challenge to Mohawk’s near-term profitability and long-term viability.

Like many firms, Mohawk now operates in a market where digital media are fundamentally changing demand for products, and e-commerce has changed how its products are produced and delivered to end customers. To remain relevant and vital in a digital world, Mohawk needed to transform its business model by rethinking who its customers are, what products and services customers require and how best to reach them. In 2010, Mohawk’s Chairman and CEO, Thomas D. O’Connor Jr., and CIO Paul Stamas recognized the need for a new type of IT platform on which Mohawk would lead change and restructure the paper industry.

To achieve this transformation, however, Mohawk faced several challenges:

1. How to transform from a primary focus on manufacturing toward becoming a service-oriented enterprise
2. How to pursue a collaborative business model that combined its core competencies with the complementary skills, resources and capabilities of a network of partners
3. How to develop a flexible network of partners that could be continually shaped to deliver new products and services to more customers through new markets and channels
4. How to manage a business transition that would fundamentally change the
Table 1: Mohawk’s Business Model Transformation Enabled by Transition to the Cloud

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<thead>
<tr>
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<tbody>
<tr>
<td><strong>Corporate Branding</strong></td>
<td>“Making Paper”</td>
<td>Needed to transform an 80-year-old paper manufacturing company</td>
<td>“Making Connections” via broader range of products and services; name change from “Mohawk Paper Mills” to “Mohawk” reflecting shift from “Mohawk” to new portfolio of products and services. Logo changed to reflect importance of relationships</td>
</tr>
<tr>
<td><strong>Targeted Customers</strong></td>
<td>Indirect B2B sales through a dozen large paper distributors</td>
<td>Decline in demand and influence on customers</td>
<td>Pursue new markets and direct customers (B2C)</td>
</tr>
<tr>
<td><strong>Products and Services</strong></td>
<td>Fine paper products only</td>
<td>Needed to create new sources of revenue and growth</td>
<td>Expanded products and services to include envelopes, digital substrates, photo books and journals, calendars</td>
</tr>
<tr>
<td><strong>Sales and Marketing</strong></td>
<td>Direct relationship selling to the largest paper distributors</td>
<td>Needed to target, influence and sell to customers in new markets</td>
<td>Direct sales and marketing leveraging cloud technologies</td>
</tr>
<tr>
<td><strong>Manufacturing Platform</strong></td>
<td>Internal operations highly optimized for papermaking</td>
<td>Needed ability to rapidly scale-up partners with new types of products</td>
<td>Leverage a network of manufacturing partners with complementary capabilities</td>
</tr>
<tr>
<td><strong>Supply Chain/Logistics</strong></td>
<td>Single warehouse sourcing paper distributors for sales; two- to three-day delivery in the U.S.</td>
<td>Needed to expand reach and service levels with new products</td>
<td>Distribution network across the U.S. and Europe; next-day delivery in the U.S.</td>
</tr>
<tr>
<td><strong>IT</strong></td>
<td>Internally focused on operational efficiencies (pursued economic benefits)</td>
<td>Needed the cloud’s technology capabilities to form flexible partnerships and value networks</td>
<td>Externally focused on business partnerships (pursued transformational benefits)</td>
</tr>
</tbody>
</table>

5. How to leverage emerging information and communications technologies to quickly and effectively integrate the capabilities of multiple diverse partners with those of the enterprise.

Mohawk’s leadership and employees were highly motivated to find a solution. Table 1 summarizes Mohawk’s business transformation imperative by showing its “before” state,
The Business Transformation Payoffs of Cloud Services at Mohawk

The business drivers and the after state it achieved. Mohawk’s transformation is encapsulated by its new mission statement and branding, where the 80-year-old company shifted its primary focus from “making paper” to “making connections.”

The Cloud as a Solution

The notion of a value network that leverages the complementary skills, resources and capabilities of external partners as a source of innovation, growth and competitive success is not new. For decades, companies have used value-added networks and electronic data interchange (EDI) to automate business activity with their network of suppliers, distributors and customers. Large companies have deployed enterprise application integration software or middleware solutions to integrate internal systems with business-to-business (B2B) partners.

For Mohawk, with an IT function of the CIO and only five individuals, these traditional technologies and methods for inter-enterprise data exchange were too expensive to purchase and manage, the protocols were rigid and inflexible, and the methods were not designed to connect cloud applications and services to the enterprise. Mohawk’s leadership team, including the Chairman and CEO, President and CFO, and the CIO, recognized that a new approach to partner integration was required to enable business transformation.

A technology platform was required that would enable business users to quickly and cost-effectively connect both traditional B2B partners and emerging cloud service providers. Recent technical advances in cloud computing and service-oriented design offered the promise of a more flexible approach to designing and continually evolving a dynamic partner network.

We describe below how Mohawk designed and exploited the capabilities of a cloud integration platform, leveraged the services of a cloud broker and empowered its users to orchestrate inter-enterprise business processes and information flows to help transform its business model.

Transitioning to the Cloud in Six Cycles

Early in 2010, Mohawk initiated a two-year action design research (ADR) project with Syracuse University and Liaison Technologies (an integration company) to design, develop and implement a new type of business technology platform to enable its business transformation. (The ADR approach is described in more detail in the Appendix.) This industry-university collaboration used two interrelated and concurrent design phases: a primary phase to design and implement a new type of cloud integration platform, and a secondary design phase where Mohawk’s business users interacted with the cloud integration platform to establish digital connectivity with partners using cloud services. ADR employs an iterative design-build-feedback process, where feedback from secondary design activities informed the primary design of the cloud integration platform to deliver ever-higher levels of functionality.

Mohawk’s transition to cloud services occurred in six design-build-feedback cycles (see Table 2). The first cycle established the foundation of the cloud integration platform, cycles two to five incrementally delivered increased levels of functionality and usability, and the sixth cycle involved Mohawk’s business users creating and deploying several hundred inter-enterprise processes and information flows. This cycle is still ongoing.

Establishing the Foundation

Cycle 1: Cloud Integration Platform (April-December 2010). To begin the transition, the ADR team established a manifesto detailing the key principles to guide the design of a new type of business platform—an integration platform-as-a-service (iPaaS). The cloud integration platform would leverage a repository of services accessible on-demand (cloud services). This would enable users to design and implement different types and combinations of digital connections with a network of partners.

An essential requirement outlined in the design manifesto was to use the services of a
### Table 2: Mohawk’s Six-Cycle Transition to Cloud Services

<table>
<thead>
<tr>
<th>Cycle</th>
<th>Description</th>
<th>Design Objective</th>
<th>Benefits Achieved and Feedback for Next Cycle</th>
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<tbody>
<tr>
<td>Cycle 1</td>
<td>Cloud Integration Platform</td>
<td>Establish an integration platform as-a-service (iPaaS) using cloud services for “any-to-any” business partner connectivity in the cloud</td>
<td>Platform built on the principles of service-oriented architecture and cloud computing; the integration platform was designed to scale up by leveraging a suite of cloud services (Cycle 2)</td>
</tr>
<tr>
<td>Cycle 2</td>
<td>Data File Integration</td>
<td>Develop a suite of cloud services to send and receive (and transform) data files between the enterprise and its business partners</td>
<td>Enabled simple data exchange with smaller firms (orders, inventory, invoices) and file synchronization with SaaS partners Feedback for next cycle: Need for real-time data exchange at a record level, and capabilities for continuous multi-step inter-enterprise workflows</td>
</tr>
<tr>
<td>Cycle 3</td>
<td>Database Integration</td>
<td>Develop a suite of cloud services to integrate on-premises databases with business partners (i.e., direct read and write to/from the cloud)</td>
<td>Enabled synchronous data exchange to automate workflows based on event-driven business logic Feedback for next cycle: Need for cloud databases to be directly accessible to/from on-premises systems, applications and processes.</td>
</tr>
<tr>
<td>Cycle 4</td>
<td>Cloud API Integration</td>
<td>Develop a suite of cloud services to integrate SaaS applications with internal applications and business processes</td>
<td>Enabled direct integration with SaaS partners using cloud APIs (e-marketing, CRM, HR, expense, transportation, etc.) Feedback for next cycle: Exposed complexities of cloud API integration; identified need for expertise of a cloud integration broker</td>
</tr>
<tr>
<td>Cycle 5</td>
<td>Web Services Integration</td>
<td>Develop a suite of cloud services to publish and subscribe to private and cloud (public) web services using XML, REST, JSON, etc.</td>
<td>Enabled direct integration with partners for “finer-grained” cases (order status, inventory check, freight rate, etc.) Feedback for next cycle: Cloud services broker essential to manage repository of web services and enhancements to web-services tools</td>
</tr>
<tr>
<td>Cycle 6</td>
<td>Inter-Enterprise Business Process Orchestration</td>
<td>Develop a suite of web tools and capabilities to enable users to mash-up cloud services to design inter-enterprise workflows and business processes</td>
<td>Empowered users to leverage the cloud platform to design, test and implement combinations of cloud services Ongoing feedback and development continues in action design mode</td>
</tr>
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</table>

The Business Transformation Payoffs of Cloud Services at Mohawk
cloud integration broker. This is a new type of service provider that offers a company the expertise, frameworks and technologies to manage connectivity between its on-premises infrastructure, cloud applications and services, and those of its partner network. Cloud integration brokers offer value-added services that include network connectivity, data transformation, business activity monitoring and enhanced security protection. They may provide integration services only, but may also provide the cloud integration platform.

In the initial design cycle, the cloud integration model and platform were established. Mohawk selected Liaison Technologies as its cloud integration broker to establish the cloud integration platform and provide ongoing integration services. A service-oriented infrastructure was established to provide on-demand delivery of infrastructure and enterprise application integration capabilities in the form of cloud services.

Most companies have a hybrid cloud environment where some computing infrastructure exists within the enterprise and some in a public or private cloud. Mohawk's computing environment consisted of on-premises ERP and manufacturing systems, but well over half of its enterprise applications were hosted in the cloud. Through the cloud integration platform, a secure private network was established between Mohawk's infrastructure, systems, applications and services with those of its network of partners. A suite of web-management tools was developed to provide users with the capability to design, implement and monitor digital transactions.

**Getting Value**

The next four cycles (two to five) of the design-build-feedback process focused on incrementally developing and deploying capabilities of the cloud integration platform in response to Mohawk's business requirements. In these four cycles, cloud services were developed and made available to the cloud integration platform to support integration of data files, databases, cloud application program interfaces (APIs) and web services.

**Cycle 2: Data File Integration (December 2010-January 2011).** In cycle 2 of the design-build-feedback process, a suite of cloud services was developed to enable users to automate the exchange of a variety of data files (text files, Excel files, etc.) between Mohawk and its network of partners. The team developed a suite of cloud services to send files to partners' systems and to receive (and transform) files from partners for use in internal business processes. The use of cloud services for data file integration offered a more flexible and cost-effective alternative to traditional EDI. This was important, as much of Mohawk's partner network comprised SMEs that often lacked the technical and financial resources to implement traditional inter-enterprise integration approaches.

Business use cases demonstrated in this cycle included receipt of customer orders, exchange of inventory between Mohawk and its manufacturing and third-party logistics partners, automation of shipment information to/from customers and invoice delivery.

The use of cloud services for file integration also provided an effective method to synchronize master files between on-premises systems and software-as-a-service (SaaS) applications. Use cases included sending employee data from a cloud-based HR system to on-premises systems for reporting, synchronizing sales quotes between Mohawk's ERP system and a cloud-based CRM system, receiving data files from banking institutions and cloud expense-management systems for financial analysis, and exchanging item-level product information between Mohawk's enterprise systems, customer purchasing systems and e-commerce websites.

The file-based integration capabilities demonstrated in this design cycle addressed a wide range of business scenarios. However, these use cases typically processed larger amounts of data, were scheduled to occur at regular frequencies (e.g., hourly, daily, weekly) and required additional processing steps to prepare or use the data files in business processes. Thus, feedback from this cycle highlighted the need for additional capabilities to exchange specific data records based on a conditional process event, to transact this information in a real-time or synchronous manner and the ability to orchestrate or sequence cloud services for a more continuous and automated inter-enterprise workflow.
Cycle 3: Database Integration (January-February 2011). In cycle 3 of the design process, Mohawk developed a suite of cloud services to provide direct connectivity between its on-premises databases and its partner network. To address feedback from the previous cycle, the company implemented the capability to select data from on-premises databases and send the resulting files to partners for use in their own processes. Similarly, Mohawk developed the capability to receive files from network partners and automatically update on-premises databases for immediate use in internal business processes.

The capability to select files from and insert files to on-premises databases eliminated processing steps and enabled a continuous workflow across the partner network. By making information available to enterprise systems as it arrived, this capability enhanced the speed of business activity and processing updates. In addition, Mohawk made enhancements to web-management tools to enable users to design and control multi-step integration flows by sequencing multiple cloud services (e.g., receive-file service followed by insert-database service).

The capability to integrate on-premises databases into inter-enterprise workflows established a foundation for enhanced integration features in the later design cycles. For example, access to on-premises database systems enabled conditional business logic and event-driven integration flows. In this way, web services could be used to provide more granular access to data (e.g., processing a record based on an event vs. daily processing of a data file). Other feedback from this design cycle suggested integration workflows would become more dynamic and beneficial if direct integration with cloud-based applications could be achieved. Feedback also identified that databases located in the cloud needed to be directly accessible (e.g., cloud APIs vs. file integration) as a complement to the on-premises database integration capability.

Cycle 4: Cloud API Integration (February-March 2011). Cycle 4 of the design process was concerned with developing and implementing a suite of cloud services to enable inter-operability between Mohawk’s internal systems and processes and those of cloud service providers. Cloud applications delivered as SaaS commonly use APIs to expose data and functionality for use by external systems. The capability to leverage cloud services by invoking cloud APIs enables direct and real-time workflow integration. In this design cycle, the expertise of the cloud integration broker was essential because invoking cloud APIs can be complicated, with performance and security concerns that must be addressed.

In this design cycle, cloud services were developed to integrate SaaS applications with Mohawk’s on-premises systems. This included a cloud transportation management system, a cloud CRM system, a cloud-based expense-management system and a cloud-based HR and payroll system. Real-time integration workflows were designed and implemented to issue shipping orders to cloud transportation carriers, to update customer quotes in a cloud CRM system for immediate sales force visibility, to validate employee information in a cloud HR system and to validate credit card transactions via a cloud payment gateway.

Feedback from this cycle highlighted the complexities associated with cloud API integration. This emphasized both the need for expertise offered by cloud integration brokers and the requirement for a robust and highly available service-oriented infrastructure. With integration workflows now deeply embedded with inter-enterprise processes, communications were occurring in near real-time.

Cycle 5: Web Services Integration (March-April 2011). Cycle 5 of the design process was concerned with developing and implementing a suite of cloud services to publish and subscribe to private and public web services. Mohawk’s need for web service integration came from the business need to exchange finer-grained information with its partner network. These inter-enterprise workflows are more situational, and they complement the real-time data file, database and cloud API integration capabilities developed in earlier cycles.

Business use cases demonstrated in this cycle included:

- Real-time integration of workflows that use web services to enable e-commerce websites and customer purchasing systems to check price and availability for a specific item in Mohawk systems
● Authorization of credit card transactions in on-premises enterprise systems accessing a cloud payment gateway
● Updating freight rates from logistics providers for a customer order processed in on-premises systems
● Updating currency conversion rates at invoice generation.

In this design cycle, the use of web services proved to be a cost-effective, flexible and dynamic method for inter-enterprise integration. To reduce development time and maximize reuse, a suite of cloud services was developed to publish and subscribe to a range of web services using industry standards (e.g., XML, WSDL, SOAP, UDDI). Once again, the capabilities of the cloud integration broker were essential to manage the repository of web services. From a transaction perspective, web-service integration represents the majority of inter-enterprise workflows (30,000 web-service calls per month between Mohawk and its partner network). This high volume required a scalable cloud integration platform to support real-time workflows using web services.

In this cycle, Mohawk also created enhanced web management tools to enable users to more effectively schedule integration workflows using synchronous communications, as well as to monitor performance service levels in real time.

Creating Inter-Enterprise Processes and Information Flows

Cycle 6: Inter-Enterprise Business Process Orchestration (From April 2011). During the two-year design process, several hundred inter-enterprise processes and integration workflows were designed and implemented to digitally connect Mohawk with more than 100 of its customers, material suppliers, contract manufacturers, third-party warehouses, transportation and logistics partners, financial institutions and cloud service providers. As part of this, a repository of nearly 100 services (e.g., get-file, insert-database, check-inventory, issue-invoice) was orchestrated by users to design, evaluate, implement and manage a wide range of inter-enterprise integration workflows. Mohawk has implemented end-to-end integration workflows across the enterprise to its extended partner network, where transactions were securely processed and monitored in the cloud integration platform.

Leveraging the cloud integration platform, Mohawk quickly integrated its new network of partners to deliver a wide range of complementary capabilities that supported business growth, while enhancing business velocity and lowering transaction costs. The company was able to automate purchase orders to suppliers and from customers, exchange inventory data with warehouses and manufacturers, publish items and inventory to e-commerce websites, perform real-time price and availability checks, calculate freight rates with transportation carriers, update quotes in a cloud-CRM system, automate cash receipts from banks, and more.

Mohawk's transition to cloud services has resulted in significant near-term payoffs, but equally important, cloud services provide a robust and flexible platform for sustained business change. The company continues to mash-up cloud services to design and deploy inter-enterprise workflows and business processes.

Mohawk's Tangible Business Payoffs from Transitioning to Cloud Services

Mohawk's adoption of cloud services has enabled the transformation of its decades-old business model from offering core paper products sold through a few distributors to a flexible business model that leverages the complementary resources of its network of partners to provide a wider portfolio of products and services to a larger and more diverse customer base.

The payoff of cloud services for Mohawk has been significant, extending well beyond economic and operational benefits to transforming its very identity. Cloud services provided the business technology platform to help the company launch new lines of business and access new markets with an expanded portfolio of high margin products.

The use of cloud services also helped to extend market reach and improve service levels for its current products, while at the same time reducing
its internal operating costs. Mohawk credits its transition to cloud services with helping generate annually over $30 million in new revenue and savings of $1.5 million in internal operating costs. At the end of the two-year project, the company’s earnings before interest and taxes had increased by 200%. As important, cloud services provided Mohawk with a flexible platform to continually reshape its partner network in response to business threats and opportunities occurring in a rapidly changing digital print market.

Mohawk’s six tangible business payoffs from cloud services can be categorized as economic, business and transformative (see Table 3).

**Increased Profitability (Economic Payoff)**

The financial payoff of cloud services for Mohawk is measured in increased revenues and higher earnings. Increased sales revenues resulted from an expanded portfolio of higher-margin products sold direct in new market segments and channels. The cumulative effect of new lines of business, introduction of higher-margin products and direct selling using cloud platforms generated over $30 million per year in new sales revenues.

The use of cloud services reduced internal operating costs through the automation of business transactions across the partner network, despite the significant increase in business activity volumes. The combination of increased sales revenues and cost reductions helped Mohawk to double its earnings over prior years, even though sales of core premium paper products experienced a single digit decline.

**Reduced Operating Costs (Economic Payoff)**

Despite Mohawk’s business becoming more complex with the expansion of the partner network and the introduction of new products, no additional staffing was required to manage the two-fold increase in transaction volume. Because of the efficiencies resulting from digital connections with the partner network, headcount
was gradually reduced through the transition by 20%, saving the company $2 million per year.

As examples, the implementation of several hundred inter-enterprise connections automated information flows and streamlined business processes, resulting in significant back-office savings. These inter-enterprise workflows touched all aspects of Mohawk’s business processes, including order processing, inventory management, transportation management and cash management. Call center activity was reduced by more than 50% by providing customers with self-service capabilities to check product prices, availability and delivery status using cloud services accessed from websites and mobile devices. As noted earlier, this resulted in more than 30,000 web service calls per month. Inventory updates and movements between Mohawk and its network of suppliers, manufacturers and third-party warehouses were fully automated using cloud services. In addition, the processing of cash with Mohawk’s financial partners, cloud payment gateways (Authorize.Net, PayPal) and a cloud expense-management system (Concur) was fully automated using cloud services.

**Expanded Market Reach (Business Payoff)**

Mohawk’s partner network was designed and configured both to expand market reach to access new customers and to enhance service levels in markets currently served. This was achieved by using third-party warehouses and partnering with logistics partners across the U.S. and Europe. These partners were connected to Mohawk’s internal systems using the cloud integration platform, so that products could be shipped just minutes after the receipt of customer orders. To manage the expanded distribution and transportation network, a cloud transportation management system (TMS) was implemented to provide freight quotes and execute shipment plans across the partner network. Cloud services provided real-time integration of freight loads from Mohawk’s on-premises enterprise system to the cloud TMS for tendering.

The addition of four third-party warehouses and implementation of the cloud TMS helped Mohawk to extend its distribution to Europe and to increase its North America market reach by 25%-30%. In the U.S., same- or next-day service delivery levels increased from 75% to 95% of the country.

**Expanded Value Network (Transformative Payoff)**

The flexibility of cloud services and their ease of use provided Mohawk with the ability to continually design and configure its partner network to offer customers value propositions not achievable by the enterprise alone. Mohawk was able to quickly and efficiently establish digital connectivity with a wide range of business partners and cloud service providers. More than 100 customers, suppliers, outsourced manufacturers, third-party warehouses, transportation and logistics providers, financial institutions and cloud providers were digitally connected to Mohawk’s on-premises systems and processes. Cloud services were leveraged to process quotes, receive orders, exchange inventory, ship products, process invoices and exploit the functionality of cloud-enabled applications and services.

**Moved to a Direct Selling Model (Transformative Payoff)**

The expanded partner network enabled Mohawk to provide new high-margin products for direct sale in new market channels. This required a shift from Mohawk’s traditional "sell to distribution model" to a direct selling model targeting small businesses and online web consumers. The company's customer profile shifted from 10 to 15 distributors to many thousands of B2B and business-to-consumer (B2C) customers. To support this business model, Mohawk needed to fundamentally transition its market strategy and selling approach to target and influence a significantly larger and more diverse customer base.

Mohawk’s transition from relationship selling to relatively few distributors to direct sales to tens of thousands of customers required significant changes to its sales and marketing processes. It needed to establish new systems and processes to process customer orders in a more efficient and scalable manner. To facilitate this change, Mohawk implemented a cloud CRM system (SugarCRM) and an e-marketing system (Salesforce.com) to target, influence and sell to
the significantly larger customer base. The cloud CRM and e-marketing applications were quickly implemented and seamlessly integrated into Mohawk's internal systems and processes using cloud services.

To market and sell directly to small businesses and consumers, Mohawk developed a comprehensive online digital selling platform (MohawkConnects.com) in collaboration with its partner network. It also invested in a German start-up company, MetaPaper (Europe’s first online service platform for paper and print), to sell its products across Europe. Mohawk then partnered with online marketplaces and retailers like Amazon and Ariba to sell its products directly to consumers. The company’s new platform enabled it to integrate the e-commerce platforms of several of its largest paper distributors so it could exchange online orders based on the proximity of inventory to online customers.

The e-commerce platforms, online marketplaces and merchant online stores were integrated with Mohawk’s on-premises systems and its partner network through the cloud platform. Cloud services were used to maintain an online catalog of product attributes, and end-to-end order processing and fulfillment. These digital selling platforms very quickly generated $3 million to $5 million in direct online sales of higher-margin products.

Launch of New Business Ventures (Transformative Payoff)

During the two-year cloud transition, Mohawk launched three new business ventures to exploit market opportunities and to offer customers new products and services. Responding to the anticipated bankruptcy of the largest U.S. envelope manufacturer, Mohawk saw the opportunity to establish its own envelope-converting business to fill the impending market void. In six months, the company identified and integrated a network of six outsourced envelope manufacturers to convert its premium papers into envelopes. Six months later, once a market position had been established and Mohawk had scaled up its own envelope capabilities, about 90% of the envelope operations were insourced.

Cloud services automated and streamlined much of the business transactions between Mohawk and the network of envelope partners. This success demonstrates the flexibility of the cloud-enabled business model and the ability to outsource and insource capabilities as market conditions change. As a result of launching the highly profitable envelope business, thousands of new envelope products are now available to Mohawk’s customers.

Mohawk’s second business venture was a new line of specialty digital substrates—synthetic materials (e.g., polyester, vinyl and plastics) used in high-value digital printing applications. Typical applications include labels, cards, menus, signage and stickers where moisture or excessive wear are of concern. The business model for this line of business was to leverage a network of manufacturing partners and use Mohawk’s internal resources and partner network to market, sell and distribute digital substrate products. The digital substrate business was launched in less than one year and offered customers several hundred products. The cloud integration platform enabled the digital connections between the contract manufacturers to process customer quotes and orders, to locate products in warehouses, to sell products using on-premises enterprise systems and e-commerce platforms, and to ship products to customers.

The third business venture enabled by Mohawk’s new cloud infrastructure was an Internet-based image publishing service. With the proliferation of digital images and customer demand for higher-quality output, Mohawk developed an online digital publishing platform. The online service provided professional photography businesses and consumers with the ability to design higher-end photo books, calendars, journals and cards to be printed on-demand using Mohawk’s premium papers and digital substrates. The online publishing service was connected to Mohawk’s on-premises systems and partner network using the cloud integration platform for order processing, credit card authorization, shipment and invoicing.

The envelope converting, specialty digital substrate and online digital publishing businesses increased Mohawk’s product portfolio five-fold and delivered higher margins.
Lessons in How to Gain Business Payoffs from Cloud Services

Mohawk has been widely acclaimed for its innovative use of cloud services to transform its business model, which has resulted in significant business payoffs. The Mohawk story offers business and technical leaders deeper insights into how cloud services can deliver flexible inter-enterprise processes that enable dynamic partner networks capable of responding to market threats and opportunities. While there are clear economic and IT operational benefits from cloud services, the Mohawk case demonstrates the transformative payoff enabled by adopting a cloud architecture.

The impact of adopting cloud services has caused four significant shifts at Mohawk, which are summarized in Table 4. The first shift is a realization that cloud services are about more than providing IT services; they can provide a business model platform as well. The second impact is that the focus of IT integration shifts from internal applications to business partners. The third impact is that application design shifts from traditional methods to using mash-ups of cloud services to create inter-organization processes. The fourth impact is that the focus of trust shifts from intra-organization to inter-organization. Each of these shifts needs to be acknowledged and managed.

These four shifts give rise to the four lessons described below. These lessons show how Mohawk achieved the business model transformation needed to realize the fundamental shift in value enabled by cloud services. We explain how the lessons can be adopted by other organizations to drive business model change.

Lesson 1. Cloud Services Provide a Dynamic Business Model Platform

The conventional view of cloud services is that they enable rapid provisioning of on-demand computing resources and SaaS applications. This perspective of cloud services offers many benefits to businesses and their IT departments, including the ability to easily test and prototype applications, the capability to quickly scale-up computing capacity to accommodate changing business conditions and to shift IT spend from capital outlays to operating expenses based on actual usage. This perspective of cloud services

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Table 4: Shifts Resulting from Mohawk’s Transition to Cloud Services

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<tr>
<th>Shift</th>
<th>Impact of Cloud Services</th>
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<tbody>
<tr>
<td>From IT Provisioning to Business Model Platform</td>
<td>Cloud services provide value beyond an operational platform to deliver on-demand computing; they can provide a business technology platform for designing and continually reshaping a business model that leverages a dynamic partner network.</td>
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<tr>
<td>From Internal Application Integration to Business Partner Integration</td>
<td>A cloud-based extended enterprise and hybrid computing environment demands an inter-enterprise perspective on integration. Cloud services are the basic building blocks to construct flexible inter-enterprise processes that exploit the capabilities of the partner network.</td>
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<tr>
<td>From Traditional IS Design to Mash-up of Cloud Services</td>
<td>Cloud services encourage a new approach to application design, where services are mashed-up in unique combinations to create inter-enterprise processes. The capability to reuse cloud services and the flexibility to connect them with partners’ services encourages experimentation of design outcomes.</td>
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<tr>
<td>From Intra-Organizational Trust to Inter-Organizational Trust</td>
<td>As trust in cloud partners grows based on proven performance, the adoption of cloud services will accelerate. Enterprises should start with basic cloud services and incrementally add capability using a design-build-feedback ADR process.</td>
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</table>
has certainly helped to make the IT function more responsive to the needs of the business.

The Mohawk case, however, demonstrates that the use of cloud services has significantly more potential, well beyond that of an operating platform to host applications, to become a business technology platform to support dynamic business models. The cloud has evolved to become a dynamic platform for designing and managing a flexible business model that leverages the complementary resources and capabilities of a network of partners to offer customers value-propositions not achievable by the enterprise alone. In this context, the cloud becomes a dynamic business process hub that enables digital connectivity between a company’s internal systems and processes and those of its customers, suppliers, service providers and a growing number of public and private cloud services.

Lesson 2. Cloud Services Enable Business Partner Integration

Most organizations focus considerable time and resources on integrating their internal portfolio of enterprise systems to eliminate redundancies and information silos. A service-oriented approach using enterprise application integration software has become widely used to streamline business processes and improve information flows across the enterprise. However, traditional enterprise application integration and middleware solutions are expensive to purchase and very complex to manage, making them cost prohibitive for many SMEs. Moreover, on-premises integration solutions were not designed for interconnecting on-premises systems, applications, processes and data with those of business partners or emerging cloud service providers.

The emergence of the cloud integration platform and cloud integration brokers has enabled a fundamental shift from traditional intra-enterprise integration to inter-enterprise integration. This shift is in direct response to an increased reliance on more business partners to generate value to customers, the proliferation of the number and types of cloud services available, and the need to seamlessly integrate internal and external resources and digital assets. Cloud services are the basic building blocks for constructing inter-enterprise business processes and making the partner network more agile and responsive to changing business conditions. The ability to create a dynamic partner network that leverages the competencies of a company with the complementary capabilities of its business partners and cloud services providers is a necessary ingredient of sustained business success.

Lesson 3. Mash-ups of Cloud Services Enable Rapid Development of Inter-Enterprise Workflows

Traditional design approaches to interface a company’s computing infrastructure with partner systems and cloud applications typically requires the expertise of the IT department to translate EDI protocols and complex cloud APIs. Custom programming is often required for data mapping and transformation, thus requiring the involvement of security personnel to enable data flows through the corporate firewall. This traditional approach relies on a software development lifecycle to specify and develop desired levels of functionality. Integration projects that traverse the corporate firewall require complex middleware and expertise of technical resources, often leading to relatively long implementation timelines and rigid, inflexible design outcomes.

The power and flexibility of cloud services have enabled a new paradigm and approach to designing and implementing inter-enterprise processes and information flows. Cloud integration platforms provide a suite of adapters in the form of cloud services that can be used to securely connect disparate systems, applications and data with minimal regard for the underlying technology or its location. Cloud integration brokers provide a range of services to help companies design and govern inter-enterprise processes and workflows. These include establishing partner connectivity to the cloud platform, data mapping and transformation, enhanced security measures and real-time monitoring of integration flows.

The capabilities of the cloud integration platform and services of a cloud integration broker minimize the complexity associated with establishing inter-connectivity with a partner network. This empowers business
users to develop inter-enterprise workflows relatively quickly and inexpensively. For Mohawk, this reduced the time needed to develop and implement inter-enterprise processes from weeks to days. Moreover, a cloud platform exposes its registry of private, public and partner cloud services for users to discover, select and use in unique combinations or mash-ups. The flexibility of cloud services encourages experimentation of design alternatives, leading to differentiated and innovative process designs that span the enterprise and its partners.

Lesson 4. Achieving Payoffs from Cloud Services Means Building Inter-Organizational Trust

The commitment of Mohawk’s leadership team to pursue a business transformation enabled by the wide-scale adoption and pervasive use of cloud services was deeply rooted in the notion of earned trust. Prior to the rise of cloud computing at Mohawk, cross-functional teams evaluated and recommended business technology initiatives based on a high level of confidence in the organization’s intentions and capabilities. These cross-functional teams pursued projects and initiatives only after a level of intra-organizational trust was established through assurances of executive sponsorship, line of business ownership of project outcomes and commitment of IT resources.

For Mohawk, the adoption of cloud services as a technology enabler of its business strategy demonstrated a shift from intra-organization trust towards earned inter-organizational trust. Certainly, executive-level support and buy-in from the business are still important, but there is less reliance on the internal IT function and more dependence on external cloud providers. Mohawk needed to trust that cloud providers outside of its direct control would secure and process sensitive information and consistently deliver to service-level agreements. Trust needed to be earned based on sustained performance over time.

Based on Mohawk’s experience, we provide the following techniques for building trust with cloud partners through incremental successes, leading to a transformational result:

- Select a cloud integration broker that has proven experience managing multiple partners and inter-enterprise integration scenarios.
- Embrace a design-build-feedback approach in collaboration with the cloud integration broker.
- Start with inter-enterprise integration cases with lower technical complexity and business dependencies.
- Measure results and performance, solicit feedback from users and communicate successes.
- Incrementally design and build enhanced integration capabilities to address business requirements. Mohawk used six design cycles, each building on the capabilities and successes of the others, to establish trust with its cloud partners.
- Select cloud partners that are transparent about their performance and provide users with real-time access to service-level metrics.
- Encourage business users to interact directly with cloud brokers and cloud partners to co-design inter-enterprise workflows as a means to build trust and accelerate adoption.

Concluding Comments

The business payoffs and design knowledge from the Mohawk case have been widely acclaimed. Mohawk has been cited as providing important lessons for companies seeking to transform their business models using cloud services. Its experience has implications for how CEOs, CIOs and other senior IT executives should view emerging cloud services and how these services can bring value to their organizations. The cloud has become the business technology platform for the 21st century enterprise, where in a digitally connected economy, the flexibility and agility of the enterprise and its value network are the basis for sustained competitive advantage. Emerging cloud integration platforms serve as a business process hub through which flexible, shareable, reusable cloud services can digitally connect partners to a value network, with minimal regard to the underlying technology or its location.
The growing adoption of cloud services will have a significant and lasting influence on the role of IT in the organization. The traditional CIO will assume a more prominent role as a Chief Process Officer, and IT practitioners will assume more responsibilities as business process architects. The IT and business roles will converge toward a common objective of designing, deploying and governing inter-enterprise workflows and orchestrating them across a dynamic value network.

**Appendix: The Action Design Research Conducted at Mohawk**

Mohawk (then Mohawk Paper Mills) offered a unique context in which to conduct action design research (ADR) to address a real-world business challenge through iterative design-build-feedback cycles using cloud services. Action design research is a real-time, problem-focused research method for generating design knowledge through the concurrent building and evaluation of an IT artifact in an organizational setting. The research was conducted during a two-year period from April 2010 to April 2012. It aimed to demonstrate how the organization could use cloud services to develop a digital platform to implement a flexible business model that would leverage complementary skills and capabilities of a dynamic value network. This represented a real-time exercise of the ADR approach.

The research involved industry-university collaboration between Mohawk, Syracuse University and Liaison Technologies. The research team pursued concurrent build-design-feedback cycles to demonstrate a novel cloud integration platform. Mohawk business users interacted with the cloud platform and cloud services to design and deploy several hundred inter-enterprise processes and integration workflows to connect more than 100 partners to the enterprise. Action design research seeks to make meaningful contributions to the knowledge base of design while providing practitioners with insights into the applicability of the artifact within their unique settings and context. Mohawk’s CIO, Paul Stamas, was also in a unique position to pursue this approach, having good rapport with his CEO and CFO, and a real problem that needed to be addressed in how to use IT to transform the organization.

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