

Open Your Analytics Architecture To Keep Up With The Speed Of Business

Why Organizations Need Multiple
Analytical Engines To Uncover
Actionable Insights From Big Data

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Executive Summary

Enterprises face higher volumes and a greater variety of data than ever before — presenting both a challenge and opportunity for big data analytics to provide actionable insights back to the business that can drive key business imperatives. And as these enterprises are faced with many purpose-designed data and analytics technologies, including a plethora of both commercial and open source technology, they must decide which analytics approach to pursue to generate the greatest amount of meaningful insights to power the business and generate financial return.

In March 2016, Hewlett Packard Enterprise (HPE) commissioned Forrester Consulting to examine the full diversity of analytical engines and workloads currently used by enterprise data analytics professionals. To explore this trend, Forrester tested the hypothesis that there is no single silver-bullet analytical engine that will efficiently serve the diversity of analytical workloads needed to provide a full range of business insights. Therefore, organizations will find the greatest amount of success-generating insights by implementing an open analytics architecture that will seamlessly leverage a diverse set of analytical engines.

In surveying 301 data analytics professionals in North America, EMEA, and Asia Pacific, Forrester found that enterprises are adopting Hadoop to augment — not replace — existing and additional analytical engines such as data warehouses. However, these same enterprises struggle to unify data management, data governance, queries, and analytics that can leverage the totality of a diverse set of analytical engines.

KEY FINDINGS

Forrester's study yielded three key findings:

- › **Organizations currently use multiple analytical engines.** Data analytics professionals in this study reported using more than just one tool — they are interested in nearly all of them and have currently implemented an average of three.
- › **No analytical engine dominates any other — all are effective in delivering value back to the business.** Many professionals are familiar with the effectiveness Hadoop offers in executing various analytics workloads, but Hadoop does not strongly dominate any other analytical engine. Indeed, all analytical engines have their

strengths, and they all deliver benefits back to the business.

- › **The more analytical engines that organizations employ, the greater their ROI.** Analytical engines deliver greater ROI when they are deployed with others — organizations deploying six to nine different types of engines see ROIs ranging from 61% to 82%, while those only using one see ROIs ranging from 0% to 45%.

Data Insights Are A Strategic Necessity

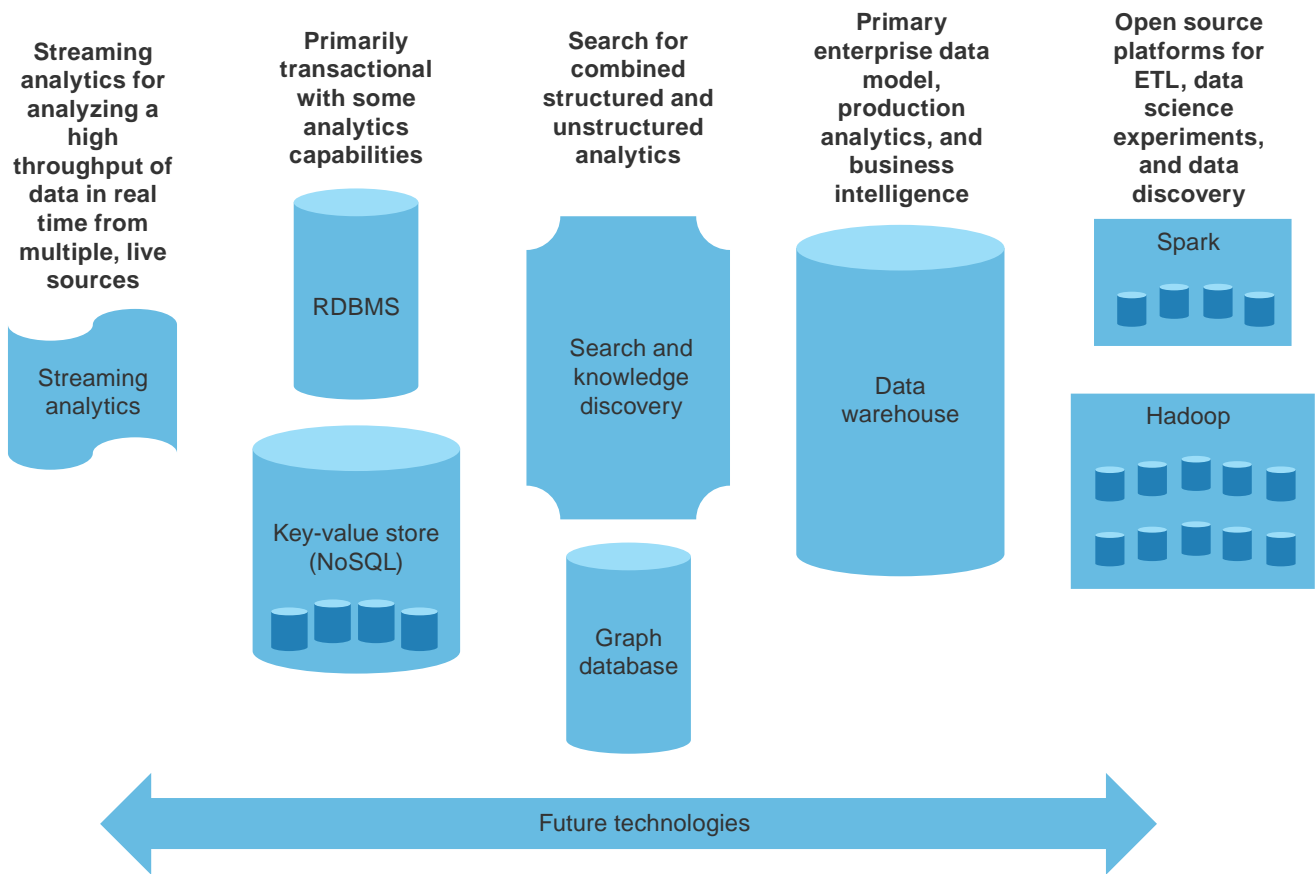
Big data is the fuel. Analytics is the engine. Insights are strategic. Enterprises understand this, and that’s why they seek technology solutions to derive crucial business insights from a swelling sea of data.

The analytical engine landscape can be a source for confusion. Despite the unique strengths analytical engines possess, their capabilities and strengths can overlap (see Figure 1). For example, Hadoop and Spark are general-purpose batch processing platforms, and data warehouses are high-concurrency, performant SQL engines. Most enterprises can benefit from having both as part of their

analytical infrastructure. And as new technologies and analytics processes come along, they augment and improve some capabilities while not completely addressing others.

Indeed, this custom study of 301 data analytics professionals in North America, EMEA, and Asia Pacific indicates that organizations across the globe adopt a diverse array of analytical engines — commercial and open source, purpose-designed data and analytics technologies capable of running workloads — in an effort to turn data into insights. Those insights are solid gold to enterprises that use them to take actions to create new, more individualized customer experiences, streamline operations, and outmaneuver traditional and startup competitors.

FIGURE 1
Each Analytical Engine Has A Sweet Spot, But Capabilities Often Overlap



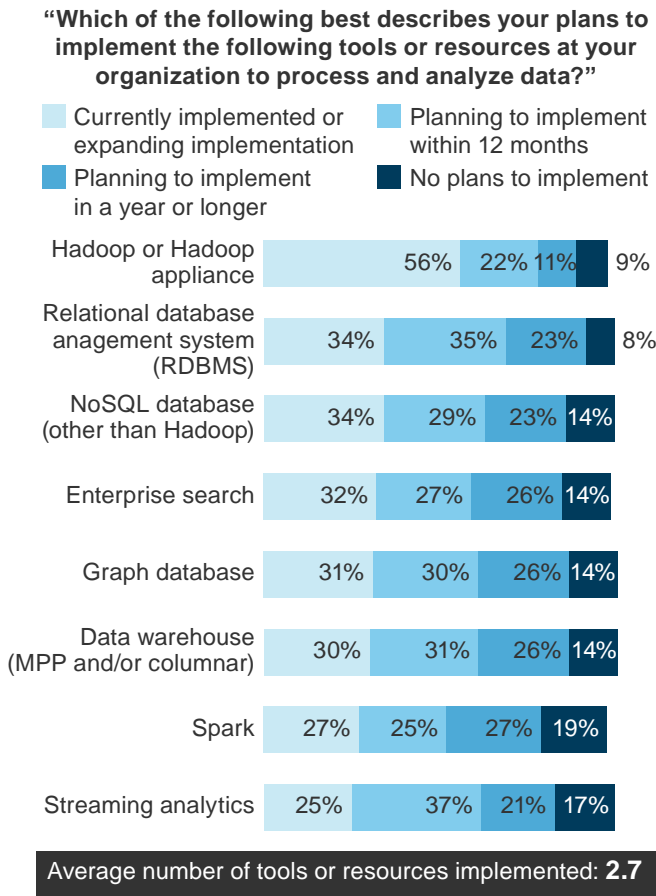
Source: Forrester Research, Inc.

Results indicate that:

- › **Organizations use multiple analytical engines.** Data analytics professionals do not rely on a single solution for all of their needs — they use an average of three engines (see Figure 2).
- › **A majority plan to adopt at least one of every type of analytical engine.** Data analytics professionals are also interested in implementing other engines. Thirty-three percent to 58% stated they are planning to adopt each engine that they don't already have (see Figure 2).

In addition to deploying a number of different analytical engines, data analytics professionals employ many different analytics workloads to gain insights. Taking the same

FIGURE 2
Adoption Of Analytical Engines Is Widespread

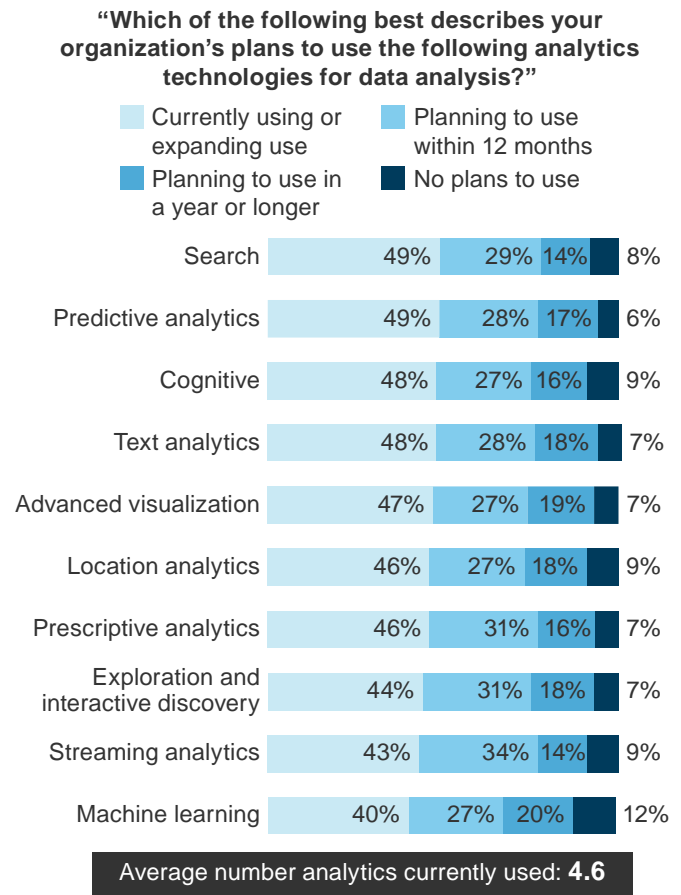


Base: 301 data analytics professionals at enterprises with 100 or more employees in North America, EMEA, and Asia Pacific (“don't know/NA” responses not shown)
Source: A commissioned study conducted by Forrester Consulting on behalf of HPE, May 2016

approach as they do with the analytical engines that run these workloads, professionals:

- › **Widely use different types of analytics workloads.** Forty percent to 49% of data analytics professionals currently use any one of a number of advanced workloads — such as text analysis, predictive analytics, and machine learning —and employ an average of five (see Figure 3).
- › **Plan to use many more.** Mirroring the pattern with analytical engines, professionals intend to use more workloads than they do currently (see Figure 3).

FIGURE 3
Professionals Employ Multiple Analytics Workloads



Base: 301 data analytics professionals at enterprises with 100 or more employees in North America, EMEA, and Asia Pacific (“don't know/NA” responses not shown)
Source: A commissioned study conducted by Forrester Consulting on behalf of HPE, May 2016

- › **Use analytics to derive insights.** These analytics workloads are actively used to generate real-time decision-making, provide operational insights, measure business performance, and/or inform strategic business decisions (see Figure 4).

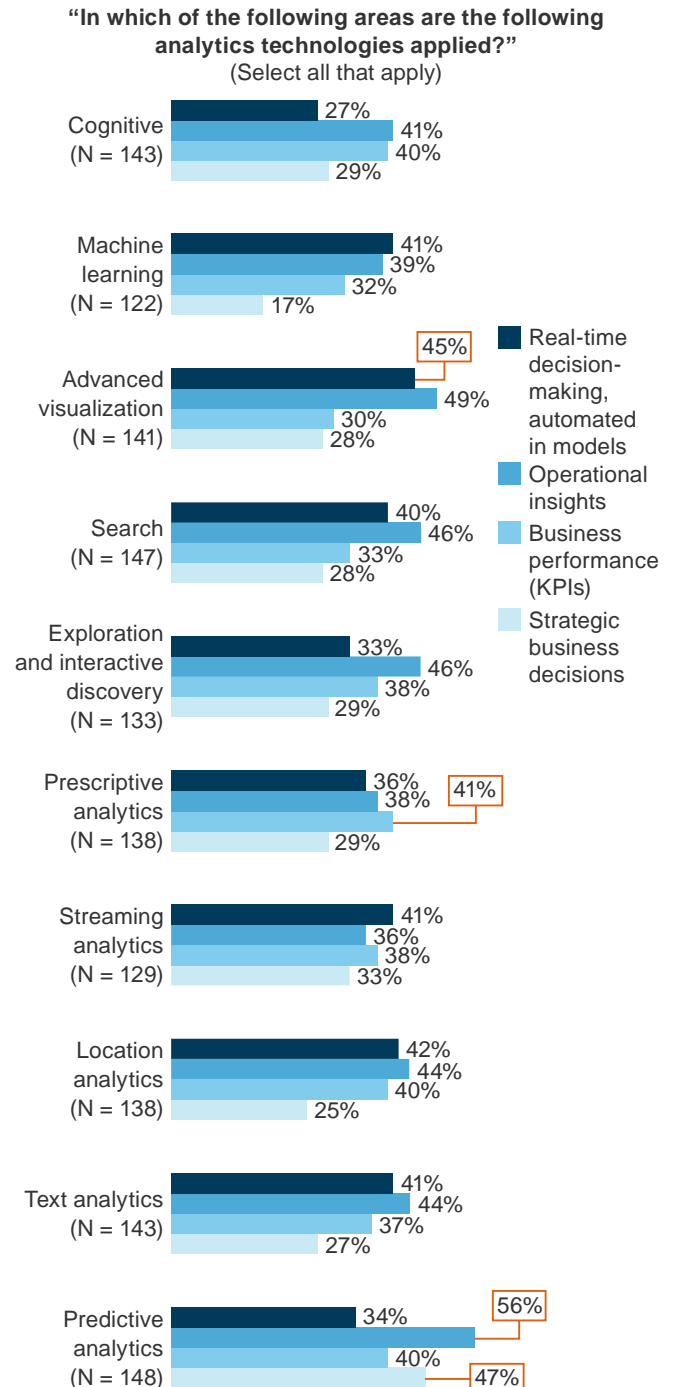
Multiple Analytical Workloads Demand Multiple Analytical Engines

Data analytics professionals realize that multiple analytical engines are needed to effectively handle multiple analytical workloads to develop much needed business insight. There is no analytical “silver bullet” and that is unlikely to change, as the types of data and analytics get more sophisticated. Indeed, every analytical engine has its strengths, and they all have the capability of delivering value in the form of insights back to the business.

Results from this study confirm:

- › **Multiple engines in addition to Hadoop are effective.** Although many professionals using each workload feel that Hadoop is the most effective engine (see Figure 5), other engines follow closely. For example, the 17% who feel Spark is the most effective engine for search closely follows the 19% who feel Hadoop is the most effective. Likewise, the 20% who feel NoSQL is the most effective engine for predictive analytics closely follows the 23% who prefer Hadoop.
- › **Different workloads align to different engines.** Indeed, the current configurations that data analytics professionals employ indicate there is no single analytical engine that works best for each workload — those using each engine use an average of about two workloads each. For example, Spark users are more likely to run search, predictive analytics, and location analytics, while graph database users are more likely to run prescriptive analytics (see Figure 6).

FIGURE 4
Analytics Workloads Drive Business Insights And Decisions



Base: Data analytics professionals at enterprises with 100 or more employees in North America, EMEA, and Asia Pacific using each analytics workload

Source: A commissioned study conducted by Forrester Consulting on behalf of HPE, May 2016

FIGURE 5

Many Professionals Prefer Hadoop To Run Workloads, But Other Engines Follow Closely

“Of the following tools and resources that your organization uses, which one is the *most effective* for each of the following types of analytics?”
(Select one)

	RDBMS	Data warehouse	Hadoop	Hadoop appliance	Spark	NoSQL database	Graph database
Search (N = 147)	12%	11%	19%	13%	17%	14%	13%
Advanced visualization (N = 141)	10%	8%	23%	14%	14%	15%	16%
Predictive analytics (N = 148)	13%	11%	23%	11%	13%	20%	10%
Text analytics (N = 143)	10%	10%	26%	14%	13%	14%	12%
Streaming analytics (N = 129)	11%	9%	26%	12%	12%	13%	17%
Prescriptive analytics (N = 138)	12%	12%	26%	10%	15%	12%	14%
Machine learning (N = 122)	9%	10%	27%	14%	14%	14%	12%
Location analytics (N = 138)	14%	8%	28%	10%	15%	13%	12%
Exploration and interactive discovery (N = 133)	9%	10%	30%	16%	13%	9%	13%
Cognitive (N = 143)	13%	8%	31%	10%	10%	15%	13%

Base: Data analytics professionals at enterprises with 100 or more employees in North America, EMEA, and Asia Pacific using each analytics workload

Source: A commissioned study conducted by Forrester Consulting on behalf of HPE, May 2016

FIGURE 6

Data Analytics Professionals Use Many Workloads With Different Engines

“Which analytics technologies do you use with each of the following tools and resources at your organization?”
(Select all that apply)

	RDBMS (N = 87)	Data warehouse (N = 77)	Hadoop (N = 141)	Spark (N = 79)	NoSQL (N = 88)	Graph database (N = 89)
Predictive analytics	25%	19%	21%	28%	24%	17%
Text analytics	21%	22%	21%	19%	14%	21%
Location analytics	25%	26%	18%	27%	17%	18%
Streaming analytics	16%	19%	17%	16%	19%	12%
Prescriptive analytics	9%	25%	17%	16%	22%	25%
Exploration and interactive discovery	11%	18%	21%	16%	20%	20%
Search	18%	23%	15%	28%	24%	21%
Average # of analytics workloads per tool	1.5	1.7	1.9	2.1	1.7	1.9

■ Top three workloads per tool

Base: Data analytics professionals at enterprises with 100 or more employees in North America, EMEA, and Asia Pacific using each analytics engine

Source: A commissioned study conducted by Forrester Consulting on behalf of HPE, May 2016

ALL ANALYTICAL ENGINES DELIVER VALUE BACK TO THE BUSINESS

The results of this study find that one analytical engine is not objectively better than another — all of them have strengths relative to others, and they all provide value back to the business in the form of benefits and insights gained.

Responses from data analytics professionals indicate that each analytical engine:

- › **Has unique strengths.** Data analytics professionals acknowledge the strengths that every analytical engine possesses. Fifty percent of those who have implemented RDBMS, for example, feel it provides more data availability, and 50% of NoSQL users recognize its lower cost (see Figure 7).
- › **Delivers business value.** Likewise, those citing the benefits they have realized through the use of their analytical engines did not differ significantly from engine to engine. However, data analytics professionals stated that data warehouses and NoSQL help them make better informed business decisions, more than any other engine. These professionals also indicated that RDBMS is the best tool for improving business planning (see Figure 8).

Reap The Best From Multiple Analytical Technologies

Blending the best benefits of every analytical engine and workload requires developing an analytical architecture that is technology-agnostic and open. This will allow data analytics professionals to take advantage of new technologies and leverage powerful existing technologies.

Data analytics professionals in this study who have already witnessed the benefits of the different technologies are gravitating toward this type of architecture. This study finds that:

- › **Analytics pros know they need more.** Conversations with data analytics professionals in this study illuminate that while individual tools and workloads are generating valuable insights, no solution can capture everything necessary to remain competitive. Indeed, no single solution can yet create a single view of everything under the organization's umbrella. As a director for a US-based retailer said, "Each [analytics] tool delivers great insights, but no one tool is able to connect all of the dots." A VP at a US consumer products manufacturer indicates where the trends are heading, as she said: "Analytics are very important. We aim to develop a fit-for-purpose type of architecture in order to be better prepared for future opportunities."

FIGURE 7

Each Analytics Engine Has Unique Strengths

"Which of the following statements best describe the strengths of each of the following tools and resources your organization uses to process and analyze data?"
(Select all that apply)

	RDBMS (N = 103)	Data warehouse (N = 90)	Hadoop (N = 145)	Spark (N = 80)	NoSQL (N = 100)	Graph database (N = 93)
Low cost	38%	39%	31%	36%	50%	31%
Quick turnaround on customer requests	43%	34%	37%	39%	45%	30%
Expanded access to more business users	32%	42%	30%	42%	45%	29%
Fast performance	47%	36%	41%	30%	41%	40%
Insights that we couldn't previously obtain from the data	40%	37%	32%	32%	33%	24%
More data availability	50%	43%	39%	38%	46%	29%
Excellent security	41%	37%	43%	38%	46%	32%

Base: Data analytics professionals at enterprises with 100 or more employees in North America, EMEA, and Asia Pacific using each analytics engine

Source: A commissioned study conducted by Forrester Consulting on behalf of HPE, May 2016

FIGURE 8

All Analytics Engines Deliver Business Benefits

“Which of the following statements best describe the strengths of each of the following tools and resources your organization uses to process and analyze data?”

(Select all that apply)

	RDBMS (N = 103)	Data warehouse (N = 90)	Hadoop (N = 145)	Spark (N = 80)	NoSQL (N = 100)	Graph database (N = 93)
Increased revenue	37%	31%	32%	28%	29%	28%
Improved cross-sell and upsell opportunities	35%	29%	27%	32%	31%	26%
Faster time-to-market with products	40%	33%	31%	24%	43%	31%
Increased operational cost efficiency	35%	33%	32%	34%	38%	26%
Improved customer experience	34%	38%	34%	39%	40%	28%
Improved business planning	43%	36%	24%	36%	36%	28%
Increased competitive advantage	37%	34%	28%	31%	29%	26%
Better informed business decisions	37%	40%	24%	32%	40%	25%
Ability to create an entirely new business model	33%	31%	32%	30%	33%	35%
Ability to create an entirely new customer experience	33%	36%	30%	32%	36%	31%

Base: Data analytics professionals at enterprises with 100 or more employees in North America, EMEA, and Asia Pacific using each analytics engine

Source: A commissioned study conducted by Forrester Consulting on behalf of HPE, May 2016

“Each [analytics] tool delivers great insights, but no one tool is able to connect all of the dots.”

— Director at a US-based retailer

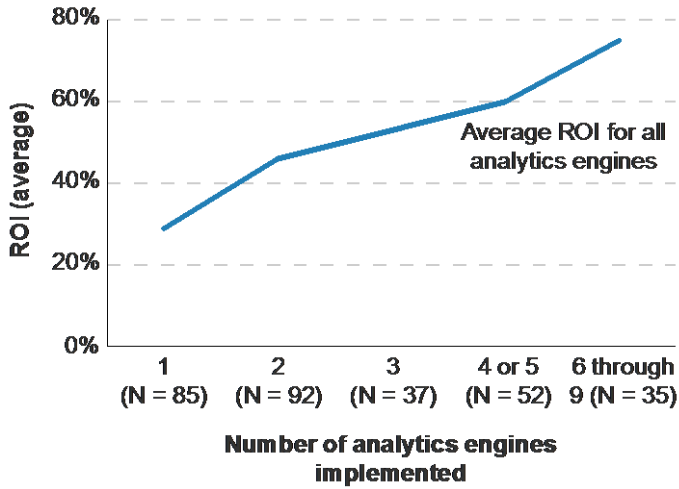
- › **Multiple engines are worth the investment.** Data analytics professionals who use a greater variety of engines see a greater return on investment. Those using six to nine different engines see an average ROI of 75% per engine, while those only using one see an ROI of 29% (see Figure 9).

ANY ARCHITECTURE MUST ALLOW SELF-SERVICE TO UNLEASH THE FULL POWER OF ANALYTICS

As data analytics professionals build out a single analytical architecture, they must know that organizations that are truly data-driven allow decision-makers throughout the organization to have access to the data necessary to derive data-driven insights. Our survey shows that an average of three departments in any given organization have complete access to the data necessary for decision-making, and an average of six departments are seeking access (see Figure 10). Decision-makers must rectify this discrepancy.

FIGURE 9
Each Analytics Engine Delivers Greater Return On Investment When More Are Implemented

“What is the estimated return on investment (ROI) you have currently seen so far on each of the following tools and resources your organization uses?”



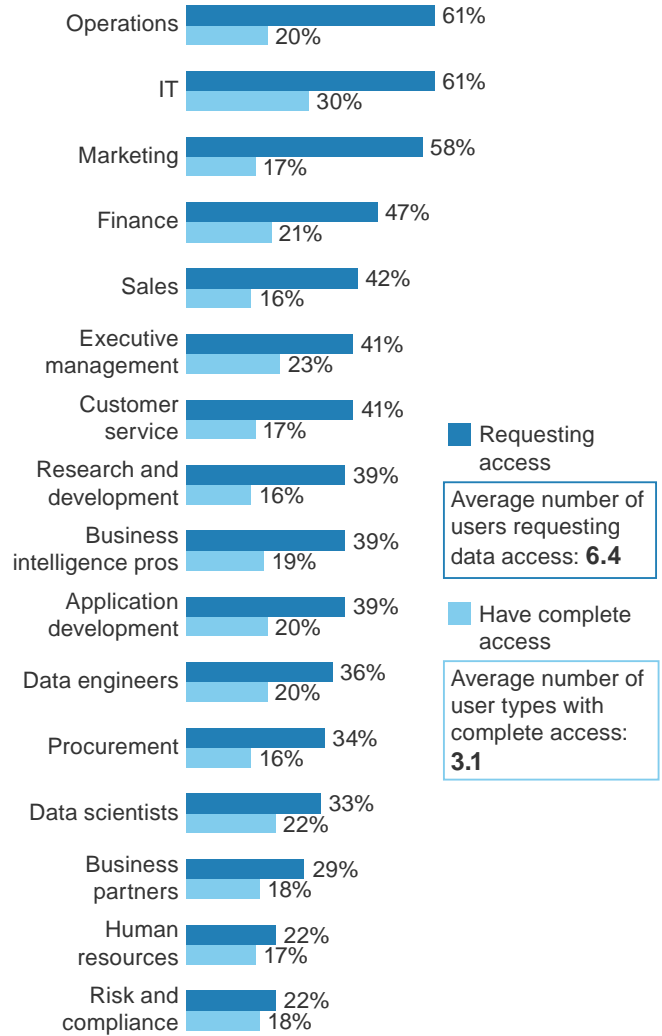
Base: Data analytics professionals at enterprises with 100 or more employees in North America, EMEA, and Asia Pacific using each number of analytics engines

Source: A commissioned study conducted by Forrester Consulting on behalf of HPE, May 2016

FIGURE 10
Organizations Must Address The Gap Between Those With Access And Those Requesting Access To Data Necessary For Making Business Decisions

“Which of the following users at your organization have requested access to data and analytics in order to make decisions?”

“What level of access to data and analytics does each of the following users currently have at your organization in order to make decisions?”



Base: 301 data analytics professionals at enterprises with 100 or more employees in North America, EMEA, and Asia Pacific

Source: A commissioned study conducted by Forrester Consulting on behalf of HPE, May 2016

Key Recommendations

The best analytics hasn't been invented yet and will surely require new, specialized analytical engines. Machine learning, natural language processing, deep learning, and augmented intelligence are not on the horizon — they are here now. Also, new analytics will increasingly have to be performed in real time. This will require new technology to be added to existing engines and the adoption of entirely new engines. Enterprise analytics organizations mustn't commit to one analytical engine. Rather, they must, and some already have, plan for multiple analytical engines by beginning to:

- › **Implement a common data ingestion, data management, and data security process for all engines.** One thing that all analytical engines have in common is that they need data. Enterprises have dozens, hundreds, and even thousands of applications that all generate data. Many new analytical engines such as Hadoop have an ecosystem of Hadoop-centric data management tools surfacing the market. The problem is that they are Hadoop-centric. Enterprises should implement data management, governance, and security solutions that will work across diverse analytical engines including data warehouses, Hadoop, graph databases, and others.
- › **Unify data access and query across all engines.** Query data is a fundamental requirement of all analytical engines, and SQL is still the lingua franca for data access. Enterprises should favor SQL technology that queries across the widest and most used types of analytical engines. Many data warehouses have adapted their SQL technology to federate queries between data warehouses, Hadoop, Spark, and databases.
- › **Experiment quickly.** The rate at which new analytics technology emerges either from open source or commercial can be paralyzing. Don't freeze or avoid requests from data analysts and data scientists to implement new technology. Be prepared to quickly set up a proof-of-concept (POC) environment to let your business intelligence professionals experiment with real data. Search first for cloud solutions because that is often the quickest and cheapest way to get started fast. But don't compromise on data security and data management — apply the same process for data ingestion, management, and security when possible. And never compromise on data security.
- › **Add new analytical engines before your competitors do.** Bring new analytical engines online quickly because the insights gained could be game-changing. Mark Andreessen famously said, "Software is eating the world." We beg to differ. What is software without data and insights? Nothing.

Appendix A: Methodology

In this study, Forrester conducted an online survey of 301 data analytics professionals in organizations of 100 or more employees in the US, Canada, the UK, France, Germany, China, India, and Japan. These individuals were managers or higher with decision-making authority over tools or resources that process and analyze data. Questions provided to the participants asked about their use of these analytics tools, their strengths and weaknesses, and what benefits they have gained. Forrester also conducted two in-depth phone interviews with the same audience. The study began in April 2016 and was completed in May 2016.