

Create A Road Map For A Real-Time, Agile, Self-Service Data Platform

Road Map: The Data Management Playbook

by Michele Goetz and Noel Yuhanna

December 16, 2015

Why Read This Report

Data bottlenecks create business bottlenecks. The days of provisioning data to simply meet the requirements of systems of record are over. Business stakeholders at the executive and line-of-business levels need data faster to keep up with customers, competitors, and partners. Information from the past won't support the insights of the future — businesses need real-time data. This report shows enterprise architects how they can use data to transform their organization from turtle to hare and keep pace with the speed of business.

This is an update to a previously published report; Forrester reviews and revises it periodically for continued relevance and accuracy.

Key Takeaways

Take The Long View To Identify Bottlenecks That Slow Down Data

Data management road maps need to extend beyond systems of record and address bottlenecks up to the edge of data consumption. Don't ignore manual data preparation or additional workarounds created in business intelligence and process applications -- fix them.

Invest In The Building Blocks To Speed Data

Enterprise architects must revise their data architecture to meet the demand for fast data. In-memory data grids, data virtualization, and NoSQL data sources are must-have technologies to effect the transition from data museums to a world of contextual data services.

Plan Road Map And Development Process On Value

Adoption of Agile development and DevOps will align development with business outcomes and deliver capabilities faster. This ensures that data technology has a business purpose at the point of release rather than using it to search for a problem. Optimize development resources toward business solutions, not just technology solutions.

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December 16, 2015

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Forrester has based this research on more than 300 data management client inquiries and vendor briefings over the past year.

Related Research Documents

[Design Tomorrow's Data Management For Agility In Context](#)

[Fix The Data Problems That Destroy Your Customer Effectiveness](#)

[Stretch Your Data Management Capabilities](#)

Create A Road Map For A Real-Time, Agile, Self-Service Data Platform

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Journey Toward A Real-Time, Self-Service Data Platform

Sixty-one percent of data and analytics decision-makers that Forrester surveyed indicated that it takes months to years for technology management to implement and support new business intelligence (BI) and advanced analytics technologies, and 43% say this is true even for creating simple BI content from existing data.¹ That isn't good enough to compete, let alone stay relevant to customers; lack of insight leads to business blindness. Enterprise architects need to change their approach to road map creation. Road maps must cover the entire data supply chain, from back-office data management to front-office data consumption. Business partners depend on access to diverse, complex data to make decisions. But the limits of your data systems might be constraining your capabilities to provide that access. Watch for key indicators where dams are holding back data and insights:

- › **It takes too long to measure business performance.** Data warehouse (DW) environments were built for a limited set of uses, including providing answers to known questions. While DWs have performed these tasks well, the process doesn't scale well when you introduce ambiguity or add questions. Enterprise data hubs need to accommodate more data and an infinite set of queries.
- › **It takes too long to provide insights for strategic and operational decision-making.** When executives need to determine why something is happening or what the best course of action is, they can't wait for a new data system. Analysts need to be able to aggregate and prepare data sets without tech management's involvement.
- › **It takes too long to get intelligence into business processes and push it to employees.** Insights and intelligence sit with select analysts and managers, but employees need those insights to be more effective and efficient in their jobs. Data systems need to quickly get insights into services and systems that automate processes and guide employee actions.
- › **Unstructured data is untapped, and human analysis can't scale efficiently.** Workers can't easily spot patterns and trends in content such as documents, email, images, audio, and social media. Artificial intelligence and machine learning aid in sifting through these sources so you can incorporate them into your data management and BI strategy.

Create A Four-Phase Road Map That Gets You To Your Destination

A fast data strategy not only supports big data, which Forrester defines as technologies and techniques to close the gap between the available data and the ability to turn that data into business insight.² It also supports systems of engagement that quickly access diverse data, and it lowers data management costs by eliminating extraneous hardware and software licenses. Enterprise architects can realize a real-time self-service platform through four stages of technology capability development. Your job isn't complete when you've optimized system processes and delivery performance. Instead, you must also measure the value of your investments by how well they improve the efficiency and effectiveness of business technologists, business stakeholders, and customers. Create a four-stage road map as follows (see Figure 1):

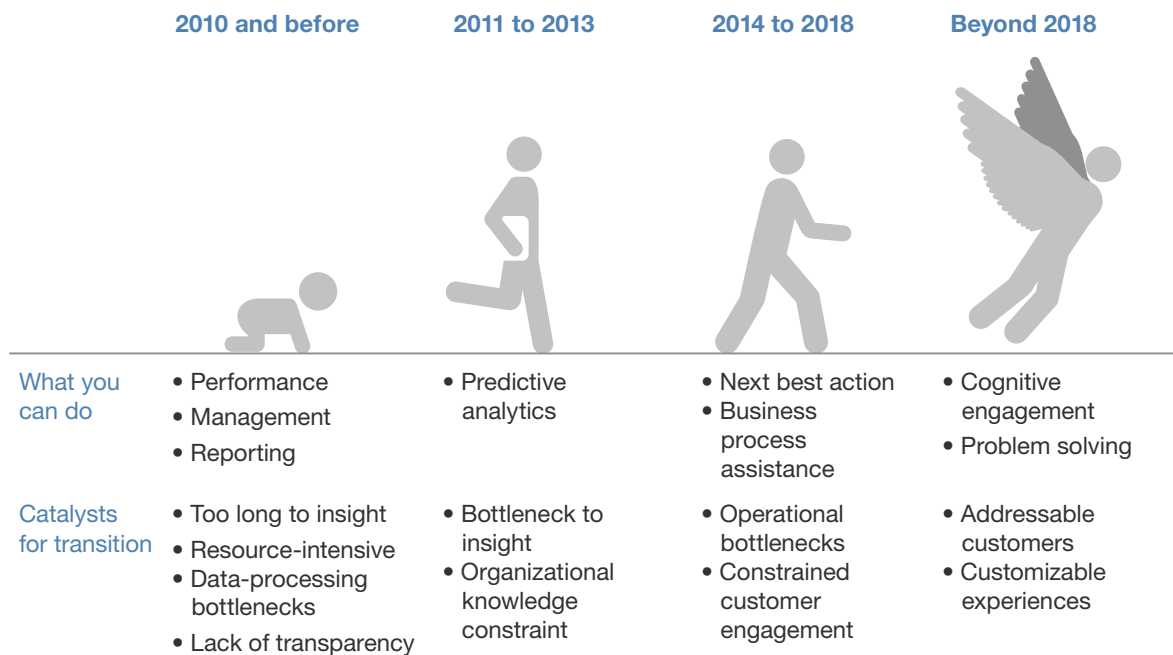
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- › **Phase 1: Remove insight bottlenecks.** Migrate away from slow-moving batch and semibatch data loading and processing for BI and analytics. The information fabric — a reference architecture for data virtualization and caching to in-memory databases and data platforms — speeds data delivery and ensures the freshest trusted data set. Semantic data models, data quality, and data security processes become service-oriented. This minimizes complexity and hides heterogeneity by embodying a coherent data model that reflects business requirements rather than the details of underlying systems and sources.³ Finally, Hadoop makes all data accessible by ingesting and provisioning big data.⁴
- › **Phase 2: Remove operational bottlenecks to scale linearly.** Transition from near-real time to an on-demand data management platform in operational environments such as enterprise resource planning, customer relationship management, mobile, and the Web. Tie streaming and embedded analytics to data management services, and link data with analytic validation to certify in-flight insights that affect areas such as next best actions for call center case management and automated personalization of eCommerce experiences. Map business processes to data processes to identify access, delivery, quality, and security gaps in data that inhibit decision points and handoffs.⁵
- › **Phase 3: Enable the data management platform for on-demand self-service.** Adjust data governance and data management policies to coincide with degrees of trust. Allow unfettered access to data with self-service tools and application programming interfaces in lower-risk consumption areas such as data science workbenches. Push production-ready data governance business rules and processes to higher-risk customer intelligence and application development environments in consumable formats to shrink development time for self-service BI applications and business or customer engagement applications.⁶
- › **Phase 4: Link all investments for a full real-time self-service and scalable platform.** The result of completing the first three phases is a platform that is in the moment, dynamic, agile, consumable, and intelligent. The service-oriented foundation, combined with in-memory, scales for immediate and future data demands. The business will obtain more value faster with each implementation (see Figure 2).

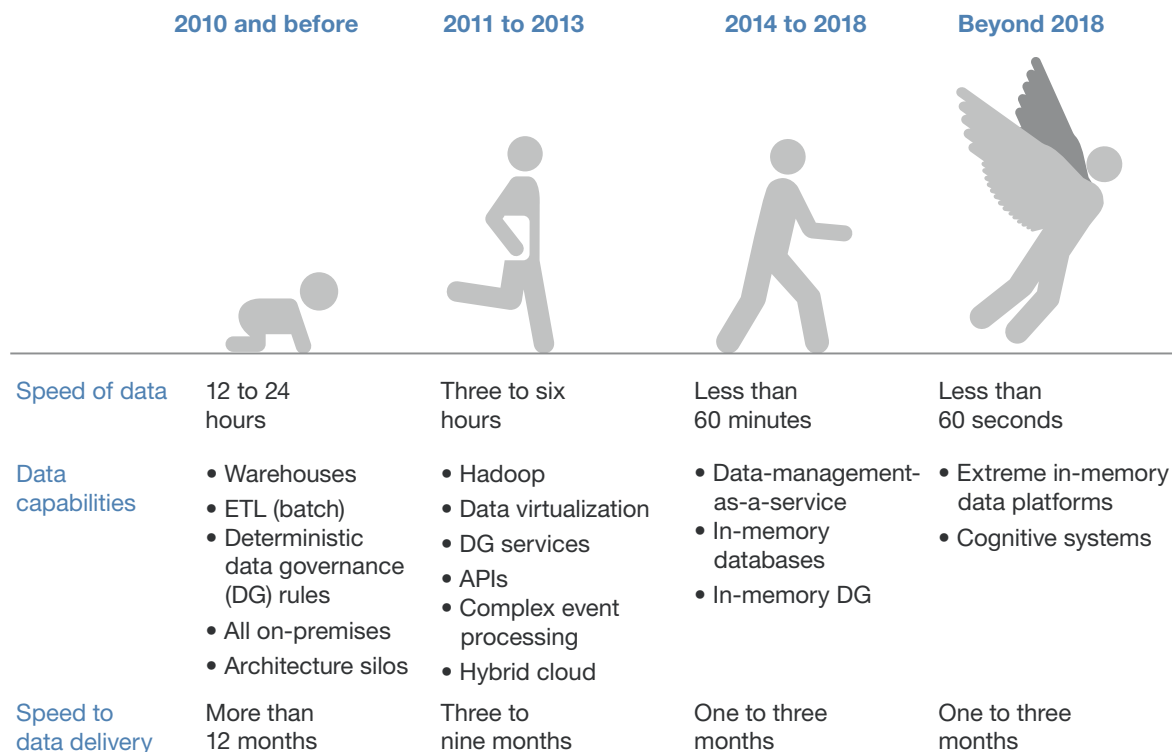
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FIGURE 1 Recognize Data Bottlenecks As Catalysts For Transition

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FIGURE 2 Mature Your Data Platform For Real-Time Business

Adopt The Building Blocks Of A Real-Time Data Platform

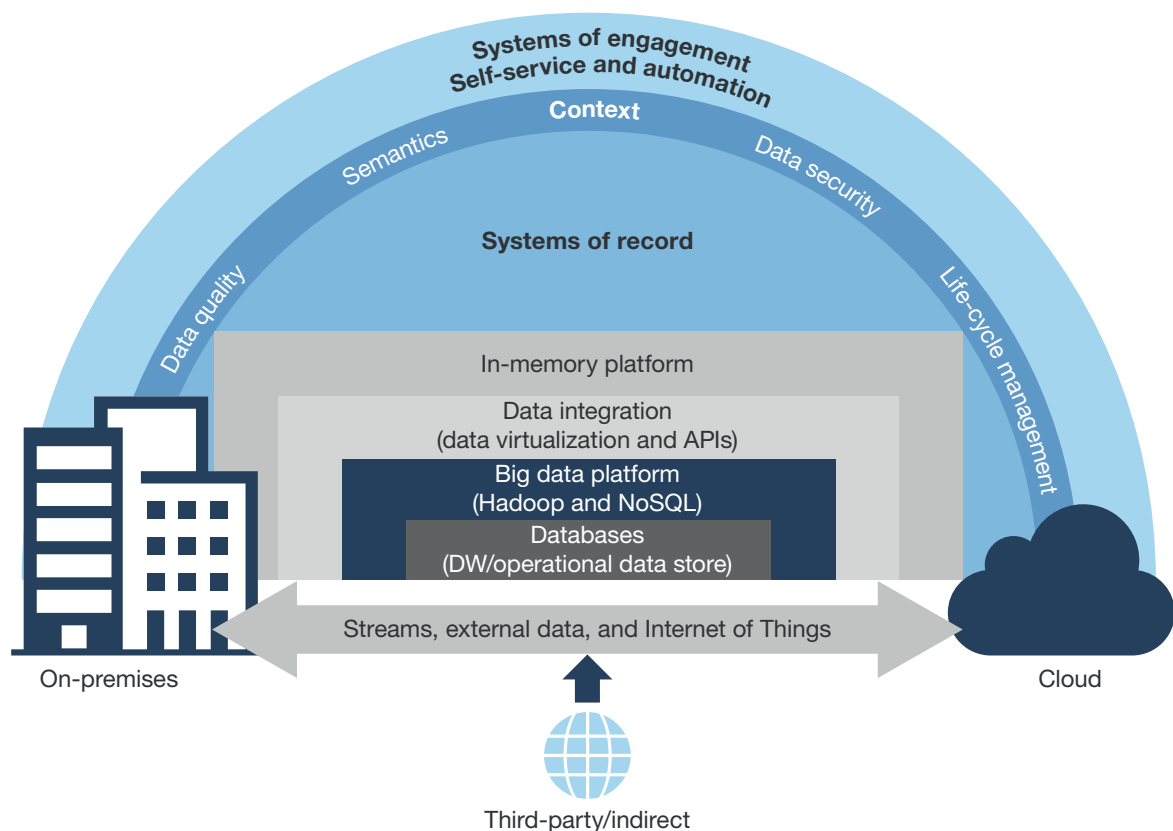
A real-time data platform is designed to anticipate change; new technologies underpin the architecture to enable the agile development of dynamically changing data requirements. Your next-generation data management platform needs (see Figure 3):

- › **An in-memory data platform to deliver data at the speed of thought.** Firms need in-memory data to support the new generation of business applications; it's critical to enabling real-time data access, processing big data quickly, offering new customer experiences, and serving customers in all of their mobile moments.⁷ Data stored in-memory can be accessed orders of magnitude faster than that stored on traditional disks. Top vendors that support in-memory technologies for customer data management platforms include GigaSpaces, IBM, Oracle, SAP, SAS, Software AG, and VMware.
- › **Data virtualization to enable real-time integration of disparate sources.** Data virtualization integrates disparate data sources in real time or near-real time to meet demands for analytics and transactional data.⁸ Data virtualization integrates internal and external data sources such as Hadoop, NoSQL, and enterprise DW platforms; packaged, custom, mainframe, and legacy apps; and social platforms. Leading vendors supporting data virtualization solutions include Cisco, Denodo Technologies, IBM, Informatica, Oracle, and SAP.

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- › **Hadoop to store and process large data sets.** Hadoop, an open source initiative under version 2.0 of the Apache license, delivers a distributed and scalable data processing platform to support big data.⁹ It supports the batch processing of analytics by parallel-processing very large sets of data, which can run into the hundreds of terabytes or even petabytes, using clusters on commodity servers.
- › **The integration of disparate big data sources.** Big data integration delivers a comprehensive, unified view of the business and its customers, employees, and products. Apache projects such as Camel, Flume, Forrest, HCatalog, Pig, and Sqoop help with big data integration based upon open source projects. In addition, traditional data integration vendors such as IBM, Informatica, Pentaho, SAP, SAS, and Talend extend their existing data integration platforms to support big data sources.
- › **A semantic layer to maintain the context and business language of data.** Semantic technologies shape and orchestrate data, continuously remodeling master data and metadata for relevant customer and business views. Graph and triple-store technologies from MarkLogic and Neo Technology (Neo4j) and open source projects such as Apache Giraph and GitHub Titan maintain data relationships. Data profiling tools such as Cambridge Semantics help explore and model data semantically.¹⁰

FIGURE 3 Five Building Blocks Deliver A Real-Time, Self-Service Data Platform

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Adapt Development For Real-Time Self-Service

Enterprise architects must revisit decades-old data management best practice frameworks to support new business initiatives and drive innovation. Dama's DMBOK and enterprise architecture TOGAF for information management provide solid foundations for discrete data management frameworks and business capability maps. But business capabilities can be defined too broadly, and data capabilities are defined by technology. Architects must focus attention on time-to-value, the definition of value itself, and designs for dynamic, interactive ecosystems. The nature of real-time data management platforms makes this possible through fast data access, collaborative capabilities, and data management analytics.

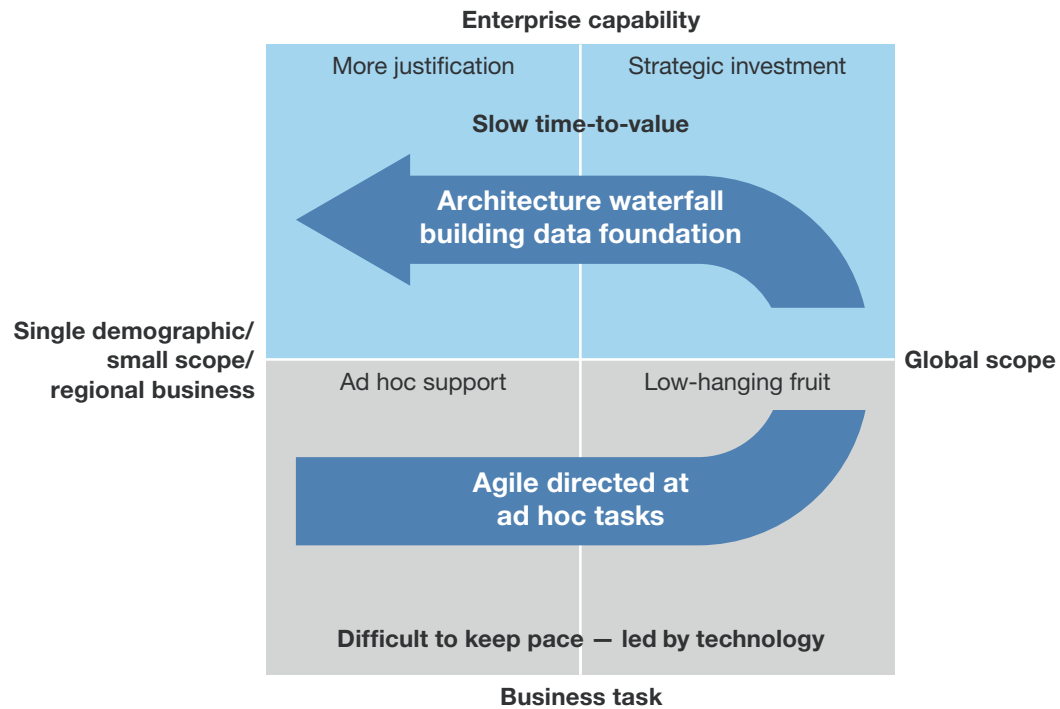
Strike The Right Balance Between Agile Development And Architecture

The Agile development trend has reached data management, but not without stumbles. For example, a leading manufacturer of agricultural equipment transitioned from waterfall development to Agile development for BI. For too long, tech management's response to business data needs was "we'll slot you in." The CIO's organization favored large architectural investments over time-sensitive needs. However, the initial transition to Agile had the effect of pushing off much-needed architectural building blocks and data governance requirements that were a drag on the value delivered. In the end, the tech management team had to adapt Agile development processes to account for both ad hoc and architectural requirements to again lower time-to-value for tactical projects and deliver faster on foundational platform investments.

- › **Avoid "demographic" road maps that are an all-or-nothing proposition.** Typical data management road maps emphasize who does what to which system. When the main goal of the project is the creation of a data platform, resources are overwhelmed and technical debt accrues. The hidden cost of thinking of the new solution as the final road map milestone is that data remains in silos and business insights remain inconsistent (see Figure 4).
- › **Adopt value-based road maps to satisfy immediate and future business gains.** One global airline is taking a different approach to data investment. The head of customer intelligence and optimization established a framework that assessed how the type of analysis influenced the value realized and evaluated the impact of the analytics capabilities' level of complexity on the insights received. The goal: to develop technical data capabilities that deliver more valuable insights faster while reducing the complexity needed for the team to gain those insights. This gives the customer data management team a better idea of how to prioritize investment and development and align operationally and strategically. If the strategy and road map don't meet the customer intelligence and optimization team's expectations, the project is further evaluated or scrapped before it starts (see Figure 5).

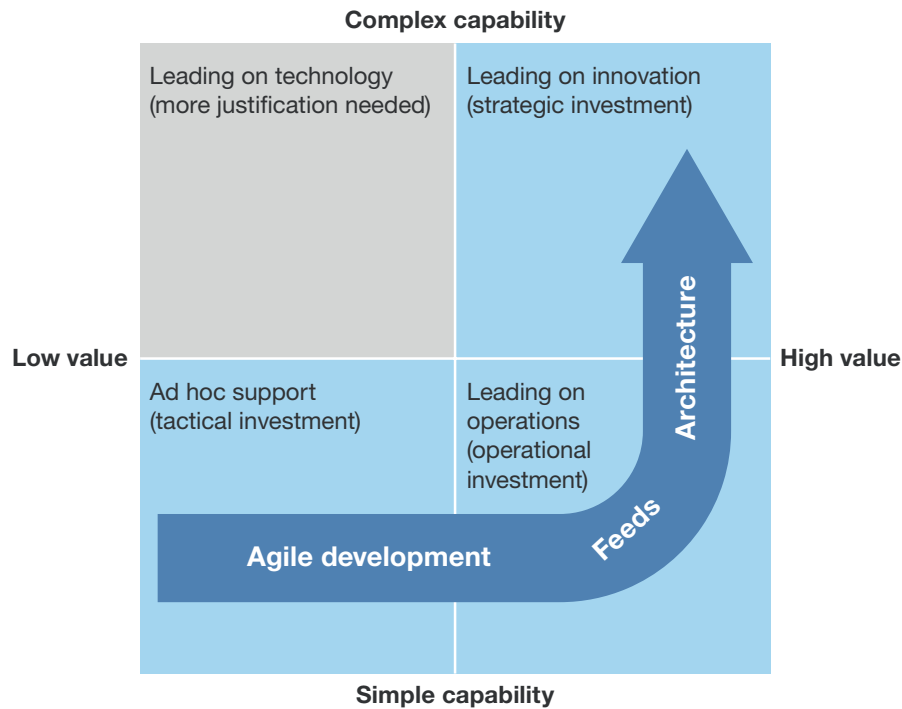
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FIGURE 4 Development Road Maps Tied To Organizational Scale Drive Technology Strategy

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FIGURE 5 Development Road Maps Tied To Value Respond To Business Demand**Recommendations****Be Sure Your Road Map Fulfills Five Design Principles**

Data management frameworks have existed for decades but need to change to enable real-time data, real-time integration, on-demand scale, predictive analytics, and self-service data platforms. To define a data management road map, enterprise architects must:

- › **Understand their business data.** Forrester clients struggle to know what data they have, where it's located, where it came from, how it's managed, what dependencies it has, and how it integrates with other systems. So start by tackling slow-moving data management frameworks to understand their metadata, interfaces, and application requirements and modernize them by moving them with new data management technologies such as in-memory, Hadoop, NoSQL, and data virtualization.
- › **Separate applications from the data management tier.** Applications should focus only on the application logic and user interface, not on data management or data integration functions. Decoupling the two helps move to a real-time data management platform faster and with less effort. Applications should focus on making generic data access calls to retrieve data from the real-time data management platform rather than hard-coding data access to diverse data sets. Consider deploying all new applications with such decoupled architecture.

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- › **Use distributed in-memory technology for performance and scale.** Look at using distributed in-memory to achieve extreme high performance and scale for applications that need real-time data or faster access to critical data. Use memory cache across physical servers to support distributed scale-out. Focus on distributed in-memory that supports all kinds of data — structured, semistructured, and unstructured — and offers a unified scale-out cache. Supplement the cache with disk-based protection for persistence to support data recoverability and long-term retention.
- › **Consider vendor solutions that help achieve faster time-to-value.** Data management solutions can help reduce time-to-value by automating and simplifying various data management functions and implementation steps. Look at those that support broader solutions and can support your business data and applications. Ask your vendor how it plans to provide the real-time data management vision; review the various components that the vendor has integrated and ask how it plans to fill any gaps.
- › **Leverage as-a-service offerings to lower platform/tools costs and scale dimensionally.** Cloud is increasingly becoming a strategic launch pad for data capabilities, not just a lower-cost storage environment. Cloud is already a backbone for retailers, which use it for commerce and advertising to create best-in-class customer experiences and engagement, but now, companies that traditionally have lagged in direct buyer engagement are using this model as a template to jump-start their data management competencies. The automotive, durable goods, pharmaceutical, and consumer packaged goods verticals can buy data management and platform-as-a-service to scale out data services and customer intelligence across an omnichannel landscape in a fraction of the time and cost to build the capability on-premises.

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Supplemental Material

Survey Methodology

Forrester's Global Business Technographics® Data And Analytics Survey, 2015, was fielded in January through March 2015 of 3,005 business and technology decision-makers located in Australia, Brazil, Canada, China, France, Germany, India, New Zealand, the UK, and the US from companies with 100 or more employees.

Forrester's Business Technographics provides demand-side insight into the priorities, investments, and customer journeys of business and technology decision-makers and the workforce across the globe. Forrester collects data insights from qualified respondents in 10 countries spanning the Americas, Europe, and Asia. Business Technographics uses only superior data sources and advanced data-cleaning techniques to ensure the highest data quality.

Endnotes

- ¹ Source: Forrester's Global Business Technographics Data And Analytics Survey, 2015.
- ² To learn more about how to find, test, and codify digital insights in software, see the "[Digital Insights Are The New Currency Of Business](#)" Forrester report.
- ³ The information fabric can adapt to changing business policies and rules while delivering trusted data. It allows for centralized administration of its distributed in-memory resources, metadata repositories, storage, policies, access, and processing functions. Data preparation is reduced as access, delivery, context, trust, and protection are linked to point of consumption rather than the integration path. For more information, see the "[Information Fabric 3.0](#)" Forrester report.
- ⁴ Given its economics, performance, and flexibility, Hadoop will become an essential piece of every company's business technology (BT) agenda. Application development and delivery professionals will build smart applications on Hadoop that not only use analytics but also become an integral part of many of their applications. For more information, see the "[Predictions 2015: Hadoop Will Become A Cornerstone Of Your Business Technology Agenda](#)" Forrester report.
- ⁵ High-quality customer data supports every point in the customer journey. To learn more about the impact of poor CRM data on business outcomes, see the "[Better Customer Relationships Require Trusted Data](#)" Forrester report.
- ⁶ As if organizations weren't already challenged by data quality, here comes big data. To learn more about data certification as a best practice to address big data quality, see the "[Big Data Quality: Garbage In, Gold Out](#)" Forrester report.
- ⁷ For more information on in-memory data platforms, see the "[Brief: In-Memory Data Platform Is No Longer An Option — It's A Necessity!](#)" Forrester report and see the "[Market Overview: In-Memory Data Platforms](#)" Forrester report.
- ⁸ Data virtualization is a virtualized data layer that integrates heterogeneous data and content repositories in real time. For more information on the current vendor landscape when it comes to data virtualization, see the "[The Forrester Wave™: Enterprise Data Virtualization, Q1 2015](#)" Forrester report.
- ⁹ Hadoop is unstoppable as its open source roots grow wildly and deeply into enterprise data management architectures. Enterprise architects must recognize Hadoop implementation is complex and requires more digging and planning than other technologies. To deconstruct the major pieces of the Hadoop ecosystem and make decisions regarding Hadoop as part of a big data platform strategy, see the "[Hadoop Ecosystem Overview, Q4 2014](#)" Forrester report.
- ¹⁰ To learn more about how organizations are benefiting from semantic data management approaches, see the "[Compose Digital Data To Create A Symphony Of Insight](#)" Forrester report.

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