



DavidChappell
& Associates

CREATING BUSINESS VALUE THROUGH INTEGRATION

WHAT BIZTALK SERVER AND SQL SERVER PROVIDE

DAVID CHAPPELL

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WHY INTEGRATION MATTERS

Applications and data are the yin and yang of information technology. IT's business value flows from the combination of the two. Yet organizations use many different applications and store data in a variety of formats. Getting the most from this diversity often requires connecting things in intelligent ways. In other words, it requires integration.

Integration can present some surprisingly hard problems. The data and applications that an organization uses probably weren't designed to be connected. Each one has its own view of the world, expressed in its own idiosyncratic way. And over time, an organization's IT environment tends to get more complex. Applications and databases are deployed at different times by different groups to address different business needs. In most firms, this complexity is an inescapable corollary of growth: It's hard to avoid. All of this makes integration challenging, both technically and from a broader business perspective.

Microsoft and other vendors have responded to this by creating integration technologies to help address these challenges. Yet understanding the benefits these technologies provide can itself be challenging. So can knowing exactly which integration technology to use in a particular situation.

A useful way to think about integration is to divide it into two categories:

- Application integration, where the focus is on connecting different applications. One common reason for doing this is to automate more of a business process.
- Data integration, where the goal is to work more intelligently with data. This most often means keeping data synchronized across systems or creating a data warehouse.

To address these integration challenges, Microsoft provides two primary products:

- BizTalk Server, which supports application integration and some kinds of data integration.
- SQL Server, which includes services for data integration.

What follows looks at each of these technologies, describing the integration scenarios in which each one makes sense. If it's done right, integration has significant business value, and so having a better sense of where and how to apply it also has significant value.

APPLICATION INTEGRATION

Two types of application integration are most common today:

- Automating business processes by connecting two or more applications. This might be done solely within an organization, where it's sometimes referred to as *enterprise application integration (EAI)*. It might also be done between organizations, where it's commonly known as *business-to-business (B2B)* integration.
- Creating composite applications. This typically means providing a common front end to a group of existing applications, making the result easier and more effective to use.

This section looks at both.

AUTOMATING BUSINESS PROCESSES

Business processes are fundamental to every organization. Supporting those processes with applications can make them better in a number of ways. Because of this, many—maybe even most—business processes now depend on software.

Yet each application typically supports only part of a complete business process. Automating more of the process requires creating connections between applications. Just as a single application improves part of a business process, integrating multiple applications can improve the process as a whole.

Some business processes are contained entirely within one organization. Others extend to partners and customers, crossing organization boundaries. In either case, automating the process commonly requires connecting applications and orchestrating their interactions. This section looks at the role BizTalk Server plays in doing this, both inside and between organizations.

Inside an Organization

Suppose a manufacturing firm decides to automate its Order-to-Invoice process. Today, this process is probably supported by various applications, such as a CRM system, a manufacturing application, and a billing application. All of these applications were created or purchased independently by different groups in the company, and all are focused on a particular part of the process.

Today, the firm integrates these applications in ad hoc ways, such as by entering information from one application into another. Automating this integration—and thus the business process—can be a big improvement. Figure 1 shows how this might look using BizTalk Server.

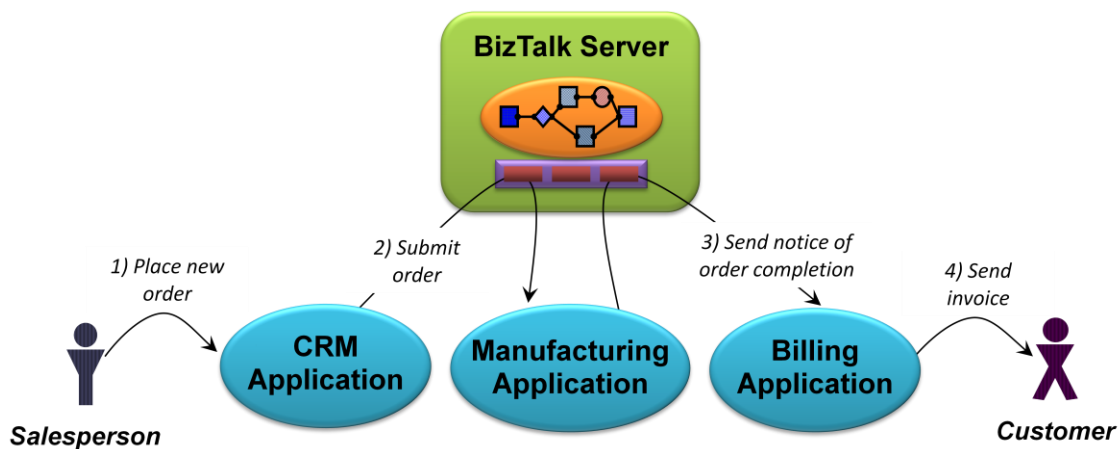


Figure 1: Automating a business process that spans applications can make the process faster, cheaper, and more accurate.

In this example, the salesperson's new order is picked up from the CRM application by BizTalk server, then sent to the manufacturing application. Once the ordered items are available, the manufacturing application informs BizTalk Server, which then contacts the billing application to send an invoice. In the normal execution of this process, no human intervention is required once the new order is submitted.

Implementing this integration requires addressing three big technical issues: connecting to each application, transforming data between the formats used by each application, and coordinating the entire process. BizTalk Server has specific components designed to address each of these. It provides adapters to connect to diverse applications, data mapping tools to translate data, and an orchestration engine to run the logic that controls the process. Because of this, the end-to-end process, from the salesperson placing the order to the customer receiving an invoice, can be supported consistently in software.

The benefits of business process automation are significant. They include the following:

- Processes can be faster. Computers are faster than people, and so replacing manual steps with software can improve the overall speed of a process. Decreasing process cycle times is often an important way to improve how a business operates.
- Processes can be cheaper. When used correctly, software costs less than people, and so the money spent on executing a business process can be reduced.
- Processes can be more accurate. Manual or other ad hoc integration introduces the possibility for errors, something that's much less likely with a well-designed automated process.
- Managers get more visibility into processes. This can make it easier to create audit trails and to track processes for compliance with internal standards and external regulations.

Determining the return on investment for this kind of integration project can be straightforward. If people who currently do manual steps can be repurposed, for example, some of the savings from automation are obvious. And while placing an exact value on faster and more accurate processes can be harder, that value is nonetheless real.

Automating business processes can bring other requirements, too. Suppose a process has complex and frequently changing rules, for example. Business rules engine (BRE) technology is designed expressly for situations like these, and so BizTalk Server includes a BRE. The people who use a process might also want to monitor the process in real time, viewing it in business rather than technical terms. To allow this, BizTalk Server includes a Business Activity Monitoring (BAM) component. And in some cases, a generalized integration approach, sometimes called an Enterprise Service Bus (ESB), is the best option. For situations like this, BizTalk Server includes technology that lets it function as an ESB.

Integration isn't a simple problem. Because of this, integration technologies include many different components. Still, the benefits of automated business processes are undeniable, and so it's worthwhile to understand how to achieve them.

Across Organizations

The process shown in Figure 1 executes entirely within a single organization, yet its last step is to send an invoice to a customer in another organization. Viewed from a larger perspective, isn't this also part of the business process? Why not automate this step as well?

Providing electronic connections like this between customers and suppliers is a typical motivation for B2B integration. BizTalk Server can also be used here, as Figure 2 shows.

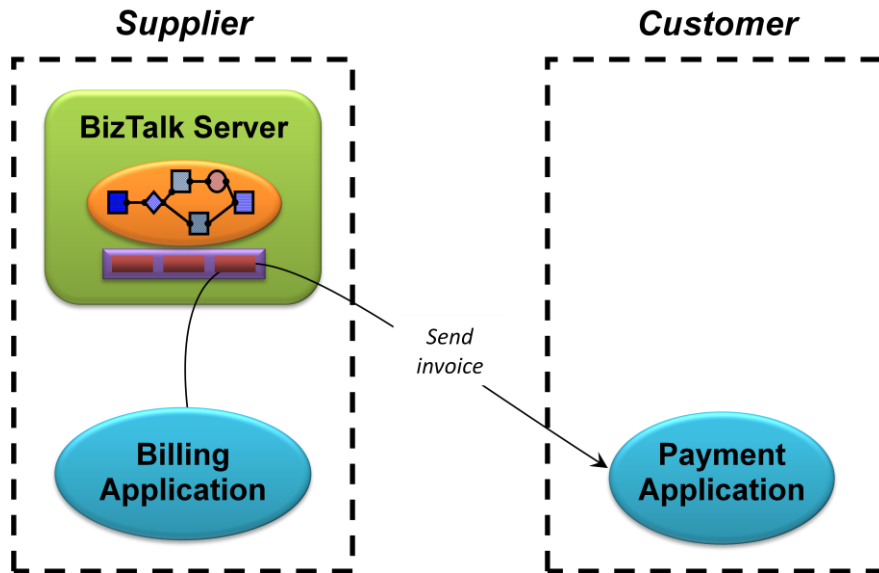


Figure 2: Parts of a business process that span organizations, such as invoicing, can be automated.

A majority of B2B integration today relies on Electronic Data Interchange (EDI), a technology with roots in the 1980s. As the figure suggests, BizTalk Server supports B2B connections, whether done with EDI or a newer technology such as Web services. Once again, the core technical requirements are a way to connect to applications, a mechanism for translating data between different formats, and some way to orchestrate the entire process. As described earlier, BizTalk Server provides all three. B2B integration raises larger issues as well, such as the challenge of managing relationships with multiple trading partners. To address these, BizTalk Server provides various other technologies, including a Partner Agreement Manager that allows configuring interactions with different partners in different ways.

Just as automating a business process within an organization has value, so does automating processes across organizations. Here are some examples:

- As with internal processes, B2B integration can make processes that span organizations faster, cheaper, and more accurate.
- B2B integration is sometimes required by business partners. For example, large retailers commonly require their suppliers to interact with them electronically using EDI or another technology.

Along with EDI, many industries have their own standards for B2B integration. High-tech companies often use RosettaNet, for example, while banks depend on SWIFT. To help companies address these requirements, BizTalk Server provides support for these and other B2B standards.

While automating a complete process can bring benefits, it also means that the software used for that automation becomes critically important to the business. For example, integration scenarios like those shown in Figures 1 and 2 often have stringent requirements for availability and performance. This implies that the systems on which BizTalk Server runs need to be fast and reliable, including redundant servers when necessary. Without this, the people who use a process might not be happy with either its reliability or its speed.

CREATING COMPOSITE APPLICATIONS

Automating a business process isn't the only useful kind of application integration. Yoking a group of existing applications into a single composite application can also provide substantial business value.

Think about a bank, for example, that provides loans, retail banking services, and mutual funds. The bank probably has separate applications for all three areas, either purchased or custom-built. Yet to the bank's customer-facing employees, these are all aspects of the same thing: services the bank sells. Providing a unified view across these three areas means integrating the underlying applications, including a common interface to all three. In other words, it means creating a composite application. Figure 3 illustrates this idea.

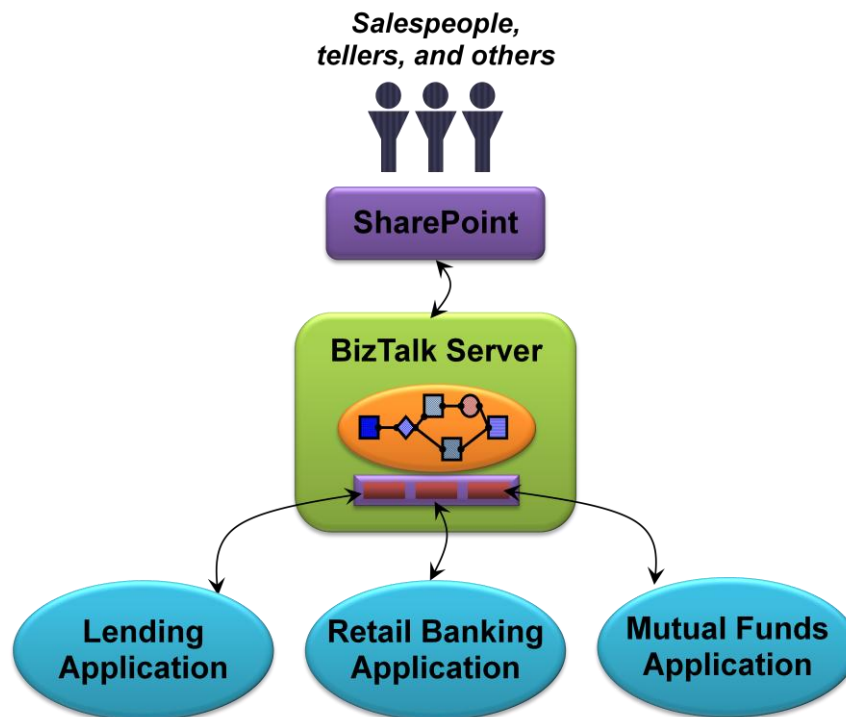


Figure 3: By integrating existing applications, a composite application gives its users a simpler and more functional interface.

Presenting one unified set of functionality to users requires connecting applications, translating between the different data formats those applications use, and implementing cross-application logic, just as with process automation. BizTalk Server provides the capabilities to do these things.

The product doesn't include a way to create user interfaces, however—more is needed. In the example shown here, Microsoft's SharePoint is used for the interface, but this isn't required. Another Web-based technology might be used, or the creator of this composite application might build a custom client for Windows, mobile devices, or other systems.

Some of the benefits that composite applications can offer are the following:

- Employees can do their jobs more efficiently. In the example shown in Figure 3, for instance, a teller interacts with just one application rather than three. Instead of making connections across these applications in his head, the integration software does it for him.
- The application can offer new cross-application functions. For example, a salesperson can more effectively cross-sell the bank's offerings because she has a 360-degree view of a customer's business with this bank. Because the integration logic also has a view across all three areas, it can support this with, say, suggestions of which loan products should be offered to particular retail banking customers.
- If some or all of the composite application is exposed to customers via the Internet, costs can be lowered further. Letting customers do things for themselves reduces the need for employees to perform these same tasks. If done well, a self-service option can also increase customer satisfaction.

Creating composite applications is less common than automating business processes, and it's not necessarily the first thing people think of for application integration. Yet in the right situations, composite applications can be quite useful. Anybody who's responsible for helping an organization run more effectively should keep this possibility on their list of options.

DATA INTEGRATION

Applications are a critical part of the IT world. But data—about customers, products, employees, and more—is also fundamental to every organization. Just as integrating applications matters, so too does integrating data.

It's useful to divide how organizations use data into two broad categories. The first is *transactional* data (sometimes referred to as *operational* data). This is the data that applications use every day to carry out their primary functions. Think of an orders database used by a purchasing system, for example, or employee data used by a payroll application. The second category is *analytical* data. As the name suggests, its purpose is to help analyze the organization's activities, usually with an eye toward making better decisions through improved business intelligence (BI). Analytical data is commonly derived from an organization's transactional data, but it includes historical as well as current information.

These two ways to use data give rise to the two main motivations for data integration. They are the following:

- Synchronizing transactional data that's used by two or more applications. How data is represented varies across different systems, but its meaning must be kept consistent. And since transactional data is used by running applications, changes to one copy of data should typically be reflected in other copies as soon as possible.
- Building data warehouses that contain analytical data, which can then be used for reporting, historical analysis, and data mining. Because a warehouse's data comes from multiple sources, the information must be transformed into a common structure before it's usable. This kind of integration usually relies on batch processes rather than the more immediate mechanisms used for synchronizing transactional data.

This section provides an overview of both approaches, together with a look at the Microsoft technology used to address each one.

SYNCHRONIZING INFORMATION

In a perfect world, all of an organization's applications could share the same copy of data. In the world we live in, however, this often isn't possible. Instead, different applications commonly have different databases, with some overlap in the transactional data they contain. Information about a single customer or employee or order might be stored in several different application databases.

Yet when different copies of the same information exist, maintaining a single version of the truth gets hard. What's needed is a way to keep all of these copies in sync. Figure 4 shows how BizTalk Server can be used to accomplish this.

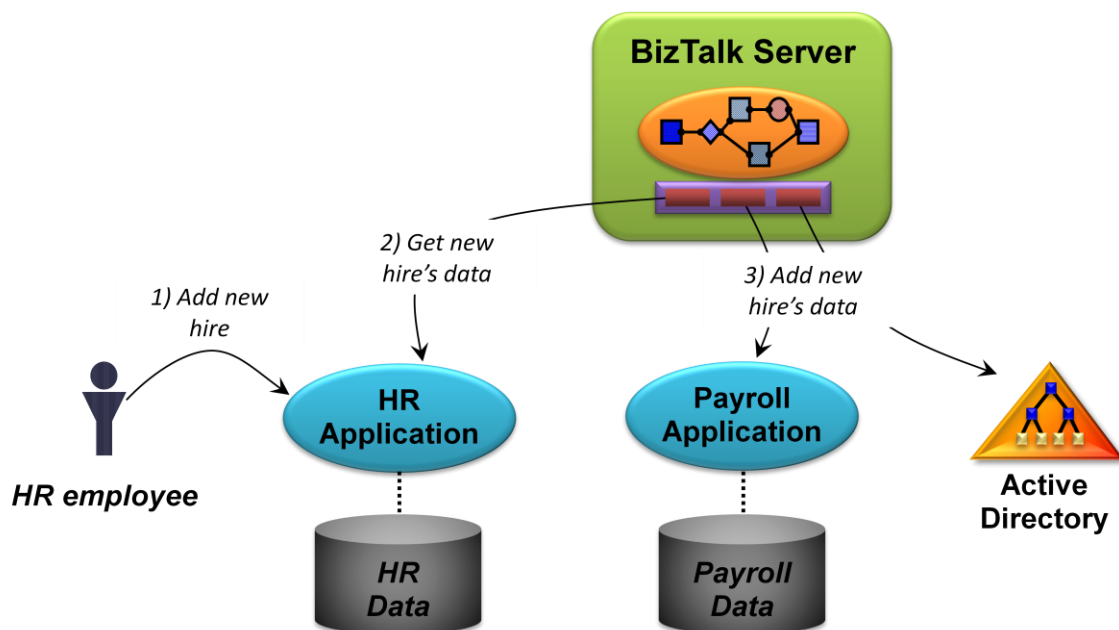


Figure 4: Automatically synchronizing transactional data across multiple applications can reduce errors and effort.

In the example shown here, an employee in the human resources department uses an HR application to add information about a new hire. Through BizTalk Server, this information is added to the database maintained by this firm's payroll application and to Active Directory. And although it's not shown here, it's reasonable to assume that changes made later to any copy of this information will be propagated across all of them.

The value of synchronized information is obvious, but it's still worth being explicit about its potential benefits:

- Keeping data synchronized through software is faster, cheaper, and more accurate than relying on people to do it.

- Effective synchronization can increase customer satisfaction. Rather than see inconsistent behavior from a firm's employees due to out-of-sync data, a customer gets a consistent experience.
- Effective data synchronization can allow an organization to carry out its mission more effectively. Think of a law enforcement agency, for example, that uses a mechanism like this to keep its list of wanted criminals in sync with other agencies. Better data synchronization will translate into catching more bad guys.

Synchronizing transactional data by going through the application, as in Figure 4, rather than directly to the database has some advantages. It allows the application to present the data in an appropriate form, for example, and it can allow more intelligent access control. There are times, though, when accessing the data directly is better. One example of that is in building a data warehouse, described next.

BUILDING DATA WAREHOUSES

All of the scenarios described so far have used BizTalk Server. This shouldn't be surprising, since BizTalk Server is Microsoft's primary integration technology. Still, it's not the only choice, and it's not right for every integration scenario.

For example, suppose an organization wishes to build a data warehouse. Doing this requires collecting data from one or more transactional databases, those that directly support the firm's applications, and storing it in a separate warehouse database. A separate database is needed both for performance—doing analysis on transactional databases tends to slow them down—and to hold historical information rather than the purely current data in the transactional databases.

Many of the integration challenges described earlier also apply here, such as translating between different data formats and executing integration logic. Yet even though BizTalk Server provides these things, it's not the best choice for creating data warehouses. A better approach is to use SQL Server Integration Services (SSIS), part of SQL Server. Figure 5 illustrates a typical scenario.

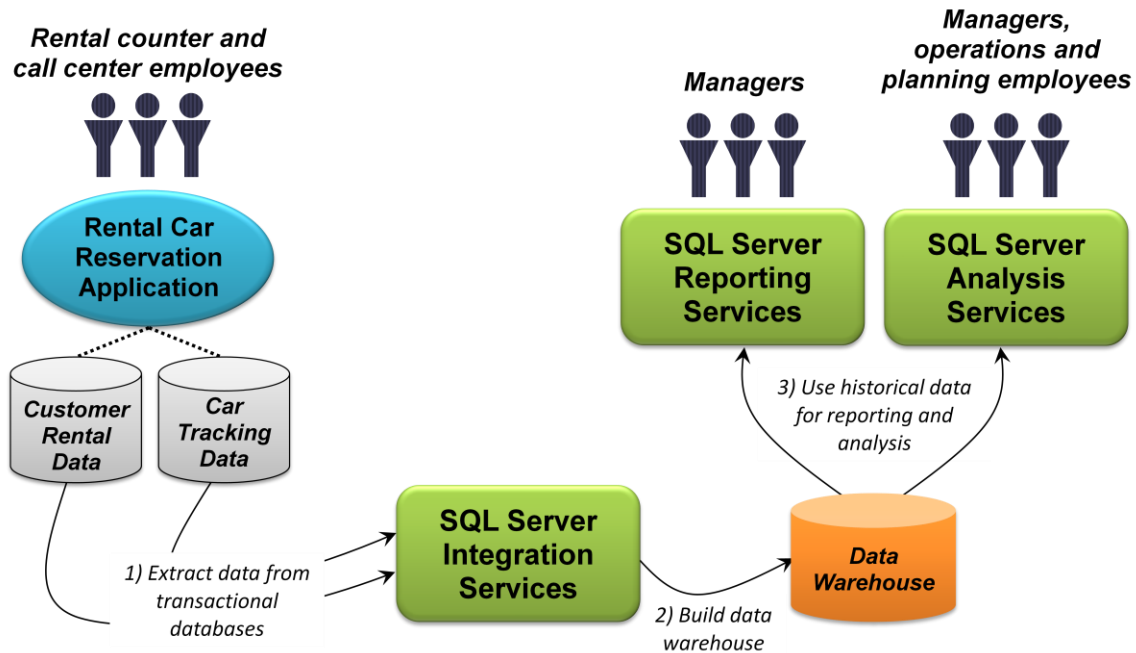


Figure 5: A firm can use a data warehouse to create reports, make smarter decisions, understand its customers better, and more.

This example illustrates how a car rental firm might create and use a data warehouse. Transactional data used by the rental car reservation application, including information about both customers and cars, is extracted by SSIS into the data warehouse. Decision makers and others in this company can then use SQL Server Reporting Services, SQL Server Analysis Services, or other business intelligence tools to examine this data.

Data warehouses are common today. Among the most important benefits they provide are these:

- Because a data warehouse contains historical data across a wide area, it allows creating reports with a great deal of depth and breadth.
- The trends visible in historical data can help a firm's managers make better predictions—and thus better decisions—about what's next in their business.
- Examining the information in a data warehouse can reveal patterns of behavior that aren't otherwise visible. For example, a rental car firm might learn that in Western Europe the highest number of convertibles is rented on Thursdays by Danish men between 50 and 60 years old. The firm can then create a special promotion aimed solely at this group.

While it's technically possible to use BizTalk Server to create a data warehouse, it's not a good idea; SSIS is much better suited for this kind of integration. And since BizTalk Server requires using SQL Server, SSIS is already available to everybody with a BizTalk Server license. Using the right technology for a particular integration problem, and using it in the right way, are essential attributes for success.

CONCLUSIONS

For all but the simplest organizations, integration is inescapable. Maybe better business processes require connected applications, or diverse data must be kept in sync, or perhaps really understanding customers requires creating a data warehouse. Whatever the problem, application and data integration are frequently part of the solution, and they can provide real business value.

Given this reality, it's essential to understand the main integration scenarios, then know which technology to apply in each one. To summarize, here's a list of those scenarios along with the Microsoft technology that addresses each one:

- Application integration
 - Automating business processes within and between organizations: BizTalk Server
 - Creating composite applications: BizTalk Server
- Data integration
 - Synchronizing information: BizTalk Server
 - Building data warehouses: SQL Server Integration Services

Using integration well can improve your organization. The next time you're confronted with a problem like those described here, consider whether an integration solution is warranted. More often than you might think, it will be your best option.

ABOUT THE AUTHOR

David Chappell is Principal of Chappell & Associates (www.davidchappell.com) in San Francisco, California. Through his speaking, writing, and consulting, he helps people around the world understand, use, and make better decisions about new technology.