BI in the Cloud

BI Leadership
Benchmark Report

By Wayne Eckerson
Director of Research
Business Applications and Architecture Media Group
September 2013
# Table of Contents

- Executive Summary: 3
- Research Background: 4
- Introduction: 5
- Cloud BI Trends: 6
  - Adoption Rates: 6
  - Architecture: 8
  - Cloud Usage and Users: 12
  - Drivers and Challenges: 13
- Recommendations: 17
EXECUTIVE SUMMARY

RUNNING BUSINESS INTELLIGENCE (BI) in the cloud is inevitable. User organizations reap significant benefits when they migrate their BI environments to a public cloud platform. Yet, adoption of cloud BI services has hovered at about 33% for several years. Part of the problem is that BI is not necessarily a packaged application; it’s a custom application that requires custom ETL programs, data models and reports.

But BI vendors are starting to figure out how to profit from the cloud and are now offering more of their products as online services. To date, small companies (less than $100M) outside of North America and Europe are adopting the cloud most quickly. With little IT staff and limited available capital, cloud BI offers an attractive way to gain insights into the business.

Power users are the most active users of cloud BI services, while reports and dashboards are the most common BI artifacts to be deployed in the cloud. Power users use the cloud to do ad hoc data exploration, while casual users are the biggest consumers of custom reports and dashboards in the cloud.

The biggest drivers for implementing cloud BI services have shifted during the past two years. In 2011, most companies implemented cloud BI to reduce hardware/software costs and speed time to market. In 2013, the biggest drivers are cost and flexibility. A major reason for this shift is the advent of new low-cost cloud BI services that can be dynamically deployed and can be purchased on an hourly basis, if needed.

The future of cloud BI looks bright, since three-quarters of companies that have already deployed cloud BI services plan to increase their cloud BI footprint in the coming year. So despite the early obstacles, cloud BI will soon be a permanent fixture in most BI environments.
Research Background

This report examines market trends for implementing cloud BI. Most of the research is based on a 2013 survey of 396 BI professionals from TechTarget’s database. Some of the questions in the 2013 survey repeat those in a survey of BI Leadership Forum members that Wayne Eckerson conducted in June, 2011.

The charts in this report only include responses from qualified users. We filtered out vendors from both surveys, leaving a respondent base of self-professed BI professionals, BI users or sponsors, and BI consultants. This left 278 respondents in the 2013 TechTarget survey and 112 respondents in the 2011 BI Leadership Forum survey.

TechTarget’s members tend to be more IT-oriented, more global and from larger companies than the BI Leadership Forum members, who are largely BI directors at mostly North American companies. (See Figure 1.) The remaining respondents represent a range of company sizes and industries.

![Figure 1: Survey Respondents](image)

The 2011 survey was based on 112 responses from the BI Leadership Forum, a LinkedIn group run by Wayne Eckerson that serves largely North American BI directors. The 2013 survey is based on 396 people who responded to a global TechTarget campaign about BI in the cloud.
Introduction

Although companies have enthusiastically embraced the cloud for many types of operational applications, such as sales and customer management (think Salesforce.com), they have been less inclined to implement business intelligence (BI) in the cloud. Why the reluctance?

BI holds the keys to corporate data, and many companies don’t want that data to pass beyond the firewall for security and compliance reasons. In addition, robust BI applications require custom development to create a data model, BI semantic layer and reports/dashboards. All this custom work undermines one of the main benefits of using the cloud: low-cost, fast deployment.

Finally, delivering BI in the cloud is an onerous business proposition for vendors: they not only have to create the software, but they often have to build a custom environment (i.e., ETL, data models and reports), and then operate it for years before they earn a profit on their investments. This is not a recipe for creating new software tycoons, so it should be no surprise that there aren’t a lot of pure-play cloud BI vendors in the market. Moreover, most mainstream BI vendors have avoided making big commitments to cloud BI because it undermines their perpetual license sales model.

Nonetheless, BI in the cloud is inevitable. There are simply too many advantages to building, deploying and managing applications in the cloud. There is no hardware and software to buy, install, tune and upgrade. Consequently, there are no IT people to hire, pay and manage. Applications upgrade “automagically” and can be scaled seamlessly. As a result, the cloud drives down costs and speeds delivery. It’s fast becoming a quick way for small- and medium-sized companies to gain the technology capabilities they need to compete with larger players.

And BI vendors are slowly figuring out cloud BI strategies. Some focus on delivering packaged cloud BI applications that source data from predefined cloud-based operational packages. Others provide a BI platform in the cloud that customers can use to build their own environments. And others offer a hybrid BI environment that enables users to leverage both on-premises and cloud-based environments to meet their unique business and security requirements.

Finally, Amazon.com has fundamentally changed the calculus for cloud BI (as well as BI in general) by offering Redshift, a cloud-based subscription service that enables customers to stand-up their own data warehousing environment.
on a high-performance database for less than $1,000 a terabyte per year. Just as with e-commerce back in the 1990s, highly attractive pricing can help customers overcome security and other fears of shifting operations to an Internet-based processing platform.

Cloud BI Trends

Adoption Rates

Our research shows that for the past two years, about one-third of organizations have implemented some facet of their BI environment in the cloud, while two-thirds have not. In fact, the data shows a slight downward shift in the percentage of companies adopting BI in the cloud, from 36% in 2011 to 28% in 2013. (See Figure 2.)

Figure 2: Are you currently using the cloud for any components of your BI program?

Regional differences. Drilling into the data, we see that adoption rates in North America have slipped by 6% since 2011 and now stand at 30%. Meanwhile, Europe’s rate of adoption of cloud BI is well ahead of North America at 36%. And the rest of the world trails both North America and Europe with a 20% adoption rate. (See Figure 3.)
Medium- and small-sized companies are a bit more likely to adopt cloud BI than large companies.

**Size differences.** In addition, medium- and small-sized companies are a bit more likely to adopt cloud BI than large companies. Almost a third (32%) of medium-size companies have implemented cloud BI, while 29% of small companies and just 23% of large companies report implementing cloud BI. These results confirm what many pundits have said about cloud BI: It’s ideal for smaller companies with fewer IT resources, limited capital to spend on servers and software, and minimal to no BI expertise. (See Figure 4.)
“What’s refreshing for me is that I can go in at any time of day and [run a] report on any metric in our organization, such as item received/delivered, inspected at the category, personnel, or employee level and track it by any time period,” says a vice president of operations at a mid-size technology recycling company.

Although large companies are last on the list, they are still adopting cloud BI, largely thanks to individual departments who lack their own IT resources and capital and, in many respects, behave a lot like small- and medium-sized companies. But that’s not to say corporate BI managers haven’t considered cloud BI. Most have, but they aren’t yet sure how it fits into their enterprise architecture, except for greenfield projects and for prototyping.

“I see us moving very slowly with adoption because of installed base and switching costs,” wrote a director and chief architect at a large professional services firm based in Virginia, in a BI Leadership Forum discussion thread. “When and if we decide to replace our BI infrastructure, cloud BI offerings will be seriously considered.”

Architecture

Adoption is only the tip of the iceberg. The real question is what BI components organizations are implementing and in what types of cloud environments.

Components. A majority of organizations that have deployed cloud BI have implemented at least the “front-end” of their BI environments in the cloud; that is, the query/reporting side of their BI environment. This makes sense architecturally since it’s the easiest thing to move into the cloud and poses the least risk to data security.

There are several basic cloud BI options that only involve front-end BI components:

1. **Report sharing.** Users post completed reports on a cloud server and give colleagues permission to access and interact with them there. If done in a public cloud, this is likely part of BI Software as a Service. (See next.)

2. **BI Software as a Service (SaaS).** Here, users generate reports from a packaged cloud application (e.g., Salesforce.com) and run canned or configured reports against it. These are generally operational reports or reports that run against a single, dedicated source system.
3. **BI Platform as a Service (PaaS).** Here, users create a custom report by uploading their own data into the service and using its online authoring, exploration and publishing tools. Of course, BI platform-as-a-service options may also support data warehousing and ETL development as well.

According to our 2013 survey, almost two-thirds of the respondents have implemented reports/dashboards (64%), followed by BI servers (56%) and BI tools (55%). This is the front end of the BI environment. And the “back end” is not far behind, with data warehouses (47%), ETL tools (38%) and data marts (31%) used by between a third and a half of organizations that have deployed cloud BI. (See Figure 5.)

**Figure 5: Which BI components run in the cloud?**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reports/dashboards</td>
<td>64%</td>
</tr>
<tr>
<td>BI servers</td>
<td>56%</td>
</tr>
<tr>
<td>BI tools</td>
<td>55%</td>
</tr>
<tr>
<td>Data warehouse</td>
<td>47%</td>
</tr>
<tr>
<td>ETL</td>
<td>38%</td>
</tr>
<tr>
<td>Data mart</td>
<td>31%</td>
</tr>
<tr>
<td>Metadata</td>
<td>27%</td>
</tr>
<tr>
<td>Data mining</td>
<td>27%</td>
</tr>
<tr>
<td>Data quality/profiling</td>
<td>25%</td>
</tr>
<tr>
<td>Data exploration</td>
<td>20%</td>
</tr>
</tbody>
</table>

What is surprising is that data exploration is at the bottom of the stack at 20%. If respondents correlate data exploration with data profiling, this result makes sense. But if data exploration means ad hoc exploration, this figure is way too low and conflicts with Figure 9, which indicates that 52% of companies are using the cloud for ad hoc data exploration.

**Cloud services.** Given that front-end components are the most commonly deployed in the cloud, it’s not surprising that Software as a Service is the most common service offering for BI deployments, and by a large margin. In 2013, almost two-thirds of cloud BI deployments (64%) rely on software-as-a-service offerings, compared to 51% for infrastructure as a service (i.e., provisioning BI
and database servers), and 43% for platform-as-a-service. Interestingly, both infrastructure-as-a-service (IaaS) and platform-as-a-service offerings for BI have increased by more than 10% in the past two years. (See Figure 6.)

**Figure 6: Cloud Services for BI**

Drilling into the data, we find that small companies are more apt to implement software-as-a-service offerings compared to medium- and large-size companies. Otherwise, there is not much difference in the use of these services. Software-as-a-service offerings are ideal for small companies without IT resources since users or organizations simply need a Web browser to access, configure and use the software services. (See Figure 7.)

**Figure 7: Cloud BI Services by Company Size**
Cloud types. BI runs on several types of cloud environments. The three primary ones are:

- **Public cloud**: A shared (i.e., multitenant) Internet service run by a third party that charges customers on a subscription or metered basis.
- **Private cloud**: An internal data center offering built on virtualization software.
- **Hybrid cloud**: A combination of both public and private clouds that gives organizations the ability to dynamically provision servers to handle peak processing. In addition, a hybrid cloud BI environment could enable organizations to run their BI “front end” in the public cloud and their “back end” in their own data center to optimize data security.

Our data shows that the “public” cloud is the most popular cloud BI platform. In 2013, close to a majority of organizations (44%) that have deployed BI in the cloud use the public cloud, compared to 27% for a private cloud and 29% for a hybrid cloud. (See Figure 8).

In 2011, the percentage of public cloud users was greater than today, while the percentage of private cloud users was lower and hybrid cloud usage was about the same. This trend most likely reflects the growth of private clouds more than a diminution of public cloud usage.

**Figure 8: Usage by Cloud Type**

<table>
<thead>
<tr>
<th>Cloud Type</th>
<th>2013</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public cloud (i.e., externally managed, vendor owned)</td>
<td>44%</td>
<td>53%</td>
</tr>
<tr>
<td>Private cloud (i.e., internally managed, customer owned)</td>
<td>27%</td>
<td>18%</td>
</tr>
<tr>
<td>Hybrid (i.e., a mix of both above)</td>
<td>29%</td>
<td>30%</td>
</tr>
</tbody>
</table>
Cloud Usage and Users

Cloud BI architectures, like their on-premises counterparts, can support a multiplicity of workloads. The question is what types of business users use cloud BI and for what purposes.

Figure 9 shows the primary BI workloads that organizations have deployed in the cloud. Not surprising, they mirror traditional on-premises workloads. The top two responses are classic casual user workloads: “View reports/dashboards” (81%) and “Interact with reports/dashboards” (66%). The next three are classic power user workloads: “Explore data in various data sources” (52%), “Create new reports/dashboards from existing ones” (48%), and “Submit ad hoc queries” (48%).

![Figure 9: Cloud BI Workloads]

While both casual and power users use cloud BI environments, power users are much more active than casual users. This is typical for on-premises environments as well. Although casual users comprise the majority of BI users in most organization, they use BI infrequently, usually once or twice a week. In
contrast, power users are fewer in number but much more active, submitting queries multiple times a day.

Figure 10 shows that 46% of power users use cloud BI to a “high” degree, while only 19% of casual users use cloud BI to a high degree. However, 42% of casual users use cloud BI to a “moderate” degree compared to 21% for power users. Casual users are using cloud BI, but not to the same degree as power users. Interestingly, 22% of customers/suppliers use cloud BI to a “high” degree, while 35% use it to a “low” degree. This suggests that some companies are using cloud BI as a way to exchange information with their customer or supplier base.

![Figure 10: To what degree do the following types of users use cloud BI in your organization?](image)

**Drivers and Challenges**

**Drivers.** The motivations for using cloud BI have changed significantly in two years. In 2011, companies were motivated by “speed of implementation” (30%) and “reduced maintenance of hardware/software” (30%). In 2013, the primary motivations are “reduced cost” (26%) and “flexibility” (23%), followed by the two previously mentioned. (See Figure 11.)

I suspect that Amazon’s new Redshift data warehousing offering, which provides 1TB of data on a high-performance analytical database for $1,000 a year, may have something to do with these new drivers of cloud BI. Redshift pricing is prompting companies to begin investigating and implementing BI in
the cloud in the next several years. Moreover, Amazon Redshift offers great flexibility: users can provision any number of data warehousing servers on demand, and then scale their BI deployments up or down as needed. That’s a significant degree of flexibility compared to on-premises solutions as well as many cloud BI offerings.

**Figure 11: What was your top reason for using cloud BI? (Respondents were asked to select only one.)**

<table>
<thead>
<tr>
<th>Reason</th>
<th>2013</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>11%</td>
<td>26%</td>
</tr>
<tr>
<td>Flexibility</td>
<td>19%</td>
<td>23%</td>
</tr>
<tr>
<td>Speed of implementation</td>
<td>18%</td>
<td>30%</td>
</tr>
<tr>
<td>Reduced maintenance of HW/SW</td>
<td>18%</td>
<td>30%</td>
</tr>
<tr>
<td>Performance</td>
<td>5%</td>
<td>12%</td>
</tr>
<tr>
<td>Security</td>
<td>0%</td>
<td>3%</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
<td>5%</td>
</tr>
</tbody>
</table>

**Challenges.** The challenges organizations face with cloud BI are more clear-cut. Security is the biggest concern by far, registering 23% of the vote. (Respondents could only select one answer.) Trailing are “performance” (10%), “reliability” (9%) and “politics” (7%). The only answer choice that comes close to security as a challenge is “Other” (16%). Unfortunately, we didn’t ask respondents to elaborate since we listed more than a dozen challenges in the question. Obviously, organizations are experiencing many individual challenges implementing cloud BI. (See Figure 12.)

In terms of security, many organizations, especially those in the financial services industry, are bound by current regulations that require them to keep customer data inside corporate data centers or pinpoint the systems on which the data is held. Since most cloud BI environments use multi-tenant software, it’s impossible to identify which database server actually houses customer data. Companies can work around this limitation by purchasing a virtualized cloud BI environment, which hosts a single company’s data on a dedicated server. Of
course, such dedicated environments usually cost more, undermining one of the primary benefits of the cloud.

Ironically, most cloud data centers are more secure than their corporate counterparts. They must comply with the most stringent data and physical security codes in the industry. In many ways, you can argue that corporate data is more safe in a cloud BI data center. However, there are vulnerabilities, the primary one being the transfer of data from on-premises systems to the cloud. Another is the robustness of multi-tenant security software, which prevents customers from seeing each other’s data that is interleaved in the same database.

**Figure 12: What is the biggest challenge facing your cloud BI initiative? (Respondents were asked to select only one.)**

![Bar chart showing the biggest challenges facing cloud BI initiatives]

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security</td>
<td>23%</td>
</tr>
<tr>
<td>Performance</td>
<td>10%</td>
</tr>
<tr>
<td>Reliability</td>
<td>9%</td>
</tr>
<tr>
<td>Politics</td>
<td>9%</td>
</tr>
<tr>
<td>Pricing is too complex</td>
<td>7%</td>
</tr>
<tr>
<td>Vendor lock-in</td>
<td>7%</td>
</tr>
<tr>
<td>Corporate policy</td>
<td>7%</td>
</tr>
<tr>
<td>IT won’t support</td>
<td>5%</td>
</tr>
<tr>
<td>Support</td>
<td>4%</td>
</tr>
<tr>
<td>Don’t know what cloud is</td>
<td>3%</td>
</tr>
<tr>
<td>No executive support</td>
<td>1%</td>
</tr>
<tr>
<td>Too difficult to use</td>
<td>0%</td>
</tr>
<tr>
<td>No budget</td>
<td>0%</td>
</tr>
<tr>
<td>Other</td>
<td>16%</td>
</tr>
</tbody>
</table>

**Strategic.** Interestingly, nearly a majority of companies that deployed cloud BI say it is strategic for their BI program to a “high” degree (47%). More than a third (38%) say it’s strategic to a “moderate” degree while only 16% checked “low” degree. (See Figure 13.)
Most organizations that have implemented BI in the cloud have had a positive experience.

**Figure 13: How strategic is the cloud to your BI program?**

![Chart showing strategic levels of cloud BI]

Not surprisingly, cloud BI is more strategic to small companies (<$100M in revenues) and companies outside of North America and Europe. (See Figure 14.) These go hand in hand, since there are more small companies outside of those two regions on a percentage basis. Given the increasingly lower costs of deploying BI in the cloud, along with its greater flexibility (see “Opportunities” above), it’s not surprising that small companies are leveraging the cloud to reap the benefits of BI.

**Figure 14: Cloud BI is Strategic to a “High” Degree**

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Companies (&gt;1B)</td>
<td>40%</td>
</tr>
<tr>
<td>Medium Companies ($100M to $1B)</td>
<td>32%</td>
</tr>
<tr>
<td>Small Companies (&lt;less than 1B)</td>
<td>60%</td>
</tr>
<tr>
<td>North America</td>
<td>43%</td>
</tr>
<tr>
<td>Europe</td>
<td>45%</td>
</tr>
<tr>
<td>Other</td>
<td>55%</td>
</tr>
</tbody>
</table>

**Future.** Most organizations that have implemented BI in the cloud have had a positive experience. This is clearly evident by the percentage of companies that plan to increase their cloud BI deployments in the next 12 months. In 2011, two thirds of respondents (65%) said they plan to increase their use of cloud BI in the next 12 months, while in 2013, that percentage increased by 10% to 75%. (See Figure 15.) Clearly, the old advertising jingle, “Try it, you’ll like it!” applies to cloud BI.
Figure 15: Are you planning to increase or decrease your use of the cloud for BI in the next 12 months?

Recommendations

Before embarking on a cloud BI project, there are several things you should evaluate to help you define the best approach.

1. **Evaluate your data security and privacy requirements.** If your company has strict regulations or attitudes about data privacy and security, then cloud BI may not be a good fit. However, don’t rule it out. You might be able to use the cloud for prototypes, test beds or non-permanent applications with non-sensitive data. Or you might be able to appease data security concerns by carving out a dedicated environment within a cloud data center.

2. **Understand your sources.** Your cloud BI solution needs to provide hooks into your source systems. This usually involves building custom ETL programs that move, clean, integrate and aggregate data from the specific source system into the data warehouse. This is the hardest part about delivering cloud BI solutions. If you are lucky, your cloud BI tool supports a packaged connector and ETL mappings to the source systems you run. But if not, you will have to customize the solution to meet your data sourcing needs. Or you can simply create a custom data mart from your data warehouse and use that as your source.
Estimate data volumes. If your cloud BI solution needs to ingest large volumes of data each day, then you will need to implement a trickle-feed architecture that captures changes in source systems and flows them into the cloud BI environment in near-real time. Make sure your cloud BI provider can implement the appropriate hooks or agents in your on-premises systems and that it supports change data capture and trickle feeds.

3. **Estimate costs.** Once you know projected data volumes, then you can estimate your ongoing operational costs. Fortunately, the costs of moving and storing data in the cloud have dropped precipitously, thanks to Amazon’s Redshift offering. This will exert significant downward pressure on cloud BI fees, making the cloud even more attractive for BI activities.

4. **Know your use cases.** Casual users need reports and dashboards that access a fully dimensionalized data model and support a range of queries and drill downs in a guided environment. Power users need a more ad hoc environment that enables them upload and merge data and create their own reports and dashboards. Understand which types of users your cloud BI provider is best suited to support.

5. **Understand your BI/DW skills.** If you have BI/DW skills in house, then you should choose a platform-as-a-service offering that enables you to build your own BI environment. If not, then you will need to rely on a vendor partner to build and operate a cloud BI environment for you. If only need to support power users, then you can select a software-as-a-service offering that lets savvy power users upload their own data to the cloud to conduct analyses and build ad hoc reports and dashboards for departmental colleagues.

Historically, analytical applications have closely trailed their operational brethren. Today, most new operational applications are designed to run in the cloud. In the future, most new analytical applications will also run in the cloud. The time to start evaluating cloud BI is now!
ABOUT THE AUTHOR

WAYNE ECKERSON has been a thought leader in the business intelligence field since the early 1990s. He has conducted numerous research studies and is a noted speaker, blogger, and consultant. He is the author of two widely read books: *Performance Dashboards: Measuring, Monitoring, and Managing Your Business* (2005, 2010) and *The Secrets of Analytical Leaders: Insights from Information Insiders* (2012). Wayne is currently director of BI Leadership, an education and research service run by TechTarget that provides objective, vendor neutral content to business intelligence (BI) professionals worldwide. Wayne’s consulting company, BI Leader Consulting, provides strategic planning, architectural reviews, internal workshops, and long-term mentoring to both user and vendor organizations. For many years, Wayne served as director of education and research at The Data Warehousing Institute (TDWI) where he oversaw the company’s content and training programs and chaired its BI Executive Summit. Email him at weckerson@techtarget.com.

*Benchmark Report: BI in the Cloud* is a BI Leadership e-publication.

Wayne Eckerson  
Director, BI Leadership

Jean Schauer  
Editor in Chief

Jason Sparapani  
Managing Editor, E-Publications

Doug Olender  
Publisher

TechTarget  
275 Grove Street, Newton, MA 02466  
www.techtarget.com

© 2013 TechTarget Inc. No part of this publication may be transmitted or reproduced in any form or by any means without written permission from the publisher. TechTarget reprints are available through The YGS Group.