

## Part One

# Overview of Fundamental Concepts

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# Chapter 1

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## Introduction to DaaS

### TOPICS COVERED IN THIS CHAPTER

- This chapter introduces the Data as a Service (DaaS) framework and the approach taken by several organizations to introduce DaaS into their organization.
- It provides an introductory overview of the underlying drivers for transformation of data as a monetized asset and evaluates how commercial trends in the marketplace will further drive this service trend.
- It also suggests several key steps for preparing the blueprint for Enterprise Data Services in your organization. These steps include establishing a service delivery model (SDM) comprised of a service catalog, service governance, and a resourcing strategy.
- Finally, this chapter looks at commercialization aspects of data as a service, its potential for generating revenues as well as some of its common limitations.

The most profound technologies are those that disappear. They weave themselves into the fabric of our everyday life until they are indistinguishable from it.

—Late Prof. Mark Weiser (Father of Ubiquitous Computing)

**T**his book offers a huge undertaking to its readers. It aims to offer a definitive roadmap on how to significantly transform your organization by providing Data as a Service (DaaS) to consumers of your data across the enterprise. It also suggests ways to explore the promise of data and its expanded role as a strategic business enabler.

Using DaaS as the unifying conceptual framework, the book shows readers how they can successfully integrate distributed systems across heterogeneous platforms virtually and publish data to subscribers securely using industry data standards and governance mechanisms.

This introductory chapter provides an overview of the exciting possibilities around leveraging reusable data services across any organization as well as the

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*Data as a Service: A Framework for Providing Reusable Enterprise Data Services.*

First Edition. Pushpak Sarkar.

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economic value proposition of providing DaaS to your customers. It also explains the overall approach and necessary steps for any data provider to establish a service delivery model (SDM) for offering DaaS to subscribers.

## **DATA-DRIVEN ENTERPRISE**

In the words of Peter Drucker, a world-renowned management visionary, an information-based organization requires “clear, simple, and common objectives that translate into actions.”

In this chapter, we examine what these guiding objectives are and how they define the new persona of a successful information-based organization.

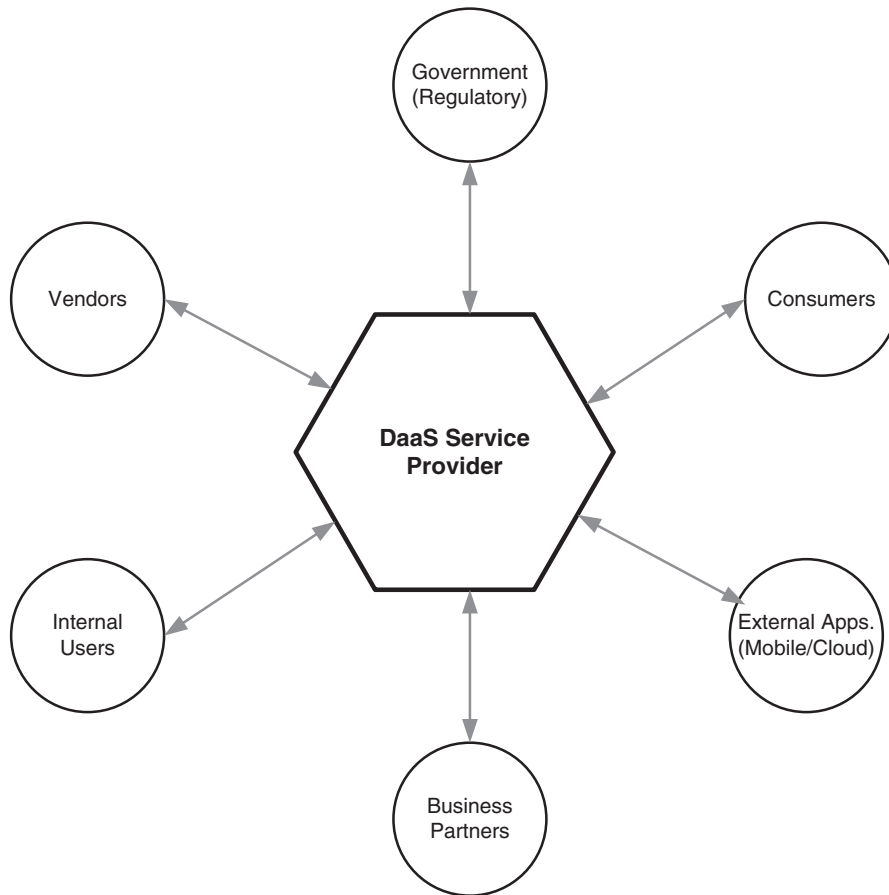
The DaaS framework presented in this book entails a paradigm shift in a fundamental sense, a shift that can help any organization transform itself into a data services-driven organization. Indeed, the DaaS framework can offer end users the capability to have convenient and timely access to data from multiple, heterogeneous data sources within the company as reusable data services. These data services can be useful to external and internal data subscribers, business partners, regulatory agencies, etc., (Figure 1.1). Additionally, this capability can be leveraged by some organizations interested in becoming commercial data providers, by publishing data for their customers and subscribers as a marketable service.

For example, if we look at the high-tech sector, the underlying shift toward IT services is being driven by new advances in technology and its resulting societal consequences. In effect, many organizations need to change how they do business. They will need to respect demands from an increasingly tech-savvy generation of customers who now spend more time interacting with each other on mobile devices, through texting, and on social media sites.

All these factors have created a marketplace that will be dominated by organizations that understand new trends driving the global market. Organizations need to anticipate these changes before their competitors do and provide services rapidly whenever requested by their customers. Companies that undergo this business transformation are data-driven enterprises.

### **Concept of a Data Service Bus**

To become more prompt and effective in responding to business or market demands, any service-based organization needs to place a larger emphasis on information sharing. The challenges faced while exchanging data usually result from a fragmented data environment made up of different platforms having no common standards. Consequently, the data entities and attributes of these systems often do not share the same syntax and semantics or even a common meaning, which is a necessary condition for systems to reliably share information. Currently, the majority of systems also have not been designed for data interoperability and sharing. This is where the DaaS framework can enhance the implementation of data services with the basic



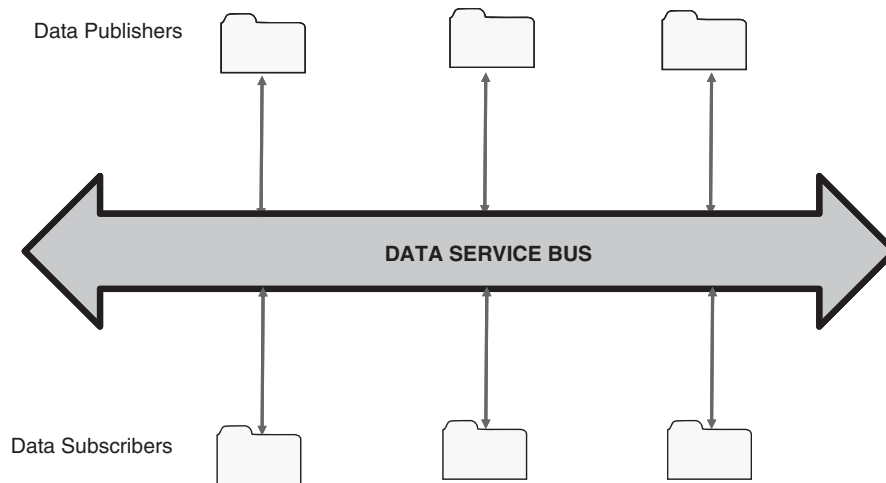
**Figure 1.1** DaaS in the business environment

concept of a real-world Data Service Bus. The Data Service Bus can act as a key foundation for data reuse in any DaaS deployment.

For effective sharing of enterprise data across divisions, it is essential for large organizations to build an underlying data foundation (similar to a bus architecture) that provides a consistent view of enterprise-level data in the organization. The concept of a data service bus, which is a logical data abstraction layer created at the enterprise level, can act as a foundation for virtually sharing and reusing information across IT applications. However, it should not be confused with the enterprise service bus (ESB). In some ways, the Data Service Bus can be compared to a data broker that facilitates exchange of enterprise data from a DaaS Provider, or Data Provider, to its subscribers.

In my view, the true potential of DaaS can be realized by an organization if it sets up a well-architected Data Service Bus, comprising common data modules for reuse by downstream applications and customers as well as using standardized

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**Figure 1.2** Data Service Bus

Enterprise Data Services. In addition to the data foundation layer, successful DaaS deployments also need to maintain standardized business logic and rules to process data that downstream systems can exploit (Figure 1.2).

To align the Data Service Bus with long-term business strategy, an organization interested in setting up DaaS should also establish an overall data strategy that integrates data from both internal and external data sources (social media, twitter feeds, etc.). Also recommended are the adoption of a few architectural principles and goals that will enable data sharing and interoperability across the enterprise as part of the DaaS architectural framework. This topic is explained in greater detail in Chapter 2 of this book.

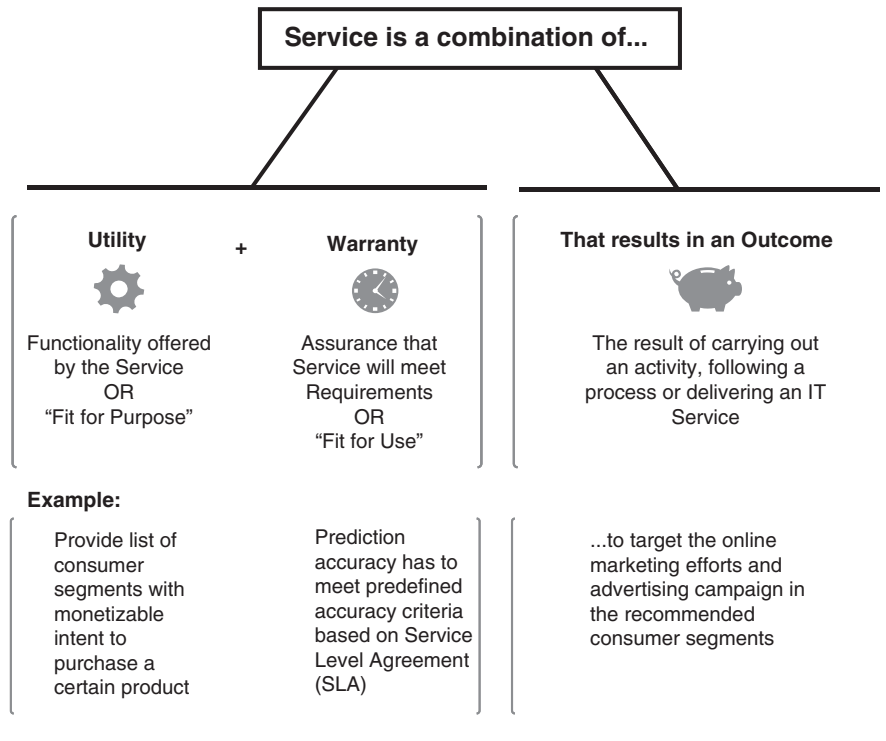
Let us now try to understand the concept of a data-driven organization and what it means in the context of data-oriented services.

### DEFINING A SERVICE

Over the last few years, businesses have increasingly felt pressure to transform into providers of value-added services. Often, these services become necessary for customers to fulfill some of their daily needs. This concept is not entirely new or radically different from the traditional definition of a service. As per the *Merriam-Webster's Collegiate* dictionary, service is defined as a "facility supplying some public demand." Consequently, in real life, we find the utility company providing households with water or electricity services. Similarly, a life insurance company exists in the service marketplace, primarily for fulfilling the need felt by most people for security and well-being (Figure 1.3).

Any type of service displays a few common characteristics:

- It provides the means of providing a clear **value** to customers.



**Figure 1.3** Key features of a service

- It facilitates **outcomes** that the customers want to achieve.
- It is delivered through a few **capabilities**, while managing associated **risks**.

## Service Taxonomy and Decomposition

In the context of DaaS, a data service is referred to as a remotely accessible, self-contained module that provides data to authorized service consumers to help them carry out their business. Consumers can access the service in a standardized manner that is well documented and listed in a service catalog. The catalog can provide consumers with the ability to find whether a service exists and its functionality.

## DRIVERS FOR PROVIDING DATA AS A SERVICE

The increasing pressure to provide data services to customers is being confronted by organizations around the world. Along with other business drivers, this pressure is often caused by several technology advances in the IT sector.

## Engaging Customers with Data-Driven Choices

Over the last few years, we have witnessed a large trend toward “social shopping.” Many online shoppers embrace the social-media ecosystem as their preferred channel. These shoppers usually conduct their own informal research by browsing products that they need or they find the latest products or services through what others find interesting on social media. For example, Facebook makes this process quite convenient by registering our likes and dislikes. Shoppers then compare online prices offered by different retailers, before committing to their actual purchase. Consequently, with this trend, a larger segment of customers have become dependent on the social network ecosystem and their online behavior will affect businesses on a significant scale in the future (Shih, 2009).

As an outcome of this new trend, customers are likely to feel encouraged by taking a more proactive role themselves, while deciding on their day-to-day purchases. Over the past few years, several online retailers (e.g., Amazon, Groupon, Alibaba) are seeing huge growth in their business globally, by providing customers with useful data that can help them decide on what products to purchase. In the face of new competition, many traditional retailers such as Walmart and Target have also followed suit. Similarly, supermarket chains such as UK-based Tesco have grown to be a market leader in recent years by transforming themselves to data-driven enterprises.

Leveraging data, predictive analytics, and customer insight have become part of retailers’ competitive weaponry. In most of these cases, however, the customer has become the real beneficiary because they can now take fuller advantage of personalized discounts and reward coupons offered by web-based and traditional retailers.

## Monetization

While the majority of business organizations offer DaaS to their customers as a complimentary service, some companies have been able to identify corporate data assets that they can rent to customers on a fee-based model also called monetization. Using monetization, several data providers within the DaaS market have generated revenues to seize initiative and grow their data services commercially. A good example of a business monetizing DaaS in the current market is Dun & Bradstreet (D&B), in particular, a subsidiary named Hoovers (Figure 1.4). This pioneer organization provides business data to their corporate clients and individual subscribers for a specific service fee. The D&B Hoovers website can stream data to its client organizations in the form of a list of specific leads, which go directly to sales teams who then contact people to make sales. There are several other firms in the market who have also been taking the lead as DaaS pioneers, providing various kinds of data services to interested subscribers. Some of these data services range from providing financial data to supplying data on a manufacturer’s parts catalog for distributors as part of the supply-chain and logistics management (Soderling, 2010).



## Drivers for Providing Data as a Service 9

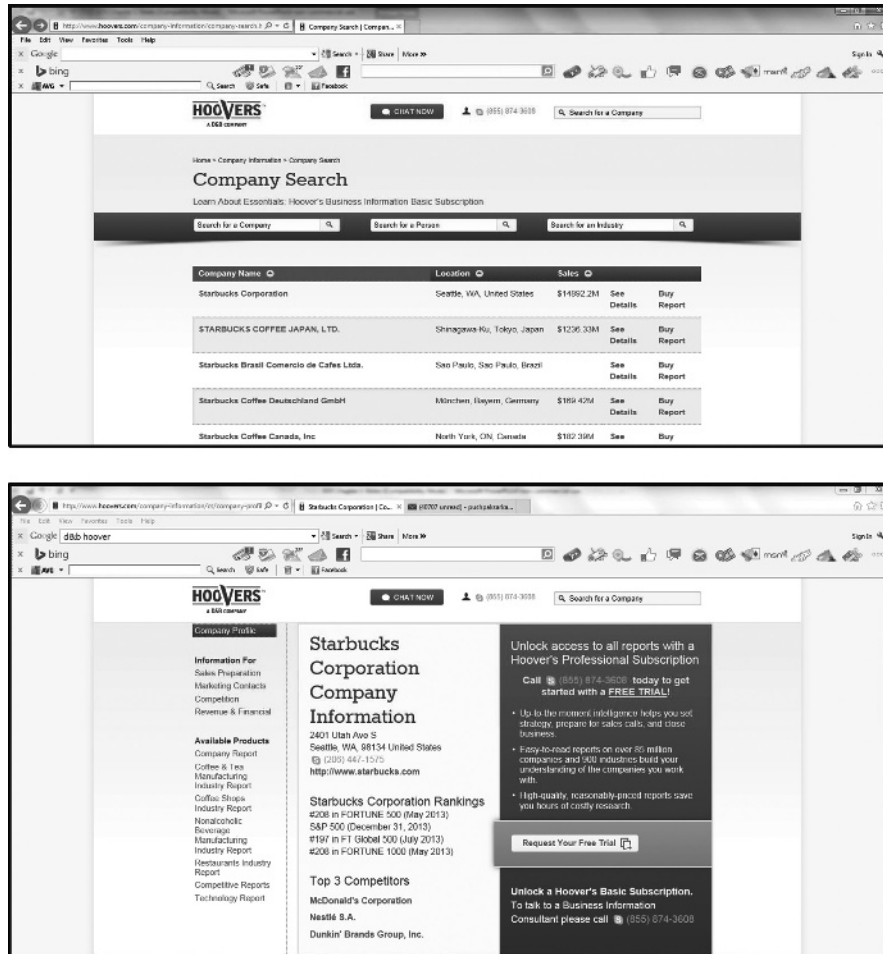


Figure 1.4 Real-life example of data services sold by D&B Hoovers (company search and results)

Another good example of an organization monetizing DaaS in the current market is cloud-based data services provider Treasure Data, a company recently named among the coolest big data vendors by Gartner. This company provides DaaS to several clients charging them a flat monthly rate for data offerings.

As part of their services, Treasure Data collects, manages, and analyzes massive volumes of big data for their clients (Figure 1.5). They can also store the client's data on the Cloud, based on a pre-built data model that supports easy data integration and export (storing different types of data formats).

The data provider can quickly set up the data requirements for their client in the cloud environment in a matter of weeks. The client can then focus on analyzing data without worrying about database administration or the other underlying DB

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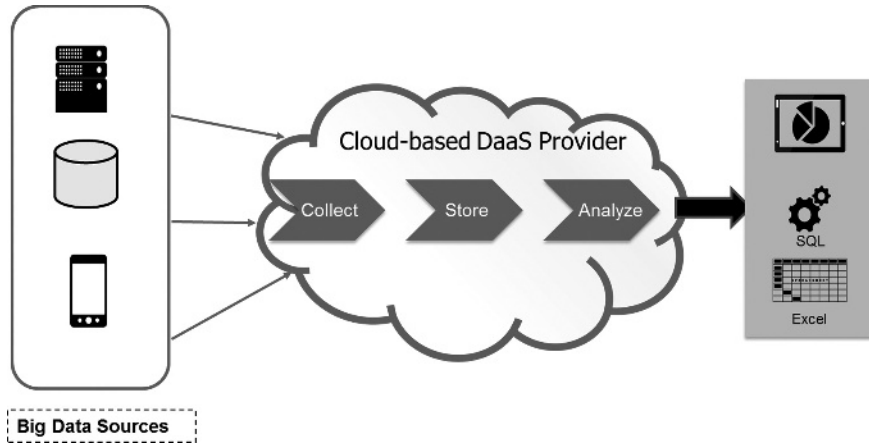


Figure 1.5 Overview of Cloud-based Data Services

infrastructure-related maintenance issues. This includes 24-hour support and monitoring, seven days a week, after the initial implementation.

**Public Sector and Government**

Today, a similar story is taking shape in the public sector and government. Data is delivered by these agencies to their consumers in several innovative ways. For example, the United Nations Statistics Division now provides statistical data as an online data service to its members across the world (Figure 1.6). They disseminate

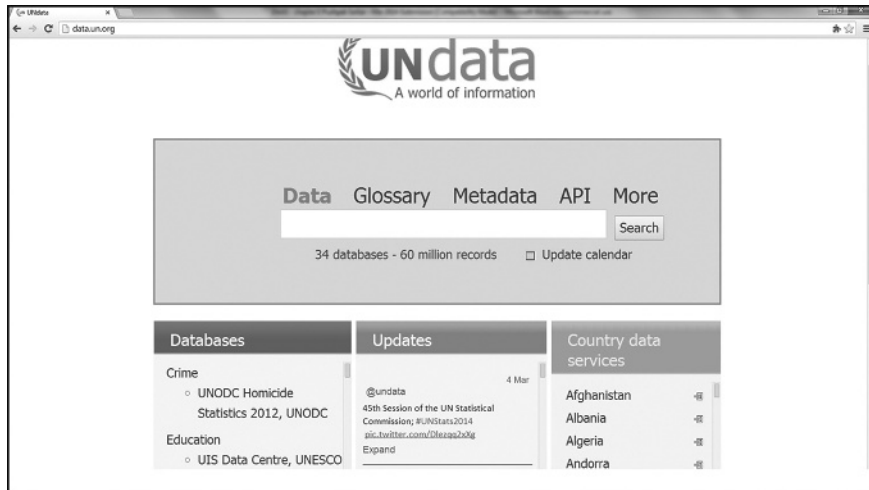


Figure 1.6 Example of Data Services provided by a leading UN Data agency

information on country-specific statistics such as country gross domestic product (GDP), population, education, life expectancy, crime, and so on.

Similarly, several community-based organizations in the healthcare sector are creating results from big-data analyses of patient data accessible to physicians and healthcare workers in real-time through data services to save innumerable lives. A prime example of this was witnessed recently when Harvard's HealthMap service (<http://healthmap.org>) spotted the Ebola outbreak and alerted the medical community before the World Health Organization formally announced the epidemic. HealthMap's role in tracking Ebola was heavily dependent on using big data analytics to harness public health information. HealthMap compiles, collates, and creates a visual report of global disease outbreaks, after sifting through millions of social media posts from health care workers in the affected African countries blogging about their work.

## Technology Shift

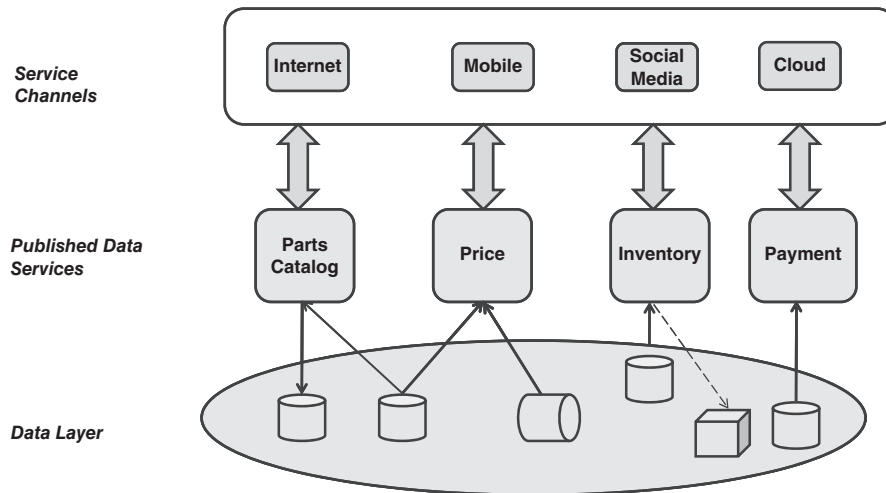
Finally, the advent of new technology (e.g., mobile computing, big data) will expand exponentially as a higher number of customers in the world become more tech-savvy. For example, in the insurance sector, customers are finding it convenient to use automobile insurers such as [geico.com](http://geico.com) or even to compare premium quotes from different insurers online using mobile or web-based applications rather than physically engaging with agents of traditional insurance companies. Some insurance companies have realized this change in customer behavior. They are actively addressing underlying technology enablers such as big data and analytics to better understand the customer and his or her preferences. Similarly, many customers prefer the convenience of hailing a taxi by using innovative software apps such as [uber.com](http://uber.com) from their mobile devices.

The use of these newer mobile apps allows customers to share both huge amounts of data and their online shopping behavior on social media channels such as Facebook, Twitter, and Pinterest.

All of these new technology and socioeconomic trends will drive businesses toward sharing more of their corporate data with customers as on-demand service offerings.

In the electronics retail sector, customers often decide what electronic gadgets suit them best after they browse through different competitors' websites selling the products they are interested in buying (Figure 1.7). Similarly, while shopping around for holidays, customers may also prefer to visit travel websites that are easy to navigate or price friendly. Consequently, most, if not all, businesses now need to engage more directly and meaningfully with their online customers. They need to have meaningful customer interactions to retain their existing customers and attract prospective customers. On the flip side, mining vast amounts of customer data while customers are shopping online can be very profitable for any organization through pragmatic leveraging of big data and predictive analytics.

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**Figure 1.7** Example of DaaS in the Retail Sector

### Pioneering Organizations

Select groups of pioneering organizations have already started employing DaaS solutions for their customers. Bloomberg, Thomson Reuters, and S&P Capital IQ are several data providers in the current market who make financial data available to customers upon payment or who sell business data on various industries and organizations to their clients for a subscription-based fee (also see the earlier example of D&B Hoovers discussed in this chapter).

### DATA AS A SERVICE FRAMEWORK: A PARADIGM SHIFT

The Cloud has created a paradigm shift, particularly among IT and business managers, away from the traditional view of data management as a support function. Just as with public utilities, banks, or insurance firms, most IT departments now need to view themselves as data service providers. They exist primarily as service providers that are responsible for providing high-quality information, accompanied by innovative analytics as services for their consumers, who are within their company, and who are also external customers and agencies. Just as new categories of products are being regularly created by manufacturers, IT service providers also have to provide innovative ways to analyze information gathered over various channels. The latest analytic models and technologies to help mine all of this underlying data could provide strategists with real-time intelligence to stay ahead of their market competitors.

## Creating New Products

The downstream effect of creating these new products has consequences on numerous departments throughout an organization, but also impacts its external partners. As if this was not sufficient motivation, many organizations are also subject to increasing scrutiny by government agencies in areas of compliance and regulations, reporting, and risk assessment.

## Successfully Delivering Value

To deliver value successfully to a business in a dynamic and fast-changing marketplace requires greater communication, collaboration, and social networking. Therefore, IT services provided by organizations also need to be flexible and responsive to changes in the marketplace. The means to access corporate data must be made highly efficient, consistent, and secure. The underlying data architecture adopted within the organization should also be flexible to adapt to business changes and to drive the underlying service processes and infrastructure. Without these changes at a fundamental level, organizations cannot be expected to provide consistent information to their global customers and partners.

## IT Planners and Enterprise Architects

IT planners and architects within an organization also have to adapt their organization's outlook from a purely technology-driven mindset to a services-driven mindset. The recent emergence of on-demand software such as Software as a Service (SaaS) is proof of this change in direction. SaaS has become a common delivery model applied by a large number of businesses. Examples of SaaS applications include customer relationship management (CRM), master data management (MDM), and enterprise resource planning (ERP) modules to name a few. Similarly, some vendors now provide infrastructure as a service product (database platform) to help developers and users gain access to the relational and NoSQL DB hosted in the Cloud.

## Exploding Data

For most customer- and client-oriented enterprises, providing DaaS to end customers has become difficult to ignore. This is often because large organizations are increasingly challenged by their business competitors and leadership to address demands for faster, more flexible data delivery to customers.

Clearly, this is not an ideal situation. DaaS can help address increased demands for data from customers by facilitating faster and more reliable ways of processing and distributing data to them over various channels such as the Internet, the Cloud, social media, etc. One of the underlying reasons for increased popularity of DaaS is new

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technology solutions in data integration. For instance, advances in data virtualization, analytics, data streaming, etc., can significantly enhance DaaS usage experience. Therefore, the virtual style of data access and integration discussed throughout this book can be viewed as a game changer in many respects.

As mentioned, Bloomberg, Thomson Reuters, and S&P Capital IQ are pioneering organizations that have already started employing DaaS solutions for their customers on a significant scale. For example, a supply chain and logistics management company employed a DaaS solution to deploy parts catalogs as a service for on-demand access and to aid in the purchase decisions of their customers. Several organizations have also started to make financial and market data available to customers as DaaS providers. These data providers sell business data on various industries and organizations to their clients upon payment.

### **DaaS Benefit Summary**

Let us now cover the major benefits expected at data-driven organizations that either adopt the DaaS framework or become data service providers to their enterprise customers.

#### **Benefit 1: Increased revenues**

While the majority of business organizations offer DaaS to consumers as a complimentary service (such as in the earlier example of the UN Statistical Division), several companies determine which data assets they can rent to customers to gain a competitive advantage. Given recent opportunities, a few data providers such as those within the DaaS market can generate revenues using DaaS commercially.

For example, D&B Hoovers currently offers their corporate clients a variety of data-related services (Figure 1.5A and B). These data services include providing D&B clients with:

- Targeted lists of customer leads for salespersons worldwide
- Company-specific research details on the leads/suppliers/vendors
- Customer demographic data suitable for marketing companies
- Financial and analytical information
- Market analysis and leading competitors

Given the opportunities seen with DaaS pioneers such as D&B Hoovers, it is very likely that several data providers within the global DaaS market will be able to generate revenues if they seize the correct set of data initiatives to grow DaaS commercially (Williams, 2012).

Using DaaS can also help clients identify, access, manage, secure, and deliver information in real time, regardless of the type of information or the platform on which it is stored. Implementing this concept over a set of reusable EDS ensures consistent packaging of data, consistent application of rules for data, and centralized control and maintenance.

Usage of DaaS is not as uncommon in the financial industry. For example, financial software, data, and media company Bloomberg provides data services for their subscribers to access reference and market-related data, spanning millions of financial instruments across all asset classes. Similarly, the leading investment research firm Morningstar provides their clients with access to a wide range of its investment data from various equity exchanges and indexes worldwide. Its real-time data services also delivers data on its investment research products to individual investors, financial advisors, and financial institutions. The internationally-acclaimed credit rating agency, Standard & Poor's has set up DaaS through an online subsidiary of the ratings firm. The subsidiary is dedicated to provide real-time data, research, and analytics services to its subscribers, including S&P credit ratings, S&P Indices, as well as fundamental market data.

A lot of business value can also be realized by traditional corporations and public sector organizations (not just commercial DaaS service providers), by providing timely and easier customer access to their data, even if the data services do not directly generate any revenue stream. For some organizations, providing global accessibility to their published data with DaaS may even lead to market opportunities in other geographic regions.

Amidst increasing data volumes, diversity, and complexity of data sources, DaaS can facilitate faster and more reliable ways of distributing and processing data across any enterprise by providing data services. Several technology-related improvements have gradually reduced the impact from resistance bottlenecks. For instance, advances in data virtualization, real-time warehousing, etc., accompanied by better design adoption, have significantly enhanced the usage of service-oriented architecture (SOA). Therefore, EDS are employed as a virtual style of data access and integration.

For many years, companies such as Amazon have been leading the way in this area. For example, many of Amazon's products are sourced from suppliers in other countries and sold to online customers in western countries. So Amazon keeps its own product catalog updated on a real-time basis for the customer to access. All the suppliers' latest product offerings, changes in product lines, expired products, etc., are available to the customer via EDS. Additionally, internal projects can also save time, effort, and money by reusing the EDS across different departments in the organization. Thus, in terms of hard dollar benefits and savings, investments in EDS, and other common components can be justified both from the strategic and project-based perspectives.

### **Benefit 2: Efficiency gains through process simplification**

DaaS is expected to facilitate a quicker and more consistent way of distributing and processing data, which leads to enhanced productivity across the organization. Significant process improvements are expected in the organization's workflow once the initial Data Service component has been deployed. Process simplification is expected to help in terms of faster information delivery to consumers across the globe (as in the UN Statistical Division example mentioned earlier). Having a foundational component such as data services will lead to better integration and alignment among different applications, largely due to the use of standardized tools, technology, and

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standards (the use of common tools also leads to savings from reuse). Organizations need to be able to discover that data exists as well as have a good definition of the data types, structure, and semantics. Eliminating confusion and rework that can occur when multiple versions of the same data exist in different locations can also result in reduced administration costs. Ultimately, these factors are also likely to improve customer satisfaction and to improve satisfaction levels in other external parties who engage with the organization.

### **Benefit 3: Improved risk management and compliance**

Across various industries, there has been steady increase in government regulations on data security and privacy issues. These new laws mean that organizations are now responsible for any breaches in data security or privacy related to their customer data. Service provider organizations (e.g., insurance companies, airlines, banks, or healthcare providers) can limit these compliance risks by ensuring their access/security-related policies, data interchange, and messaging standards (in terms of both format and structure) are embedded in the common Data Services modules. Moreover, monitoring compliance to risk regulations becomes much easier when using DaaS because of control provided by a single, managed interface to the data. It is also easier to review major components of an EDS both closely and regularly under the oversight of a central data governance council, instead of trying to oversee thousands of data services built by isolated application teams that have been released in a piecemeal manner.

### **Benefit 4: Facilitate data exchange and interoperability**

For any large and complex environment, the need for interoperability is critical for data sharing and exchange across systems. Often organizations react to business needs tactically by building multiple applications that lack the ability to work in harmony or to exchange data with external systems and government agencies. The DaaS framework addresses this problem by providing clear and consistent data exchange standards along with a set of governance principles that can reduce inconsistent integration processes and redundant data stores spanning across the entire IT enterprise landscape.

A key benefits of following the DaaS approach is that it enables data-driven organizations to share data across multiple systems using standardized data formats. In the long term, usage of these standard formats makes data exchange feasible across different systems. Data can also be reused by different parts of the business over the long term, even if their data is hosted on disparate platforms.

### **Benefit 5: Separate technology from functionality**

Any team that is invoking DaaS is not concerned with the internal technology or underlying architecture of the service. Consequently, as long as they input the correct parameters into the service, the service will return what was originally expected of it. This insulates enterprise services' user against any impacts or internal changes to the EDS that they are subscribing to. This decoupling also allows companies freedom to make faster changes and to adapt to market changes with more agility.



**Benefit 6: Consistent standards**

The DaaS framework is supported by industry-wide open standards that allow for data sharing across heterogeneous platforms and that make applications interoperable. By using consistent standards, the migration of existing applications across platforms is easier when large-scale changes become necessary. DaaS also supports organizations in enabling them to share master and reference data by ensuring consistent standards for data exchange are maintained. These standards also enable organizations to share results generated from big data and analytic platforms seamlessly with downstream applications.

**DaaS Pricing Models**

There has been a wide range of services offered to customers on the Cloud by service providers—ranging from applications to websites renting a shared infrastructure as a service (e.g., data centers). Whole classes of problems are being transitioned to the service provider, for a price, on the Cloud. A cloud-based data provider typically provides end-to-end technology and data capabilities, platform management, and support for one monthly or yearly subscription rate, which is similar to SaaS.

Based on research trends (Soderling, 2010), let us look at some of the leading DaaS pricing models that service providers can offer to their customers to use their data services. The preference for a specific DaaS pricing model may vary based on the nature of the industry sector as well as on the customer's individual preferences (based on their expected DaaS usage patterns and needs).

DaaS pricing models fall in to three major categories:

- *Request-based model*

The first option offered by data providers is more appropriate for customers with lower volume usage. The customer (or data service subscriber) is charged per transaction request, which involves charging a fixed amount, such as a few cents, every time a subscriber makes a request or call for data. A call is defined as a single request/response interaction made to the service provider's application-programming interface (API) for data.

- *Volume-based model*

This is a tier-based pricing approach based on the volume of services provided. The DaaS service provider charges the subscriber based on the volume of data accessed by them in a given period. The prices are capped at certain tier levels. For example, for a fixed monthly subscription fee, the customer (organization or individual subscriber) is allowed to make up to 500 calls to the DaaS service provider. However, if the subscriber ends up making more service calls, then they get charged at the next tier level. This is the easiest DaaS pricing model to implement, but it may not maximize revenue as it does not address overages across the quantity-based ties.

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- *Data type-based model*

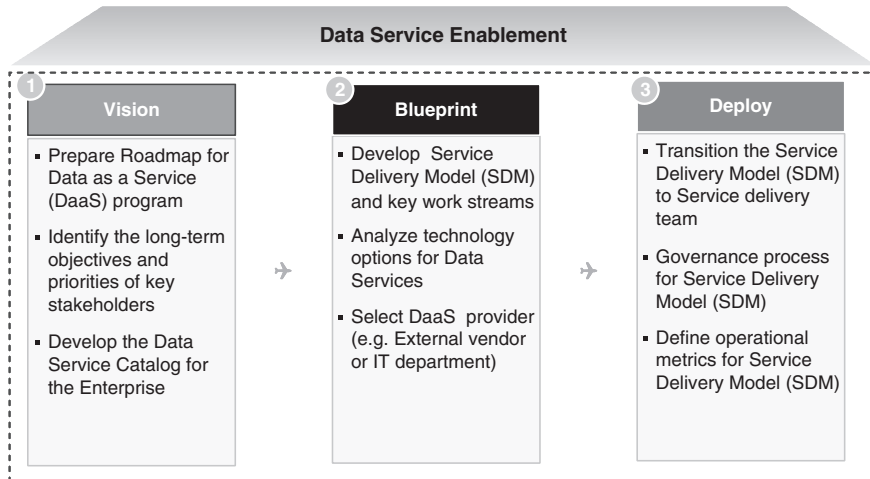
This pricing model separates the DaaS pricing tiers by data type or attribute. This is a fine-grained model under which data can be sliced or diced, depending on the complexity of the customer’s data request. However, this is a complex model to administer, but may be ideal for certain sectors. An example is a mapping service that offers the geographic coordinates and zip codes of the neighborhoods in a city or town. However, if subscribers need additional details, then they can request more attributes such as school or post office locations, which are sold for an additional charge.

- *Corporate subscription model (company-wide or per user)*

This pricing model is probably the most prevalent subscription model in the market. Business organizations can choose to purchase a company-wide subscription or subscription per user from the DaaS vendor. For example, D&B Hoovers currently offers their clients a corporate subscription on a variety of data-related service offerings. These data services include providing D&B clients with customer leads, financial and analytical information, market analysis data, etc.

**Data Services Enablement: Role of the Service Delivery Model**

Every organization has a business strategy that is uniquely driven by the market and industry that it operates within. For any organization to transform itself into a DaaS data-driven organization, there must be a clear understanding of the overall strategy, vision, and goals. Thus, a formal roadmap and detailed blueprint for Data Services enablement has to be defined by the DaaS program team (Figure 1.8).



**Figure 1.8** Key phases of enabling the DaaS vision phase

The finalized blueprint for enterprise-wide Data Services could impact critical areas of the organization's existing business processes. These impacts need to be communicated formally to top leadership and their support for these changes needs to be obtained.

After the vision and blueprint have been clearly defined and agreed upon by key stakeholders of the organization, we recommend a phased approach to the deployment of the Data Services Service Delivery Model.

During the vision phase, the organization plans out an overall roadmap for the DaaS program. The roadmap should be based on long-term objectives and priorities of key stakeholders. It should clearly articulate the catalog of services offered by the DaaS program.

The vision phase can include the following activities:

- Preparing a roadmap for the DaaS program
- Identifying long-term objectives and priorities of the key stakeholders
- Outlining the major business processes in the enterprise that can benefit by leveraging the DaaS framework

### ***Blueprint Phase***

The blueprint phase is the next part of the service-enablement process. In this phase, the organization develops the various Service Delivery Models and identifies the individual delivery workstreams along with the capabilities required for delivering different data services.

The team creating the blueprint should also refine the Data Service catalog by defining baseline data services required by the organization. It should also prioritize these services and define a phase-based approach to service deployment. This means some base data services can be implemented in the first phase due to their foundational nature. Then, other processes can be deployed in the next phases after considering the resource and budget constraints of the Data Services initiative (Figure 1.9).

The organizational structure for the Data Services deployment team also has to be proposed as part of the blueprint. This should clearly define resource requirements for every Data Services workstream. Stakeholders' roles and responsibilities in delivering data service also need to be clearly understood.

In addition to the organizational structure, a governance structure needs to be established with a formal governance council. The governance workstream ensures that the Data Services Service Delivery Model is implemented in accordance with the vision and the organization's larger data strategy.

Finally, the Service Delivery Model blueprint can provide technology recommendations for data services to be deployed. The tools and technology for data service fulfillment must be clearly identified during this exercise. The technology team should evaluate the options available to the organization for Data Services enablement and recommend what fits best with their organization. Technology recommendations would typically be driven by several underlying, organizational factors. For example,

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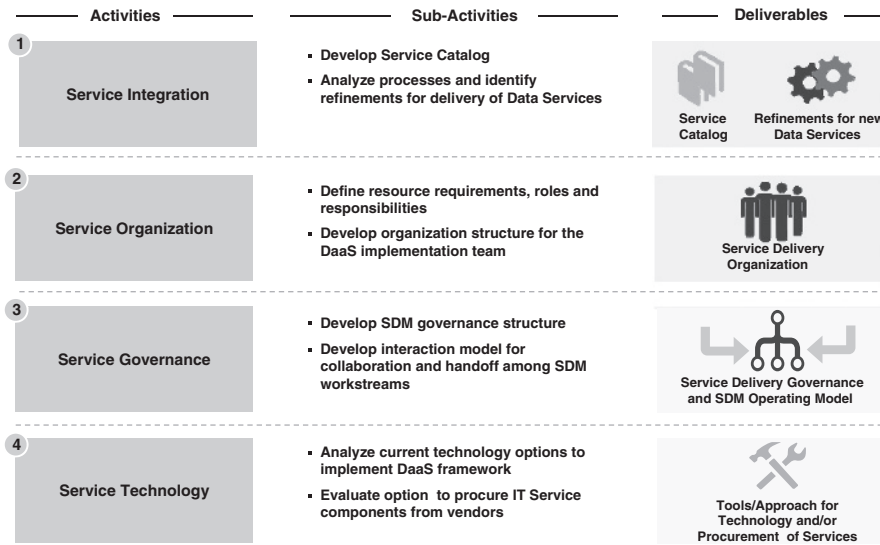


Figure 1.9 Data Services Blueprint: key activities and deliverables

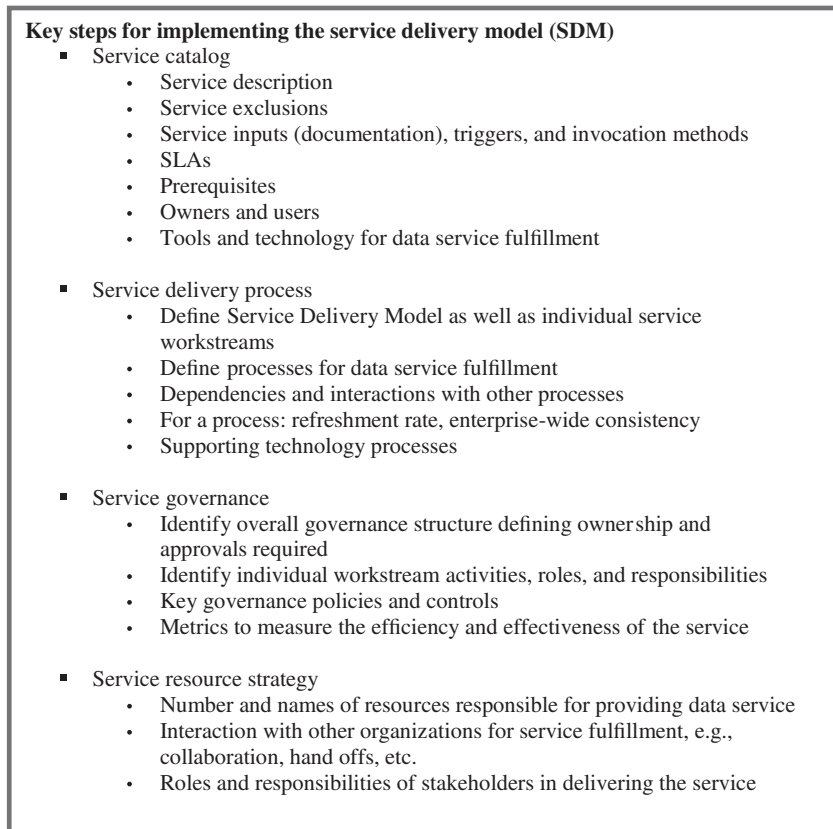
does the organization have global customers or does it want to focus only on a particular region? Are the organization’s customers primarily individual consumers or are they enterprise customers? The blueprint should also consider the existing level of in-house skills for a particular technology discipline. If in-house skills are not available, then the organizations needs to identify the service providers (e.g., enterprise IT or a Data Services vendor) best suited for helping individual service workstreams.

All of the preceding factors would help the Data Services team to finalize a blueprint that reflects the unique needs of the business organization and its daily challenges. The finalized blueprint for Data Services could impact certain critical areas of the organization’s existing business processes. For example, while defining the Data Services blueprint, the organization would need to identify the right service provider to deliver the individual workstream deliverables. In some situations, the Data Services team may evaluate and recommend that the best option for an individual service workstream would be to use an external vendor. These impacts need to be formally communicated to top leadership and their support should be obtained before moving forward to the deployment phase.

After the blueprint has been clearly defined and agreed upon by key stakeholders in the organization, we recommend a phased approach to deploy data services.

**Deployment Phase**

After blueprinting activities are complete, the Data Services team has to review all of the proposed activities relating to the impacted Service Delivery workstreams. This should be followed by a well-planned transition of service delivery responsibilities to the teams responsible for individual workstreams. For example, responsibility



**Figure 1.10** Service Delivery Model (SDM)

for designing the new data services proposed under the service catalog needs to be formally transitioned to the architecture team whereas the development team should be responsible for creating data services.

In cases where the organization has decided to engage an external vendor on a particular Data Services workstream, then the service level agreement (SLA) on timeliness, formal dependencies, and the interactions with other workstreams need to be finalized with the Data Services vendor. For example, the Data Services provider organization may decide to engage an external vendor to conduct data profiling and quality assessments for the underlying source systems that will be used to supply necessary data for publishing. In these situations, a clear understanding is necessary between the organization and the vendor on task dependencies, SLA, and timelines. The technology procurement, installation, and set-up activities also need to be undertaken during the deployment phase (Figure 1.10).

In addition to these activities, the service governance process also should be set in motion with a service governance council formally responsible for the Data

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Services program. A comprehensive set of reporting metrics to monitor the various operational processes under the DaaS program (as well as progress made) is essential to track the progress made by various SDM workstreams during the deployment phase. Chapters 8 and 14 discuss Data Services performance and quality metrics in more detail.

### Guiding Principles of DaaS

There are some key principles that may be useful to consider when any organization embarks on the road to become a data-driven organization.

**Architecture not technology:** DaaS is an architectural framework and not merely a technology or an application. In essence, DaaS can be defined as a framework for designing and developing a set of reusable data services that are designed based on enterprise-level standards. This standardization allows data services to be utilized by downstream applications for multiple purposes in the organization. Underlying these enterprise services are basic data services with well-defined functionalities that can be built as stand-alone modules (comprising reusable logic and/or data structures; Krafzig, 2007). The architecture needs to transition generations of technology.

**Reusability over rework:** The underlying foundation of DaaS is typically based on the concept of service reuse, enabling users to interact with their business using common reusable *services* over the web, the Cloud, and related technology. The reuse and flexibility associated with the Data Service components make it easier to leverage by businesses or by operational processes in an organization. Business services can be deployed as customized, functional modules of software stored in a centralized service repository, which can be run in a network. A real-life example of such a business service component is an online travel agent responsible for making airline bookings. During the airline booking and reservation process, the agent needs to know certain details about the passenger before proceeding with the booking. When the passenger requests a single reservation service, an internal call is made to the underlying data service components to gather the data requested or to make a subsequent request to process changes in the underlying corporate systems storing relevant data (e.g., customer profile, address change, etc.).

**Foundational to enterprise capabilities:** Past experience in organizations studied by industry analysts has shown that investment in any IT-based services can yield a limited return on investment (ROI) unless there is a solid enterprise foundation already in place. Data Service-based implementations cannot be expected to function well as a Band-Aid on top of unmanaged data structures. Thus, DaaS's focus has to be placed squarely on enterprise needs.

**Looking outside the enterprise boundaries:** Until recently, Data Services projects were focused on supporting internal business services and processes. However, as the profile of the data discipline has grown with the introduction of new consumer trends, things have changed. For example, consumers accessing and ordering company products in real time through online stores of the company (e.g.,

electronics retailer bestbuy.com). New DaaS projects are expected to respond rapidly to external events or requests sent from outside the organization's boundaries. To support these interactions, all of the data service users need to follow well-defined protocols as well as adhere to industry standards.

## DaaS Drawbacks and Limitations

Recently, a host of *services* have also been deployed by many business organizations using on-demand software models such as SaaS, which are implemented over the web, the Cloud, and through related technology. In addition to this, to survive, it has become increasingly necessary for organizations to consolidate and form partnerships with external organizations to develop an innovative range of financial service offerings (e.g., banks and car insurance companies can develop a new line of products). All of these factors are becoming ever more complex due to the diversity of technology and data standards across partner organizations. The data integration challenges faced by IT departments in these financial organizations are universal and are not merely limited to a few sectors.

The need for enterprise-level data services with compatible data integrity, standards, enterprise models, and common definitions of data entities and attributes has increasingly become a necessity for most large organizations.

So far, we have seen many benefits from adopting DaaS frameworks. However, there are some limitations that readers also need to take into consideration.

- Because DaaS applications are hosted in the Cloud, far away from the application users, this could introduce latency into the environment. At times, the DaaS model is not suitable for applications that demand response times in the milliseconds (unless aided by performance improvement tools, which are discussed in Chapter 13).
- When data is being stored on the DaaS vendor's servers, data security could become a major issue faced by the organization. Security concerns are addressed in more detail within Chapter 10 of this book.
- When downstream applications require integration with commercial data provided by the DaaS vendor, integrating them with remotely hosted software can be costly or risky, or can conflict with data governance regulations. This is often seen when the volume of data transferred is substantial.

However, none of these drawbacks are insurmountable. There are several technology solutions as well as process and control mechanisms that can be implemented to lessen the impact of these issues.

It is most crucial to ensure that services are tied to the organization's present and future needs. We look at the underlying role of enterprise-data strategy, architecture, and data models in greater detail in Chapter 2.

**24** Chapter 1 Introduction to DaaS**Summary**

DaaS is a data-distribution and publication framework that can be used by organizations to engage their customers in real time. The DaaS framework is expected to deliver data by leveraging reusable data services that meet enterprise and industry-wide standards. The need for EDS is already being used in a few industry sectors such as healthcare and insurance sharing data across healthcare exchanges.

DaaS's commercial market is also expected to grow, as more companies choose to become data service providers, with further demand from a range of data brokers for real-time access to enterprise data. Overall, as traditional businesses become more aware of the DaaS framework, they will identify an expanded set of data assets, which can then be offered to customers as a revenue-generating service.

This book gives readers an overview of why leveraging your organization's data has exciting possibilities as well as the economic value proposition of providing DaaS to your customers. It also provides a detailed overview on establishing a service delivery model to support a large range of on-demand service requests from data subscribers.