

A Forrester Total Economic Impact™
Study Commissioned By Snowflake
June 2018

The Total Economic Impact™ Of Snowflake Data Warehouse-As-A-Service

Cost Savings And Business Benefits Of A Snowflake Cloud-Based Data Warehouse

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Benefits And Costs



Legacy storage costs saved:
\$3,457,000



Legacy compute costs saved, DB management, and capacity planning savings:
\$1,612,000



ETL labor cost savings:
\$995,000



Faster time-to-production:
\$895,000



Snowflake usage, implementation, and professional services:
\$989,000

Executive Summary

Snowflake provides a data warehouse-as-a-service that claims to dramatically simplify concurrency, performance, and overhead challenges, offering both reduced cost and improved agility.

Snowflake Computing commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by deploying its solution rather than other on-premises appliance alternatives. The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of Snowflake on their organizations.

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed enterprise customers who chose Snowflake over traditional alternatives.

Prior to using Snowflake, customers experienced limitations in database scalability and performance, thereby holding back innovation and business growth. Organizations struggled to process, store, and access relevant data and were falling behind on analysis due to slow and unstable systems. IT teams were over-worked maintaining the databases and ensuring acceptable performance levels. Organizations were facing large upgrade costs for traditional data warehouses to support growing businesses.

Snowflake overcomes or sidesteps problems of concurrency constraints and unconstrained costs. The Snowflake data warehouse-as-a-service was built to run on public cloud infrastructure so that it can take advantage of a cloud vendor's infrastructure-as-a-service (IaaS) capabilities. Snowflake claims its public-cloud native solution fully separates data storage and compute, providing both scale-out storage and SQL compliant data warehouses on demand.

Key Findings

Quantified benefits. The following three-year risk-adjusted present value (PV) quantified benefits are representative of those experienced by the companies interviewed:

- › **Legacy storage costs saved.** High (and fast-growing) costs for data storage was holding companies back until Snowflake was able to provide a route to lower storage costs, with data compression and a low cost per terabyte (TB). This is worth nearly \$3.5 million on a risk-adjusted present value basis over three years for the composite company depicted in this study.
- › **Legacy compute costs saved.** Companies typically over provision compute resources to assure they have enough. Forecasts of need can lead to over- or under-provisioning. Snowflake's instant provisioning enables new projects and handles seasonal or time of day/week surges in compute usage, which is worth over \$731,000 by Forrester's calculations.
- › **ETL labor cost avoided.** When ETL teams no longer need to move data from transactional systems to operations systems to data warehouses, then labor savings ensue, amounting to nearly \$995,000 for the composite company.



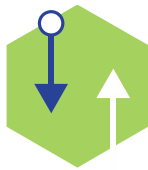
ROI
604%



Benefits PV
\$6.96 million



NPV
\$5.97 million



Payback
<3 months

- › **Reduced cost of database management.** Snowflake's managed-data warehouse requires minimal customer involvement. Reassigning four database administrators (DBAs) is worth \$796,000.
- › **Faster time-to-production.** When an organization can cut the time to launch new projects, for either the benefit of the organization or for customers, the value is at least \$895,000 to our composite company. This value is highly dependent on actual company investment in new analytics capabilities.
- › **Capacity planning labor cost avoided.** Snowflake eliminates the need for capacity planning by providing scalable infrastructure, which is worth about \$85,000 in senior DBAs' time.

Unquantified benefits. The interviewed organizations experienced, or anticipate, the following benefits, which are not quantified for this study:

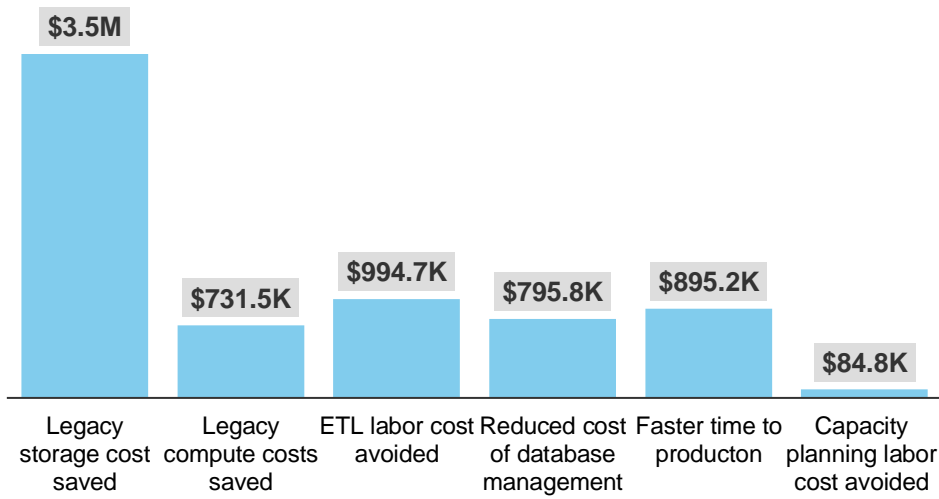
- › **Business value of new initiatives.** New data-intensive products and new analytics for customer engagement (or being able to exploit data stores for the sake of new revenue) is accretive to the top and bottom lines.
- › **Avoiding the cost of upgrades.** When organizations move off their on-premises data warehouses, they get to skip the cost of the next needed upgrade or re-investment in infrastructure.
- › **Global data sharing.** Federating data with customers, partners, and suppliers becomes valuable when it is easy and secure. Snowflake customers can share data directly within the Snowflake ecosystem.
- › **Greater employee satisfaction.** Capacity limitations, concurrency bottlenecks, and saying "no" to the businesses because of resource constraints make for frustrated IT staff. Less stress and better sleep are results of removing these challenges.

Costs. The interviewed organizations experienced the following risk-adjusted PV costs:

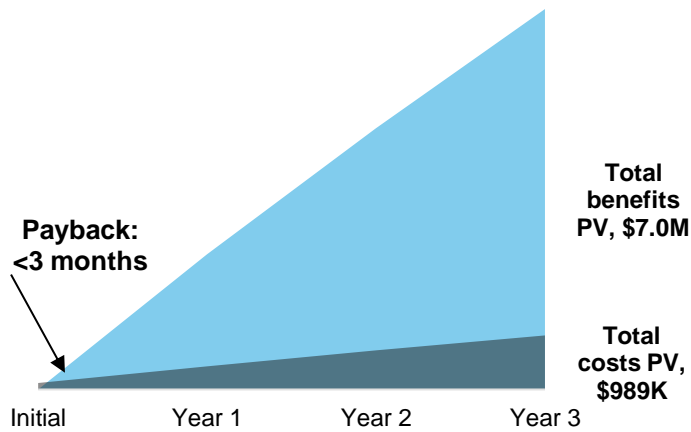
- › **Snowflake usage fee.** Twenty-three dollars per terabyte, 65% compression, and \$3 per hour of compute for the composite organization calculates to \$867,294 over three years (PV).
- › **Implementation and data migration.** Internal labor for six months, \$107,640.
- › **Professional services.** Consultants for 50 hours, \$13,750.

Forrester's interviews with four existing customers and subsequent financial analysis found that an organization based on these interviewed organizations experienced benefits of \$6,959,309 over three years versus costs of \$988,684, adding up to a net present value (NPV) of \$5,970,625 and an ROI of 604%.

Benefits (Three-Year)



Financial Summary



The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

TEI Framework And Methodology

From the information provided in the interviews, Forrester has constructed a Total Economic Impact™ (TEI) framework for those organizations considering implementing Snowflake's data warehouse as cloud-based service.

The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the investment decision. Forrester took a multistep approach to evaluate the impact that Snowflake can have on an organization:



DUE DILIGENCE

Interviewed Snowflake stakeholders and Forrester analysts to gather data relative to its data warehouse-as-a-service.



CUSTOMER INTERVIEWS

Interviewed four organizations using Snowflake to obtain data and insights with respect to costs, benefits, and risks.



COMPOSITE ORGANIZATION

Designed a composite organization based on characteristics of the interviewed organizations.



FINANCIAL MODEL FRAMEWORK

Constructed a financial model representative of the interviews using the TEI methodology and risk-adjusted the financial model based on issues and concerns of the interviewed organizations.



CASE STUDY

Employed four fundamental elements of TEI in modeling Snowflake's impact: benefits, costs, flexibility, and risks. Given the increasing sophistication that enterprises have regarding ROI analyses related to IT investments, Forrester's TEI methodology serves to provide a complete picture of the total economic impact of purchase decisions. Please see Appendix A for additional information on the TEI methodology.

DISCLOSURES

Readers should be aware of the following:

This study is commissioned by Snowflake Computing and delivered by Forrester Consulting. It is not meant to be used as a competitive analysis.

Forrester makes no assumptions as to the potential ROI that other organizations will receive. Forrester strongly advises that readers use their own estimates within the framework provided in the report to determine the appropriateness of an investment in Snowflake.

Snowflake Computing reviewed and provided feedback to Forrester, but Forrester maintains editorial control over the study and its findings and does not accept changes to the study that contradict Forrester's findings or obscure the meaning of the study.

Snowflake Computing provided the customer names for the interviews but did not participate in the interviews.

The Snowflake Customer Journey

BEFORE AND AFTER THE SNOWFLAKE INVESTMENT

Interviewed Organizations

For this study, Forrester conducted four interviews with Snowflake customers. Interviewed customers include the following:

INDUSTRY	REGION	INTERVIEWEE	SCOPE
Search engine marketing	North America	Head of business intelligence	\$3B in revenue, multiple brands, 100M readers/users, advertising revenue model
Interactive entertainment	Global	Chief architect for business applications	\$5B in revenue, multiple game titles, 7,000 employees
Mobile data	Global	Senior director of engineering	CRM platform for 6,000 customers' mobile and web app analytics, engagement
Entertainment conglomerate	Global	Director of enterprise data and analytics	\$2B in revenue, analog and digital media company, 1,400 employees

Key Challenges

The database and IT infrastructure leaders interviewed for this study described a range of challenges and opportunities that drove their decisions to invest in and deploy Snowflake.

- › **Database capabilities were holding the business back.** Legacy database challenges included: the elasticity and scalability of compute and storage resources; the need for semi-structured data; the assurance of security; and the universal challenge of concurrency. The organization could not build complex analytics due to existing workload demands.
- › **Enterprises came up against the on-premises versus cloud decision point.** Further on-premises database infrastructure development would incur new infrastructure costs and staffing and overhead expenditures. On-premises resources were in need of replacement, with the requisite future upgrade costs. Backup clusters were needed but missing. One study participant explained, "We knew that our hardware was dying, and we needed to accomplish a lot to get to a point where our data warehouse could just not go down, and it would have cost at least half a million dollars for the backup cluster."
- › **Small teams, big jobs.** "We had a very small team and we continue to have a very small team," noted one interviewee. "So we were looking for [a database environment] with less administrative overhead."
- › **Limited enterprise access to data.** Real fears about bringing down the database meant that those who needed access to data too often did not get it. According to one database engineer, "We couldn't allow support people or services or marketing people to access the database to do their work, because they could bring it down. We had a lot of production issues where someone was running a bad query." With Snowflake, IT can spin up a separate cluster for a person or for a use case that is completely divorced from the rest of the database, thus eliminating the danger of catastrophic database failure.

"Our legacy database environment was a show stopper for our business. We just could not do stuff that the business asked us to do. And data for 20% of our revenue was missing from the database. So, we hit the wall and Snowflake opened the door in that wall."

Chief architect for business applications, interactive entertainment



- › **Database as the heart of the business.** Further, rapid and recent changes in technologies and prevailing practices in database management made for challenging decisions in a dynamic market for database products or services. Interviewees described their data warehouse as the heart of the company, critical to the business, and a key driver for the product. The decision to move to Snowflake was critical. “This is not a back-office use case with some data scientist tooling around doing analytics,” noted one interviewee. “This is really driving the business. So, this is not a light decision for us and it’s directly impacted our business.”

Solution Requirements

The interviewed organizations searched for a solution that could:

- › **Solve their challenges** with concurrency and decouple compute from storage.
- › **Hold steady or reduce costs** of hardware, software, database management, and capacity planning.
- › **Assure security.** Business units that are frustrated and do not want to deal with the enterprise IT group will often store data in Excel, either on their desktop or on drives within the organization. And sometimes this information is about the company and highly confidential.

After an extensive RFP and performance testing process evaluating multiple vendors, the interviewed organizations chose Snowflake and began deployment, which took between three and six months.

Key Results

The interviews revealed that key results from these Snowflake investments include:

- › **Overcoming performance barriers.** Organizations were freed from resource contention. Concurrency problems were solved as Snowflake completely separates compute and storage. Snowflake provides the capability to instantly set up multiple clusters of compute directed towards the same data source so that multiple users can run queries without hampering performance for others.
- › **Cost containment.** Benefits versus costs are described below. Interviewees shared their insights and experience: “With the No.2 alternative, we knew that we would need at least a full team of engineers operating it, maintaining it, and making improvements. While with Snowflake’s hosted service we could just focus on our core business and not have a team supporting the database. And we made a bet that Snowflake would actually be, in the long run, cheaper and less of a hassle. And that’s actually been proven, because now, fast forward two years, I literally have zero engineers looking at Snowflake on a daily basis.”
- › **Greater security.** According to interviewees, Snowflake eases data uploads and makes data readily accessible with only a light learning curve. This helps clean up the security holes and potential security breaches that come from having data insecurely contained on hard drives or desktops.
- › **More capabilities, more speed, and new products.** Interviewees described acquiring new capabilities such as: sales, royalty, and margin analytics; digital order-to-cash processing; and usage analytics.

“Now, if you go and walk around our office, you’ll probably see across the different departments, half the people have a Snowflake screen up. And they are there doing their work. Everyone that was here prior to Snowflake, and after Snowflake, tell me about how transformational it has been. Snowflake unlocked so many things that we didn’t even think were locked.”

Director of data enterprising and analytics, mobile data



“We had to refresh data for each region in an international company, it was like three times a day. So essentially, we were running out of hours in a day, and we were looking for a platform that would allow us to support kind of real-time live reports against the database. I was looking for a platform that would scale from about 18 terabytes of data to about 100 terabytes that we’re projecting to have by the end of 2020.”

Chief architect for business applications, interactive entertainment



“Concurrency on utilization is the big problem for most of the data warehousing world. How often have you heard, ‘We can’t run your reports because accounting is running month-end right now.’”

Director of data enterprising and analytics, entertainment industry



Forrester also learned of faster time-to-production and faster time-to-market for new products that were not possible before the investment in Snowflake.

Composite Organization

Based on the interviews, Forrester constructed a TEI framework, a composite company, and an associated ROI analysis that illustrates the areas financially affected. The composite organization is representative of the four companies that Forrester interviewed and is used to present the aggregate financial analysis in the next section. The composite organization that Forrester synthesized from the customer interviews has the following characteristics:

- › The global 2-billion-dollar business-to-consumer organization.
- › Employs five database administrators (DBAs) and five ETL developers.

The organization faces end-of-life challenges or significant upgrade expenses for its storage and server environment due to higher demand for storage.



Key assumptions

Prior state:

- 1 petabyte of data
- Monthly cost per terabyte: \$120
- No data compression used
- Four DBAs participate in annual capacity planning

Analysis Of Benefits

QUANTIFIED BENEFIT DATA AS APPLIED TO THE COMPOSITE

Total Benefits						
REF.	BENEFIT	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Atr	Legacy storage cost saved	\$1,327,104	\$1,393,200	\$1,463,184	\$4,183,488	\$3,457,175
Btr	Legacy compute costs saved	\$280,800	\$294,840	\$309,571	\$885,211	\$731,528
Ctr	ETL labor cost avoided	\$400,000	\$400,000	\$400,000	\$1,200,000	\$994,741
Dtr	Reduced cost of database management	\$320,000	\$320,000	\$320,000	\$960,000	\$795,793
Etr	Faster time-to-production	\$359,986	\$359,986	\$359,986	\$1,079,957	\$895,231
Ftr	Capacity planning labor cost avoided	\$25,999	\$34,666	\$43,332	\$103,997	\$84,841
	Total benefits (risk-adjusted)	\$2,713,889	\$2,802,691	\$2,896,084	\$8,412,664	\$6,959,309

Legacy Storage Costs Saved

All interviewed organizations experienced growth in their data storage costs as their businesses and operations expanded. In some cases, high storage costs interfered with the companies' business objectives. One interviewee told Forrester that the organization could only afford storing six months' worth of data, which prevented them from performing year-to-year comparisons. Due to the high storage costs, another interviewed organization fell behind the industry benchmark for revenue-to-infrastructure cost ratio, and as result, became less attractive for investors. With Snowflake, interviewees consistently slashed their storage costs due to lower price per terabyte and high data compression rates.

- A search engine marketing company was able to reduce their data warehousing costs by nearly 80%.
- An interactive entertainment company told Forrester that with Snowflake their cost per terabyte went down by 80%. Additionally, they compressed the data by 50% to 80%, depending on the data type, thus further reducing storage costs.
- A mobile data company improved their revenue-to-infrastructure ratio enough to surpass the industry benchmark.

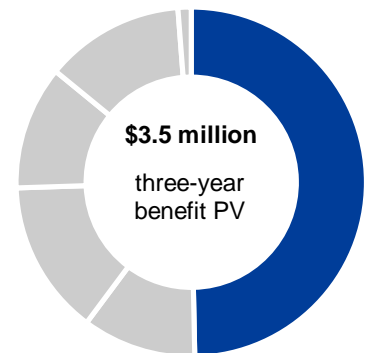
For the composite organization, Forrester estimates:

- The organization currently uses one petabyte of storage.
- Prior to Snowflake, the organization paid \$120 per terabyte per month.
- No compression was used prior to Snowflake.

The reduction in storage costs will vary based on:

- Previous cost per terabyte.
- Nature of the data stored and the compression factor.

The table above shows the total of all benefits across the areas listed below, as well as present values (PVs) discounted at 10%. Over three years, the composite organization expects risk-adjusted total benefits to be a PV of nearly \$7.0 million.



Legacy storage costs saved: **50%** of total benefits

Impact risk is the risk that the business or technology needs of the organization may not be met by the investment, resulting in lower overall total benefits. The greater the uncertainty, the wider the potential range of outcomes for benefit estimates.

- › Size of storage.

To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year risk-adjusted total PV of nearly \$3.5 million.

Legacy Storage Costs Saved: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
A1	Terabytes of storage	1,024	1,024	1,075	1,129
A2	Cost per terabyte prior to Snowflake	Per month	\$120	\$120	\$120
At	Legacy storage costs saved	A3*A2*12 months	\$1,474,560	\$1,548,000	\$1,625,760
	Risk adjustment	↓10%			
Atr	Legacy storage costs saved (risk-adjusted)		\$1,327,104	\$1,393,200	\$1,463,184

Legacy Compute Costs Saved

Historically, organizations planned their compute capacity for the upcoming year and relied on forecasting to anticipate required compute resources. As several interviewees told Forrester, it was not uncommon to over-provision for compute resources to support unexpected spikes in demand.

- › All interviewees described the value of Snowflake’s instant provisioning to quickly enable new projects and handle seasonal or time of day/week surges in compute usage.
- › An interactive entertainment company reduced compute costs by 30% (by not paying for static and unused capacity) with Snowflake’s per-second pricing structure.

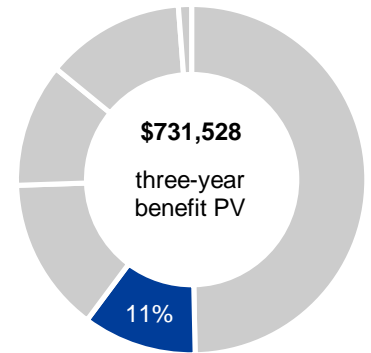
For the composite organization, Forrester assumes that:

- › The organization requires servers to run for 6,500 hours per month in the first year.
- › The organization’s pays \$4 per hour of running compute.

The reduction in compute expense will vary with:

- › Annual capacity spend prior to Snowflake.
- › Percent and duration of unused compute resources.

To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year risk-adjusted total PV of \$731,528 million.



Legacy compute costs saved: **11%** of total benefits



Organization saves **30%** on compute with instant provisioning and per-second billing.

Legacy Compute Costs Saved: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
B1	Compute hours per month	5% increase each year	6,500	6,825	7,166
B2	Cost of compute per hour		\$4.00	\$4.00	\$4.00
Bt	Compute savings	$B1*B2*12$ months	\$312,000	\$327,600	\$343,968
	Risk adjustment	↓10%			
Btr	Compute savings (risk-adjusted)		\$280,800	\$294,840	\$309,571

Reduced Cost Of ETL Developers

For interviewed organizations, preparing data for analytics required the ETL team to do the heavy lifting of moving data from transactional systems to operational systems, then to data warehouses. As a result, business and data analysts had to wait from a half-day to several days to leverage the data. Interviewees told Forrester that Snowflake's support of JSON data made ETL developers more efficient by significantly shortening query time and making data querying dynamic.

- › Before Snowflake, a search engine marketing company used to process the data at night to give their legacy system enough processing time. With Snowflake, the data was processed every 15 minutes, providing the business organization with up-to-date reporting.
- › Snowflake enabled an entertainment conglomerate to quickly receive and blend together the unstructured and semi-structured data from multiple information sources, including social media and online streaming services, and visualize it in dashboards and predictive models for the analysts.
- › An interactive entertainment company significantly reduced a footprint of ETL tools and avoided hiring additional ETL developers. For major projects, the company had hired up to 20 ETL developers. With Snowflake, seven internal staff members were able to perform the same amount of work to complete the projects.

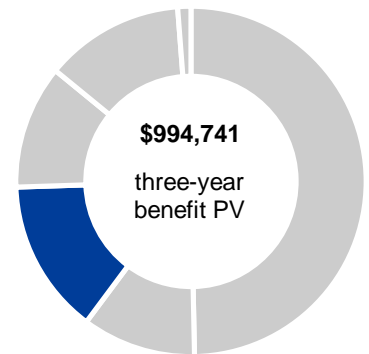
For the composite organization, Forrester assumes that:

- › The organization avoided hiring five additional full-time ETL developers.
- › ETL developer's annual fully loaded compensation is \$100,000.

Avoided costs of ETL developers will depend on:

- › Number and magnitude of business projects that require ETL developer's involvement.
- › Average fully burdened salary of and ETL developer.

To account for this variability, Forrester risk-adjusted this benefit downward by 20%, yielding a three-year risk-adjusted total PV of \$994,741.



Reduced costs of ETL Developers: **14%** of total benefits



Snowflake streamlines data processing, reducing the need for ETL developers and speeding up data availability.

Reduced Costs Of Research Staff: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
C1	Number of ETL developers avoided		5	5	5
C2	Annual compensation per ETL developer		\$100,000	\$100,000	\$100,000
Ct	Reduced number of ETL developers	C1*C2	\$500,000	\$500,000	\$500,000
	Risk adjustment	↓20%			
Ctr	Reduced number of ETL developers (risk-adjusted)		\$400,000	\$400,000	\$400,000

Reduced Cost Of Database Management

Interviewed organizations consistently describe reduction in database management as a key benefit of using Snowflake. Snowflake's data warehouse is fully managed by Snowflake and requires minimal involvement from customers.

- › A search engine marketing company used three engineers internally and two contractors to implement requirement changes and to perform testing and day-to-day maintenance. With Snowflake, the team no longer needed contractors; engineers' time spent on database management decreased from 60% to 5%.
- › After migrating to Snowflake, an interactive entertainment company reassigned five DBAs to other tasks as there was no longer the need for database support.
- › A mobile data company had four engineers involved in database management, including upgrades to newer versions of their previous data warehouse. Snowflake did not require daily maintenance, and these engineers were reassigned to building new and upgrading current product offerings.

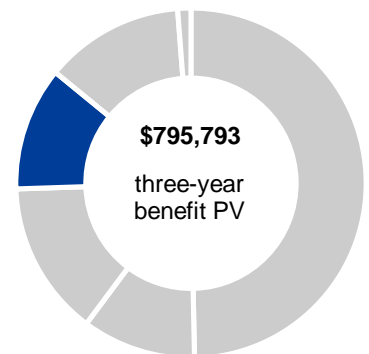
For the composite organization Forrester assumes that:

- › The organization reassigns four engineers who formerly supported the database to project-related tasks.
- › A DBA's fully loaded compensation is \$100,000.

The reduction in cost of database management will vary based on:

- › Number of DBA staff members supporting the current data warehouse.
- › DBA's annual compensation.

To account for these risks, Forrester adjusted this benefit downward by 20%, yielding a three-year risk-adjusted total PV of \$795,793.



Reduced cost of database management: **11%** of total benefits

"I have zero engineers looking at Snowflake on a daily basis. We just don't even look at it. Instead, we focus on everything around it and building our products. Snowflake is just like this constant: it's there, it's great, it's reliable and we don't pay attention to it."

Director of data enterprising and analytics, mobile data



Reduced Cost Of Database Management: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
D1	Reduction in DBA staff with Snowflake		4	4	4
D2	Yearly rate per DBA		\$100,000	\$100,000	\$100,000
Dt	Reduced cost of database management	D1*D2	\$400,000	\$400,000	\$400,000
	Risk adjustment	↓20%			
Dtr	Reduced cost of database management (risk-adjusted)		\$320,000	\$320,000	\$320,000

Faster Time-To-Production

Customers interviewed for this study noted a significant decrease in time-to-production for new projects after the Snowflake investment. Several interviewed organizations told Forrester that launching new business projects, internally, to market or both, and providing testing environments with legacy infrastructure generally required extensive capacity planning, provisioning of additional infrastructure, and data center management. While the time varied by project and organization, an average project could take three months to implement.

- › With Snowflake, an entertainment conglomerate saw the time-to-secure capacity for an advanced analytics project decrease from several weeks to an hour.
- › An interactive entertainment company saw an improvement in setting up testing environments from months to a few hours.

For the composite organization, Forrester conservatively assumes:

- › Ten IT projects were executed each year, including product development, new product launches, acquisitions integration, etc.
- › Fifty percent of global projects required additional infrastructure.
- › IT needed, on average, three months to launch a project.

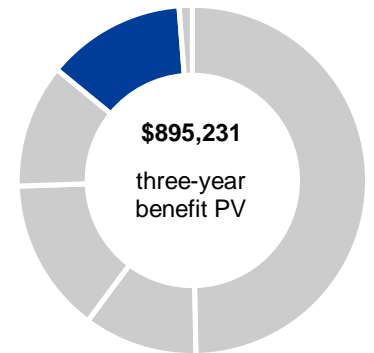
Four IT resources were involved in project start to finish, full-time:

- › Average compensation rate of an IT resource was \$8,333 per month.
- › With Snowflake, time required to launch a project went down by 90%.

Faster time-to-production can be influenced by:

- › The types and complexity of projects and the resources required to complete these projects.

To account for these risks, Forrester adjusted this benefit downward by 20%, yielding a three-year risk-adjusted total PV of \$895,231.



**Faster time-to-production:
13% of total benefits**



Without Snowflake, the composite organization would take 90% longer to launch new business projects.

Faster Time-To-Production: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
E1	Number of projects per year		10	10	10
E2	Projects requiring additional infrastructure		50%	50%	50%
E3	Average time per project in months	Interviews	3	3	3
E4	Average number of IT FTEs involved in each project		4	4	4
E5	IT FTE monthly compensation	\$100,000/12 months	\$8,333	\$8,333	\$8,333
E6	Saving in time with Snowflake		90%	90%	90%
Et	Faster time-to-production	$E1 * E2 * E3 * E4 * E5 * E6$	\$449,982	\$449,982	\$449,982
	Risk adjustment	↓20%			
Etr	Faster time-to-production (risk-adjusted)		\$359,986	\$359,986	\$359,986

Reduced Cost Of Capacity Planning

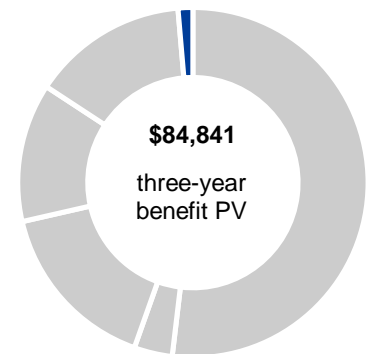
The database infrastructure determines organizations' ability to support new business initiatives and operate efficiently. When forecasting for capacity one year in advance, IT teams typically relied on information about the upcoming business projects. However, if an organization required more capacity, the IT team needed months to provide additional infrastructure, slowing the business down. In situations when organizations did not utilize their storage and compute 100%, they overpaid for unused capacity.

- › The Snowflake Data Warehouse removed the burden of capacity planning by providing easily scalable infrastructure. With pay-per-use billing, organizations only paid for compute and storage resources that were used, without over-provisioning for them.
- › As one interviewee told Forrester, capacity planning took several senior IT and engineering team members a month of gathering information across the organization about the upcoming projects. The information was then used to forecast the organization's demand for new data warehousing capacity.
- › In another organization, capacity planning included forecasting, budgeting, and growth-rate analysis, and required input from IT managers or executives, engineers, and business experts for about a month every year.

For the composite organization Forrester assumes that:

- › In the first year, a team of three senior representatives of IT, engineering, and business units dedicate one month per year to capacity planning.
- › For years 2 and 3, the team responsible for capacity planning expands as the organization's innovation pipeline grows over time.
- › A manager-level DBA/engineer/business expert's fully loaded salary is \$130,000.

The reduction in cost of database management will vary based on:



Capacity planning: 1% of total benefits

- › Complexity of forecasting for new year’s infrastructure, number of professionals involved, and the duration of their involvement.
- › Senior or manager DBA/engineer/business expert’s annual compensation.

To account for these risks, Forrester adjusted this benefit downward by 20%, yielding a three-year risk-adjusted total PV of \$84,841.

Reduced Cost Of Capacity Planning: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
F1	Number of senior DBAs involved in capacity planning each year		3	4	5
F2	Senior DBA monthly compensation	\$130,000/12 months	\$10,833	\$10,833	\$10,833
F3	Time dedicated to capacity planning (months)		1	1	1
Ft	Saving due to removed burden of capacity planning	$F1 * F2 * F3$	\$32,499	\$43,332	\$54,165
	Risk adjustment	↓20%			
Ftr	Saving due to removed burden of capacity planning (risk-adjusted)		\$25,999	\$34,666	\$43,332

Unquantified Benefits

Business value from faster processing, better decisions, and new business initiatives. Interviewees told Forrester that Snowflake helped improve their internal operations and allowed them to launch new revenue-generating business initiatives.

- › A mobile data company launched several new products based on advanced analytics that became possible with Snowflake’s flexible cloud infrastructure.
- › A search engine marketing company diversified its revenue streams by adding new data sources that required additional infrastructure.
- › Prior to Snowflake, a search engine marketing company did not have reliable hardware and as a result, had their data fractured and stored in several locations. Consolidating all the data in Snowflake, allowed the organization to get new visibility into the organization’s revenue and profit and to use the data to drive business analysis and insights.
- › An interactive entertainment company projected tens of millions of dollars in additional revenue from analyzing mobile data that they could not run prior to Snowflake due to the limited capacity of their former platform.

Avoided costs of on-premises infrastructure upgrades. Interviewed organizations faced costly infrastructure upgrades every couple of years to ensure that the systems could support the organization’s business needs. With Snowflake, they no longer needed to invest in on-premises infrastructure.

Improved performance due to re-architected scripts. For some organizations, migration to Snowflake provided an opportunity to: re-assess their processes and code; evaluate what they could get rid of and what had been deprecated; and modify the scripts to be better performing and maintainable.



Snowflake allowed organizations to launch new revenue-generating business initiatives.

“With the legacy data warehouse, there were all those things we wanted to implement, and we really couldn’t because of the glacial pace at which we could actually make changes without bringing the system down.”

Head of business intelligence, search engine marketing



Streamlined migration and simplified maintenance with Snowflake support. All interviewees used Snowflake support as a part of implementation, data migration, and on the ongoing bases. One organization described Snowflake as “reducing the knobs” for clients by making the solution easy to use. Interviewees talked about Snowflake addressing their questions in a timely manner and taking on all technical challenges during implementation and beyond.

Increased employee satisfaction and reduced stress levels by eliminating capacity bottlenecks. Several interviewees experienced the limitations of their legacy data warehouses when new business initiatives were put on hold or cancelled due to capacity limitations. IT teams experienced constant pressure to forecast, plan, and provision the infrastructure in order to ensure that the systems were not brought down by concurrent queries; performing weekend and over-night maintenance on a continual basis. IT teams struggled to establish themselves as strategic partners to the business. Migration to Snowflake data warehouse:

- › Empowered IT teams to say “yes” to new business initiatives, due to elastic capacity and fast timelines to provision Snowflake data warehouse. As one interviewee put it: “We always felt like a bottleneck to the business, it wasn’t pleasant to work on the team. We wanted to be a team that said ‘yes’ to innovation. And now we can do it.”
- › Lifted the analysts’ and researchers’ frustration from waiting to perform their tasks due to concurrency limitations and slow performance.
- › Reduced pressure on the IT team to maintain the data warehouse. One interviewee told Forrester, “My stress level since going to Snowflake has been basically zero.”

Global data sharing. Several interviewed organizations found unique value in the new data sharing feature available through Snowflake. In the past, data sharing required methods such as FTP, APIs, email, and file sharing that were labor intensive and time consuming. With the new feature, Snowflake customers can share data directly, immediately, and securely with their vendors, clients, or partners within the Snowflake ecosystem.

Flexibility

The value of flexibility is clearly unique to each customer, and the measure of its value varies from organization to organization. There are multiple scenarios in which a customer might choose to implement Snowflake’s data warehouse-as-a-service and later realize additional uses and business opportunities, including:

- › **New products.** Companies that participated in this study described new products resulting from their Snowflake investments, and more to follow. “We’ve launched several new products that were only possible because of Snowflake,” explained a senior director of engineering, “We’ve launched the whole host of new products that were possible just because of the way Snowflake does the workload management.” Present innovation is proof of the existence of future options.

“We no longer have to make a lot of decisions prior to putting data into Snowflake. We can get the data in there quickly and start to derive value immediately, which is phenomenal. It makes it a lot easier when it comes to trying new things. And given the rapid pace of change for our product, being able to do that is essential.”

*Head of business intelligence,
Search engine marketing*



Flexibility, as defined by TEI, represents an investment in additional capacity or capability that could be turned into business benefit for a future additional investment. This provides an organization with the “right” or the ability to engage in future initiatives but not the obligation to do so.

- › **New connections.** Snowflake's global data sharing capability will enable more organizations to connect and share data directly. "We've launched a couple of new analytics pages that are based on that kind of more complex aggregated data, and that was made possible because of Snowflake," explained the engineering director at a mobile data company. Another interviewee explained how Snowflake allows an organization to easily link within the ecosystem without going outside of Snowflake. "Let's say you're another studio and we want to collaborate on a movie and I got a bunch of data that we need to collaborate on. I can simply push it to your Snowflake data warehouse and I give you access to my Snowflake data warehouse immediately. This is unheard of with any other platform. Also, there are more and more companies spinning up on Snowflake. It's easier to do. I've called it the global enterprise data sharing solution. Forget about silo data warehouses and think about everything as one big ecosystem and there is no other solution today that supports that."

Flexibility would also be quantified when evaluated as part of a specific project (described in more detail in Appendix A).

Analysis Of Costs

QUANTIFIED COST DATA AS APPLIED TO THE COMPOSITE

Total Costs

REF.	COST	INITIAL	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Gtr	Snowflake usage fee	\$0	\$332,918	\$349,545	\$367,037	\$1,049,501	\$867,294
Htr	Implementation and data migration cost	\$107,640	\$0	\$0	\$0	\$107,640	\$107,640
Itr	Professional fees	\$13,750	\$0	\$0	\$0	\$13,750	\$13,750
	Total costs (risk-adjusted)	\$121,390	\$332,918	\$349,545	\$367,037	\$1,170,891	\$988,684

Snowflake Usage Fee

Fees to Snowflake varied based on the size of storage and compute. For storage, there was a \$23 charge per terabyte per month. Cost of compute was determined by the use case and needs of the business units.

For the composite organization, Forrester assumes:

- › One petabyte of data in storage in the first year. Storage grew by 5% in each of the following years.
- › Snowflake applied 65% compression to the data, reducing it to 358 TB in Year 1, 376 TB in Year 2 and 395 TB in Year 3.

Snowflake provided realistic quotes, so Forrester did not risk-adjust this cost. Over three years, the total PV cost was \$867,294.

The table above shows the total of all costs across the areas listed below, as well as present values (PVs) discounted at 10%. Over three years, the composite organization expects risk-adjusted total costs to be a PV of \$988,684.

Snowflake Usage Fee: Calculation Table

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
G1	Storage size (in terabytes)			1,024	1,075	1,129
G2	Monthly cost of 1 terabyte of storage	Snowflake		\$23	\$23	\$23
G3	Average data compression applied to the data in storage with Snowflake	Interviews		65%	65%	65%
G4	Annual storage cost	$G1*(1-G3)*G2*12$ months		\$98,918	\$103,845	\$109,061
G5	Compute hours per month			6,500	6,825	7,166
G6	Cost of compute per hour	Snowflake		\$3.00	\$3.00	\$3.00
G7	Annual cost of compute	$G5*G6*12$ months		\$234,000	\$245,700	\$257,976
Gt	Snowflake usage fee	$G4+G7$	\$0	\$332,918	\$349,545	\$367,037
	Risk adjustment	0%				
Gtr	Snowflake usage fee (risk-adjusted)		\$0	\$332,918	\$349,545	\$367,037

Implementation And Data Migration Cost

In the interviews Forrester conducted, interviewees described data migration as a complicated task for IT teams to configure the new environment, migrate the data, and test performance on the new platform. Transition duration varied from three to six months based on the complexity of the former data warehousing solution and the need for customization. According to the interviewees, Snowflake performed most of the heavy lifting and made the migration relatively easy, working hand-in-hand with internal DBAs. As one interviewee put it, “I never saw a company that was as customer-focused and committed to our success as Snowflake was.”

For the composite organization, Forrester estimates that:

- › Transition to Snowflake required full-time involvement from three DBAs/IT staff for six months (26 weeks) for 25 hours per week
- › IT staff/DBA's hourly salary equals \$48.

The cost of migration and implementation will vary based on:

- › Scope and complexity of the former data warehouse.
- › Average fully loaded annual compensation for DBA/IT professionals.

To account for cost variations, Forrester adjusted this cost upward by 15%, yielding a three-year risk-adjusted total PV of \$107,640.



Six months
Total implementation
and migration time

Implementation risk is the risk that a proposed investment may deviate from the original or expected requirements, resulting in higher costs than anticipated. The greater the uncertainty, the wider the potential range of outcomes for cost estimates.

Implementation And Data Migration Cost: Calculation Table

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
H1	Number of DBA/IT staff		3			
H2	Hourly rate per person		\$48			
H3	Hours	25 hrs/week*26 weeks	650			
Ht	Implementation and data migration cost	H1*H2*H3	\$93,600	\$0	\$0	\$0
	Risk adjustment	↑15%				
Htr	Implementation and data migration cost (risk-adjusted)		\$107,640	\$0	\$0	\$0

Professional Fees

As a part of their implementation effort, the organization worked with Snowflake support and architecture. Additionally, they engaged a consultant who helped with optimizing their architecture for the cloud.

Forrester assumes that the composite organization hires a consultant for 50 hours, paying this consultant \$250 per hour.

Cost of professional services fees could differ based on:

- › Experience and expertise of the current IT/DBA staff with cloud data architecture.
- › Complexity of the migration from the legacy system to Snowflake.
- › Need for updates to the legacy scripts.

To account for these risks, Forrester adjusted this cost upward by 10%,



One consultant
spends 50 hours to
optimize the organization's
architecture for the cloud.

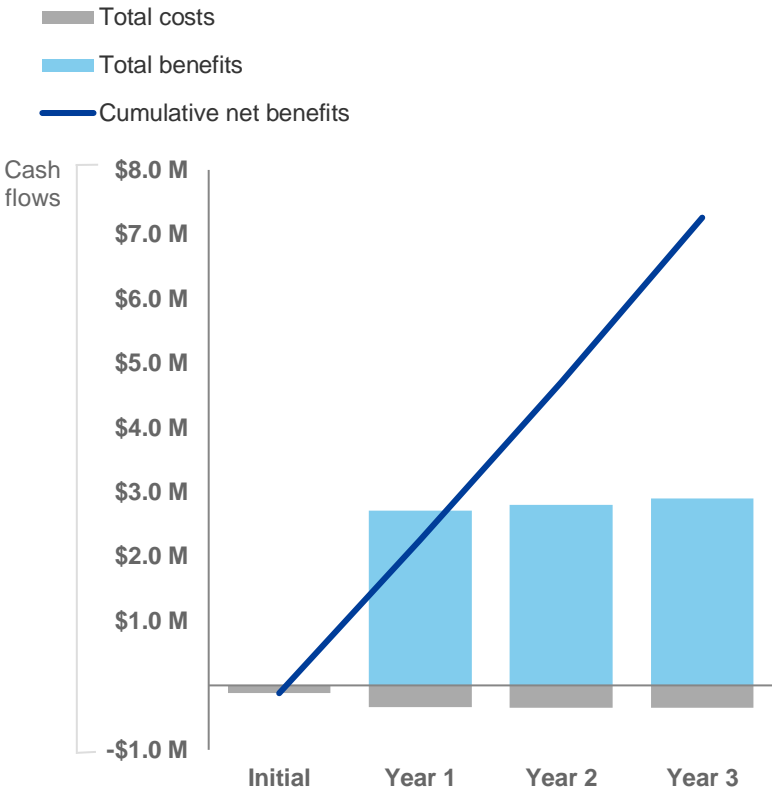
yielding a three-year risk-adjusted total PV of \$13,750.

Professional fees: Calculation Table						
REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
I1	Number of consultants		1			
I2	Hourly rate per person		\$250			
I3	Hours		50			
I4	Professional fees	$I1 \times I2 \times I3$	\$12,500	\$0	\$0	\$0
	Risk adjustment	↑10%				
I4r	Professional fees (risk-adjusted)		\$13,750	\$0	\$0	\$0

Financial Summary

CONSOLIDATED THREE-YEAR RISK-ADJUSTED METRICS

Cash Flow Chart (Risk-Adjusted)



The financial results calculated in the Benefits and Costs sections can be used to determine the ROI, NPV, and payback period for the composite organization's investment. Forrester assumes a yearly discount rate of 10% for this analysis.



These risk-adjusted ROI, NPV, and payback period values are determined by applying risk-adjustment factors to the unadjusted results in each Benefit and Cost section.

Cash Flow Table (Risk-Adjusted)

	INITIAL	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Total costs	(\$121,390)	(\$332,918)	(\$349,545)	(\$367,037)	(\$1,170,891)	(\$988,684)
Total benefits	\$0	\$2,713,889	\$2,802,691	\$2,896,073	\$8,412,653	\$6,959,309
Net benefits	(\$121,390)	\$2,380,970	\$2,453,146	\$2,529,035	\$7,241,762	\$5,970,625
ROI						604%
Payback period						<3 months

Snowflake Data Warehouse-As-A-Service: Overview

The following information is provided by Snowflake. Forrester has not validated any claims and does not endorse Snowflake or its offerings.

Snowflake is the only data warehouse built for the cloud. Snowflake delivers the performance, concurrency, and simplicity needed to store and analyze all data available to an organization in one location. Snowflake's technology combines the power of data warehousing, the flexibility of big-data platforms, the elasticity of the cloud, and live data sharing at a fraction of the cost of traditional solutions.

More information is available at snowflake.net.

Appendix A: Total Economic Impact

Total Economic Impact is a methodology developed by Forrester Research that enhances a company's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

Total Economic Impact Approach



Benefits represent the value delivered to the business by the product. The TEI methodology places equal weight on the measure of benefits and the measure of costs, allowing for a full examination of the effect of the technology on the entire organization.



Costs consider all expenses necessary to deliver the proposed value, or benefits, of the product. The cost category within TEI captures incremental costs over the existing environment for ongoing costs associated with the solution.



Flexibility represents the strategic value that can be obtained for some future additional investment building on top of the initial investment already made. Having the ability to capture that benefit has a PV that can be estimated.



Risks measure the uncertainty of benefit and cost estimates given: 1) the likelihood that estimates will meet original projections and 2) the likelihood that estimates will be tracked over time. TEI risk factors are based on "triangular distribution."

The initial investment column contains costs incurred at "time 0" or at the beginning of Year 1 that are not discounted. All other cash flows are discounted using the discount rate at the end of the year. PV calculations are calculated for each total cost and benefit estimate. NPV calculations in the summary tables are the sum of the initial investment and the discounted cash flows in each year. Sums and present value calculations of the Total Benefits, Total Costs, and Cash Flow tables may not exactly add up, as some rounding may occur.



Present value (PV)

The present or current value of (discounted) cost and benefit estimates given at an interest rate (the discount rate). The PV of costs and benefits feed into the total NPV of cash flows.



Net present value (NPV)

The present or current value of (discounted) future net cash flows given an interest rate (the discount rate). A positive project NPV normally indicates that the investment should be made, unless other projects have higher NPVs.



Return on investment (ROI)

A project's expected return in percentage terms. ROI is calculated by dividing net benefits (benefits less costs) by costs.



Discount rate

The interest rate used in cash flow analysis to take into account the time value of money. Organizations typically use discount rates between 8% and 16%.



Payback period

The breakeven point for an investment. This is the point in time at which net benefits (benefits minus costs) equal initial investment or cost.