Executive Summary

It is easy to find information sources that address the accelerated pace of business in the modern workplace or the speed at which good or bad news becomes common knowledge. For businesses that deliver such information, though, the challenges are daunting. Moreover, until such providers determine a strategy for delivering this information in a way that aligns their efforts with the accelerated pace of business, their strategic value will continually come into question.

Without aligning information delivery (publication) with insight extraction (consumption) from the ever-growing volume of information, the well-orchestrated vehicles used for information insight will be unavailable when time-sensitive or non-operational information needs arise.

This white paper covers the technologies, processes and organizational alignment needed to help organizations ensure the viability of information used to facilitate insights, especially in light of an accelerated business climate. The shattering of communication cost barriers (which are approaching near-zero) and the notion that real-time collaboration is critical to business success have made it imperative for organizations to quickly identify, ingest and interpret regularly occurring operational data (as well as data available from other sources) and deliver it in a form that can be rapidly acted upon.

Key topics covered include:

- Industry trends that enable a shift to an accelerated insight facilitation environment.
- Implications of and insights into speeding the publication of information.
- Implications of and insights into accelerating the facilitation of gaining insight and taking action.
- The concept of an early warning system.
- Making information trustworthy.
- The levers, or controls, and associated information available to steer an enterprise.
- The roadmap to enable this vision.

Getting Your Data House in Order

For the purpose of this white paper, the alignment of information insight is defined as a four-part process (see Figure 1, next page):

- **“See it:”** Identifying a strategic misalignment, opportunity or risk mitigation event that requires action.
  - This should occur within the context of a concept of business levers, or actions that can be taken that will, if properly executed and welcomed by the marketplace as intended, steer the enterprise toward the intended outcomes.
- **“Own it:”** Registering an opportunity and assigning action items that, if executed in the
prescribed timeframe and resulting in the intended market influence, lead to the intended outcome.

- "Solve it:" Determining the business levers available for influencing outcomes, as well as the appropriate actions for accomplishing the following:
  > Identifying the pertinent information for a particular strategy or event.
  > Deriving hypotheses about the actions that would influence the particular strategy or event.
  > Testing the hypotheses to expose the appropriate business levers that will result in the intended outcomes.

- "Fix it:" Creating and communicating an action plan and ensuring its timely execution. This includes the following activities:
  > Orchestrating execution of the action plan.
  > Monitoring the results of the action plan.
  > Fine-tuning the plan to ensure the intended results.

Of course, this is all happening at a continually accelerating pace of business and in a world where good and bad news circumnavigates the globe in a continually shortening timeframe. In this environment, business stakeholders have many more potential opportunities to derive and execute actions. Another factor is the much larger pool of information that must be plumbed to identify the nuggets of information that could produce insights pertinent to a particular business opportunity.

The goal of aligning information insight with the speed of business means addressing three major themes:

- **Adopting a framework to more quickly deliver trustworthy, relevant and actionable information to business stakeholders.** While there are tools and technologies available to facilitate faster information delivery to business stakeholders, tools will only help with part of this journey. The rest of the information delivery job — which consumes about 70% of the effort involved — includes addressing the complex processes used to synthesize information into the confines of a well-devised information model; the sheer onslaught of accelerating information volumes; the added complexities of introducing new data formats into the information model; and the number of sources that need synthesis into the information model.

- **Enabling business stakeholders to more quickly “see it/own it/solve it/fix it.”** Improving the process of gaining insight into data that supports action requires borrowing concepts and techniques from Google, Amazon, Wikipedia and Apple.

- **Creating a process to ensure that the information published is trustworthy and that business stakeholders are comfortable making decisions with the information without first validating it.** Today, a large number of business stakeholders are creating personal pools of data that have been scrutinized for alignment with the processes to which they are accountable and validated as relevant and accurate. These pools of data are created because the stakeholders are not convinced they could get what they need, when they need it, from the sanctioned facilities available to them. Processes are needed to change the way information is delivered to business stakeholders so they no longer find it necessary to create their own mini information stores.

**The Winds of Change**

Numerous business and technology trends are converging to improve organizations’ ability to accelerate their decision-making processes in light of the ever-deepening deluge of information and ever-growing sources of information.
Business Trends
The world is changing, and barriers have fallen, as advances in the global communication infrastructure facilitate both intended and unintended information to be the source of the next opportunity to capture, extend or create value. Managing risk has been elevated as a priority in many organizations. In reality, both opportunity and risk are equally present in organizations, and in fact, some opportunities can be exposed just as easily as risks. The value model illustrated in Figure 2 shows how information can be used to capitalize on opportunities and overcome risks.

Technology Trends
Big data tools and techniques are changing the paradigm for storing information more effectively. The concept of big data considers much more than just billions of rows of data and assumes that SQL is not ideal for accessing data. Data can be manifested as:

- A large number of rows (i.e., billions of rows).
- A variety of formats (i.e., social media, streaming newswires, blogs, map coordinates, images, videos).
- A large number of columns (i.e., thousands of tables).
- A large number of sources (i.e., database tables and hundreds of spreadsheets).
- Post-discovery methods – or de-coupling the information access model from the deployed storage and transformation models – as represented by:
  > Data wikis, or data publication methods, that use the Wikipedia concept (ordered pair logic) to access information.
  > Virtual warehouses, or a business rules-driven architecture, that displace the intensive effort of transforming data to align with an information model.
  > In-memory models, which use large amounts of memory to negate the need for segregating information into databases designed for transactional vs. analytic purposes.
- Acquisition of an industry-aligned, pre-built information model. While not limited to massively parallel processor (MPP) or appliance solutions, information models are becoming more prevalent.
- Configurable cloud-based multi-tenant solutions.
Process and Organizational Trends

- The support of self-service, through the publication of an online catalog that applies the principles introduced by Google, Wikipedia, Amazon and Apple.
- A shift of focus from a delivery-centric approach to supporting enterprise information management, to a more consultative approach.
- Metadata syndication strategies that expose active metadata, or hot links, to reports and analyses, no matter where they are physically stored or what technology is employed to display the results of reports and analyses. This unified interface will be rich with business metadata not normally captured in current-day tools, such as information lineage, business rules and information suitability tips.

R&D Trends

Developments in technology and science will continue producing solutions to today’s problems. For instance, DNA-based data storage has already been demonstrated twice, offering the potential to store over 450 exabytes per one gram of single-stranded DNA. The first “quantum” computer has already been purchased by Lockheed, with a collaborative investment made by NASA, Google and the Universities Space Research Association (URSA) to buy the second. Still several years to decades away from entering the mainstream, these solutions – and related breakthroughs – will spur the need for new models of information management.

Accelerating the Publication of Information

The time-tested method of developing an all-encompassing enterprise information model has proved to be a roadblock to accelerating the publication of information, as required in the modern business environment. Many organizations struggle to balance corporate authority with divisional autonomy. For example, some are rapidly recognizing that some information that is pertinent to organizational units is of no consequence to the entire enterprise (i.e., country-specific regulatory supporting information) or is too difficult to abstract into a comprehensive enterprise information model. It simply takes too long to write code or scripts to transform source feeds into a format required by enterprise information models or to modify the underlying foundation as new requirements are synthesized into new data structures.

Since it is generally recognized that extraction, transform and load (ETL) processes typically take 70% or more of the overall data warehouse creation effort, one of the areas that will accelerate information publication is the reduction of time and effort required to transform it into the format expected by the information model.

Several alternative methods are available to circumvent the time required to publish information. Most enterprises will find themselves entertaining all of them and picking the portfolio of tools and techniques that are least invasive and the best fit for their culture.

The methods most often discussed include:

- **Decoupling of the enterprise data model** to reduce the information modeling complexities associated with abstracting business-specific requirements. This enables all businesses contained in the enterprise to be housed under one enterprise information model. The often confusing and ill-fated “data dump” occurs when time constraints overshadow the disciplines required to collect information into a single enterprise model.

- **The technologies and techniques that fall under the umbrella of big data.** Big data includes several evolving technologies that require significant study to understand the next paradigm shift in information publication techniques. These technologies assume problems exist that either cannot be solved or are cost- and time-prohibitive to solve with query-based solutions. Deployment of these technologies is less mature than their more traditional counterparts, and companies that embark on this effort should expect more extensive coding efforts than are typically required when using ETL techniques. Moreover, few examples are available to illustrate the most appropriate fit for such technologies, which results in the need for an expert-led implementation.

- **The collection of technologies and techniques that fall under the virtual warehouse umbrella.** Segregated into two camps, these technologies include rules-based query engines (such as Red Hat, PolarLake and Composite Software) and object pair-based query engines (such as Cambridge Semantics and Many organizations struggle to balance corporate authority with divisional autonomy.
Revelytics). The solution sets for these two camps of technologies are very different from each other, which requires some explanation.

- **In-memory solutions beginning to emerge from enterprise resource planning (ERP), MPP and data warehouse appliance vendors.** The in-memory collection of solutions that start from the premise that memory is cheap and time is scarce, is no longer relevant.

Information to be published will originate from an extended number of sources, all focused on extracting, originating and capturing value (see Figure 3, next page). These data sources include:

- **The traditional, largely introspective sources generated by an organization.** This pool of acquired and created knowledge is internally sourced or transformed from internal and external sources through internally controlled processes.

- **Learned inferences,** or inferences that are obtained from information sources, informal networks and other sources that may or may not be synthesized using internally controlled processes.

- **Heard inferences,** or inferences that are heard from informal sources, such as news media, social networks, networking groups and telephone conversations.

- **Innovation,** which is normally information that is potentially disruptive and generally not yet formally synthesized with controlled internal sources.

**Accelerating the Extraction of Insight from Information**

Some of the most difficult components of facilitating data-driven insight at the accelerated speed of business are the facilities made available to business stewards to obtain the just-in-time information needed to pursue a business opportunity or resolve a crisis. Organizations need to ensure they continually focus on information that is critical for action so that a strategy can be derived, communicated and acted upon in time to matter in the marketplace.

A prerequisite to accelerating the extraction of insight from information is defining the entry points into the information as anything that could be used to enhance, extract, capture or create value. While information is rapidly becoming more available for decision-making, the entry points into this onslaught of information are fairly consistent (see Figure 4, next page) and can be used to:

- Define enterprise strategies.
- Diffuse disruptive events.
- Manage operational risks.
- Enhance sustainable value.

Information available as entry points from internal (rarely) and external (mostly) sources will typically be obtained directly from process touchpoints or derived from activities with:

- Customers and prospective customers.
- Markets.
• Competitors.
• Media.
• Regulators.
• Financiers, or funding sources.
• Geographies.

Levers that are available and can influence enterprise strategies, disruptive events, risks and sustainable value include:
• Alterations to services to participants in the value chain.
• Changes in capabilities (innovations, technical capabilities) and barriers.
• Changes to processes.
• Business disruptions or strategies that create disruption.
• Changes to funding characteristics.
• Changes to product characteristics.

The information used for gleaning insight must be accessible in such a way that business stakeholders can quickly find what they need.

The Early Warning System
The concept of an early warning system is not new; it is an outcrop of business activity monitoring (BAM) systems and is detailed in the management book, Competing on Analytics. To be effective, an early warning system must deliver prioritized, triggered events to enterprise shepherds in a way that enables them to quickly follow the “see it/own it/solve it/fix it” process.

What is new with early warning systems is the fact that internally generated data is introspective, and that events of consequence in this highly communicative world are rarely identifiable from internal systems in time to matter. Information for early warning systems will come from less structured information and normally in the form of streaming text. A variety of systems exist that synthesize insights from streaming sources of information, and these can be used to inform an early warning system. Examples include Textual ETL, ICUC Moderation Services, Sprout Social, SocialMatica and a host of other companies.

Interest in in-memory databases (VoltDB, GemFire, TimesTen, ParStream, HANA and others) is increasing, due to their ability to consume large amounts of information and apply various techniques to determine whether the information contains anything of interest.

Learning from Google, Amazon, Apple and Wikipedia
Most users require little explanation to master tools such as Google and Wikipedia. Google is known for providing a very friendly interface to
massive volumes of information, with no training required. And Wikipedia provides a simple-to-use, point-and-click, encyclopedia-style interface to data, again with no training required.

Meanwhile, Amazon provides a simple interface to search for anything that is indexed but also links references to anything within the long tail of similar information that may also be of interest. And with its Genius interface to music, Apple provides a way to find information that is similar to what was accessed, based on a profile built on listening or usage patterns.

The interface that business stakeholders will rapidly accept will adopt the best attributes of all four models: a simple-to-use interface to information that requires no training (Google), a graphically navigable interface to information (Wikipedia), links to other information templates that would be of interest (Amazon) and links to templates that could be of interest based on usage patterns (Apple).

Support for this new interface changes drastically to one that embraces self-service. Those who make a living of supporting the insights required by the business community in the decision-making process will be engaged with the business community in more of a consultative role rather than one focused on delivery.

Making Information Trustworthy

The first part of the journey on which business stakeholders embark is finding the appropriate information required to derive insight. The second part of the journey is to derive strategies and action plans based on the insight. Too often, there is an interim step added to the journey, which validates that the right information has been accessed and that it is accurate enough to support important endeavors. Validating the accuracy and relevance of information can delay a company from taking action, thereby increasing the risk of hitting the market too late to matter.

Data governance is concerned with five issues:

- **Information is correctly portrayed to those planning to use it.** This is normally solved with a sufficiently intuitive metadata solution that business stakeholders can use without training, similar to the user experience of a Google- or Wikipedia-based environment.

- **The source of information has a high degree of accuracy.** Data source quality remediation opportunities are normally addressed by reviewing and remediating any source issues. Concepts such as baseline profiling, or comparing incoming source data with a baseline to test reasonability, are gaining a foothold in the marketplace.
An Information Action Plan

- The lineage of information does not introduce unintended consequences that impede data quality. Too often, the transformation of information introduces confusion and ambiguity to the creation of action plans.

- Efforts to elevate the trustworthiness of information do not get derailed because of a “boil the ocean” approach to governance. When governance initiatives require excessive amounts of time from business leaders, whose primary role is to capture, extend and create value for the enterprise, the efforts to elevate the trustworthiness of information are at risk of being derailed.

- The lineage of information is exposed when needed. This facilitates a high degree of comfort in understanding how information was derived. Data lineage, as seen through metadata, tracks the lifecycle between systems and touchpoints.

Successful governance depends on gaining clarity around which issues really need to be solved and reaching a common understanding of which governance initiatives should take precedence, based on which data stands in the way of gaining incremental enterprise value. Also important is communicating that the investment required for governance is significantly smaller than the incremental enterprise value it enables.

Roadmap to the End State

The end state illustrated in this document is nothing less than transformational for those enlisted to facilitate the processes used to gain insight from information. While new technologies are involved to reach this end state, the effort to create a more responsive and resilient environment for the insight facilitation process will require numerous changes, including:

- Altering the processes employed to publish information.
- Employing processes to ensure information trustworthiness.
- Making facilities available to allow business stakeholders to find and ingest required information and transform it into actionable insight.

All of this must be done much more rapidly than is possible with commonly employed techniques. It is also certain that the deluge of information made available to enterprise stewards as the source to “see it/own it/solve it/fix it” will continue to grow exponentially, and that already taxed processes will become less effective if not addressed.

The business information model represents the organization of information for quick identification of the levers that will be used to help create action plans based on strategies and market
events (see Figure 6). Appropriate business model mapping should consider the following items:

- **The key business intents of the organization.** Key business intent will be organized into potential action levers, each associated with the components of a business information model. Finally, each action lever will be categorized into metrics, and each metric will be associated with data levers.

- **Navigation of information available to business stakeholders by action levers.** Also important is the validation of their action plans based on the data levers, or metrics, constraints and risks associated with each potential action they could consider.

Many lessons can be learned from organizations with proven success in making information available at all times, in ways that require no special knowledge or skills (Google, Amazon, Apple, Wikipedia). The presentation of information should be indexed by the action levers available to steer the enterprise, such as available value-based actions tied to customer, capability, market, regulatory and financing opportunity or risk. Additionally, information presentation should be supported by the available data levers, including metrics, constraints, risks (as represented in process touchpoints), measures in data warehouses and information sources made available for insight facilitation.

**Footnotes**


**About the Author**

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