WHITE PAPER

Operational Analytics: The Role of Integrated Systems

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IDC OPINION

Analytic systems for operations are designed to provide visibility, insight, and recommendations for intelligent decisions within ever-shrinking time windows — in up to near real time. At the limit, this type of workload seeks to identify potential *fraud* before a transaction is committed. Analytics for operations also includes assessment of ongoing *risk* in meeting commitments and complying with policies — both in a short time frame and in the longer term — as part of planning processes and strategy formation.

Operational analytics is a bet-the-business activity. Yet the technological support of analytics for operations involves significant challenges in the following areas:

- **Scalability.** Operational analytics requires continuous ingestion of a variety of raw, granular data, which results in ever-growing data volumes. This poses challenges to managing, integrating, and assessing the quality of diverse data sets.
- **Optimization.** Rapid, in-database processing of analytical models at the point of decision can yield an optimized response. Traditionally, this has meant a highly custom approach to integrate multiple technology components in support of this demanding workload.
- **Expertise.** Beyond the technology itself, the biggest issue faced by organizations embarking on big data and analytics projects is the lack of skills to configure the appropriate technology to meet the business demand.

Among the latest solutions available to organizations to address these challenges are workload-optimized systems that support a wide range of analytics workloads on big data. One of the vendors providing such solutions is IBM, whose IBM PureData System for Operational Analytics solution is an effective technology solution to address many of the critical requirements of operational analytics.

IN THIS WHITE PAPER

This white paper outlines the latest operational analytics opportunities and challenges facing decision makers responsible for managing risk and identifying fraud. It draws on IDC's research into big data and analytics business and technology trends and provides recommendations for organizations looking to improve their operational analytics initiatives. The paper also considers the role of workload-optimized systems as a technology platform to enable operational analytics and describes the IBM PureData System for Operational Analytics as one of the leading workload-optimized systems in the market today.

SITUATION OVERVIEW

The convergence of intelligent devices, social networking, pervasive broadband networking, and analytics is ushering in a new economic reality that is redefining relationships among producers, distributors, and consumers of goods and services.

In the enterprise, these trends have resulted in a significant decrease in the ability of managers to rely effectively on only experience or intuition to make decisions. The old cause-and-effect models are becoming less relevant, while the demand to respond faster and with greater insight to ongoing internal and external events based on facts is increasing.

In this environment, not only access to information but also the ability to analyze and act upon information creates competitive advantage in business-to-business and business-to-consumer commerce, enables sustainable management of communities, and promotes appropriate distribution of social, healthcare, and educational services.

The newly available information opens unprecedented opportunities and challenges for organizations to unlock its value. In 2012, $95 billion was spent worldwide on a range of business analytics software, hardware, and services. New use cases, case studies, and market research have confirmed the value of analytics. For example, a recent IDC study shows that 88% of organizations that have widely deployed business analytics have recognized tangible benefits from these projects. In addition:

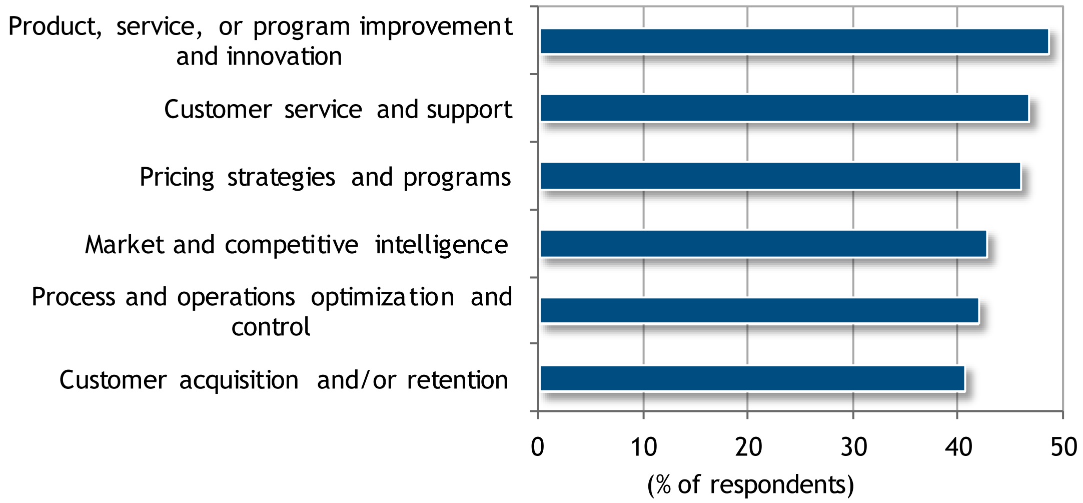
- For 90% of these organizations, the benefits met or exceeded expectations.
- For 82% of these organizations, the time to achieve quantified benefits met expectations or was shorter than expected.

Analytical systems are being deployed across all industries and all key processes and activities of the business. Organizations use analytics to examine the business and all its aspects — its people, its customers, its finances, and its operations. Clearly, the drivers of big data and analytics solutions range across business processes. But as shown in Figure 1, one of the top initiatives is "process and operations optimization and control," the heart of operational analytics. And "product, service, or program improvement and innovation" — the top initiative — is the goal of corporate initiatives to better operations.

FIGURE 1

Significant Drivers of Big Data and Analytics Initiatives

Q. Which of the following areas have been identified as significant drivers of your organization's big data and analytics initiatives over the next 12 to 24 months?



n = 700

Note: Remaining six drivers are not shown.

Source: IDC's *Big Data and Analytics Maturity Model Survey*, July 2013

Operational Analytics: Goals and Objectives

Organizations implement operational analytics to improve key operational processes. What do we mean by "operations"? Operations includes all processes and activities involved in the design, build, and delivery of a firm's products or services. As the nature of the products or services provided defines an industry, the specific operational activities and processes vary from one industry to another. Yet the common thread is that no organization can stay in business without ensuring reliable, efficient, and cost-effective operations. Operational analytics is truly a bet-the-business activity.

What are the key decisions supported by operational analytics? An organization must ensure that its operations can be executed in a predictable, reliable fashion. To achieve this goal, organizations must be able to:

- Assess risks of non-completion of a specific operation within the enterprise (i.e., *operational risk*) in a time frame that can be as short as the time required to complete a transaction such as a credit card approval or distributed across a supply chain network spanning suppliers and retail stores.
- Monitor events to predict and detect a specific type of operational risk (e.g., the commission of *fraud* by a stakeholder of value to the business, whether an employee, a customer, or a supplier; the breakdown of mission-critical plant and equipment; or late or incomplete delivery of goods and services promised to a customer).

- Provide a view that aggregates and combines risks associated with a set of key activities across functions or products (i.e., *portfolio risk*) or across the enterprise (i.e., *enterprise risk*). The review of risk exposure may result in changes to operational policies and may be mandated by government statute (i.e., regulatory compliance).

In today's fast-paced economic, social, and political environments, risk assessment and fraud detection require continuous monitoring and analysis as well as the capability to act in near real time. This puts stress on the technology infrastructure required to support these business requirements. Continuous availability and scalability (large volumes of data, large volumes of repeatable decisions) must be ensured.

Operational Analytics: The Impact of Big Data

Operational decisions such as approving a credit card transaction, settling a vendor invoice, adjudicating a claim, or identifying potential fraud are made repeatedly in an organization, up to millions of times a day. The ability to leverage big data information assets is changing approaches to risk and fraud analytics.

What is big data, and how is it impacting risk and fraud analytics? Big data technologies describe a new generation of technologies and architectures designed to economically extract *value* from very large *volumes* of a wide *variety* of data by enabling high-*velocity* capture, discovery, and/or analysis.

- **Volume.** Now it's possible to access data down to the most granular detail, such as every call for a telco customer, every trade made for a specific security on behalf of each customer, or product-level detail of every retail sale. This enables the analysis of how an individual tends to behave (rather than general patterns across a group), and deviations from the established patterns *for that specific individual* could signal fraud or operational risk. *This granularity of analysis requires a granularity of data only now possible via big data methods.*
- **Variety.** All forms of structured and unstructured data can be accessed, such as every tweet referring to a company or product or every click on a Web commerce site. The unstructured data helps provide context and confirmation related to the structured transactional data. Unstructured data (e.g., comments by a customer or by a customer service agent about a customer) can be monitored as an early indicator that precedes a change to a fraud risk profile, attempt to commit fraud, or defection of a high-value customer. *This type of analysis of structured transactions with unstructured comments pertaining to or anticipating transactions is now possible via big data methods.*
- **Velocity:** Live streams of data can be brought in and analyzed on the fly in support of commercial fraud or operational, portfolio, and enterprise risk assessment within tight time windows. *The reduction in latency for data being analyzed (near real time) is now possible via big data methods.*
- **Value.** Additional fraud and risk assessment algorithms run against detailed, varied, and/or high-velocity data sets can predict potential fraudulent activities with greater accuracy, reducing the number of false positives that can adversely impact customer relationships and operational failure, reducing false negatives that can increase process costs. *Such big data approaches can be added to the portfolio of models currently being run. The lift in fraud detection rates via big data methods over traditional techniques run against summarized or sample data can demonstrate incremental value to the business.*

Operational analytics can be tightly integrated with the transactions that run the business. Moreover, the ongoing monitoring of events and decisions, as well as their outcomes, provides a broader view of risk exposure across a portfolio or across a business. Business users can consume this information on visual dashboards and explore underlying data in queries and reports. This ongoing review can lead to recommended changes in operational policies such as credit approvals, claims adjudication, or standard time-to-complete and labor assignments to execute activities in processes. This can be part of a continuing effort seeking to optimize resource allocations, balancing risk-reward scenarios.

Big Data/Analytics Challenges

But organizations that are looking to optimize their use of big data and analytics technology are facing several challenges. Table 1 highlights that only a minority of respondents indicated that their organizations' big data and analytics technology capabilities meet their requirements. For example, among all respondents, only 15% said that the scalability capabilities of their big data and analytics technology meet requirements. Table 1 also shows the responses from organizations that identified themselves as having achieved quantified results that exceeded expectations. For each big data and analytics technology capabilities category shown in Table 1, the high achievers experience better compliance with their big data and analytics requirements than the overall sample.

TABLE 1

Meeting Big Data and Analytics Technology Requirements (% of Respondents)

Q. To what extent do your organization's big data and analytics technology capabilities meet its requirements?

	To the fullest extent needed	
	Total	High Achievers
Scalability (ease of expanding and contracting as needed)	15	29
Performance (speed of query response or data loading)	17	32
Reliability/availability	19	37
Manageability (tuning, upgrading, etc.)	14	27
Security	34	47

n = 700

Source: IDC's *Big Data and Analytics Maturity Model Survey,* July 2013

Figure 2 further highlights the challenges organizations face when trying to configure systems to run an operational analytics workload. Given that about 80% of the effort in any analytics project is managing and integrating data, it's worth noting that the leading issues are data preparation and management-related tasks — data integration, managing data quality, and managing data security. These continue to be the most challenging issues for most organizations.

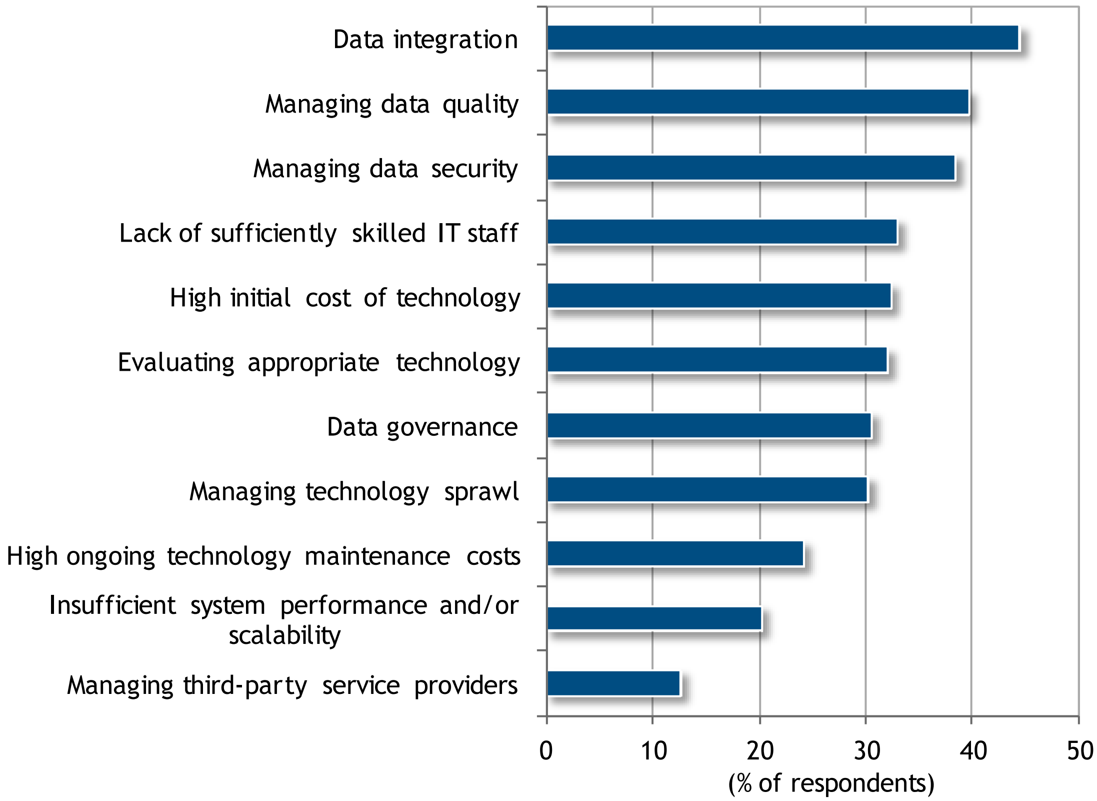
Moreover, these tasks are unlikely to become less complex in the near future as data sources and types proliferate. Structured transactional data is still the most frequently used data in analytics, but other data sources such as Web click-stream data, mobile device data, geospatial data, chatter from social media, surveys, and call center records have increasingly been incorporated into big data and analytics solutions. A majority (96.5%) of organizations use at least one of these "nontraditional" sources. Further, 40% of organizations subscribe to external data, such as demographics or social media usage data. Yet only 15% of organizations completely agree that data available to support decision making is complete.

As Figure 2 shows, lack of knowledge in configuring and applying the technology is also a leading concern. Although this issue is not at the top of the list, fully one-quarter of organizations indicated that ongoing technology maintenance costs are a top challenge, and 20% pointed to insufficient system performance and/or scalability as a top challenge. There's clearly room for improvement.

FIGURE 2

Top Big Data and Analytics IT Challenges

Q. *What are the top IT challenges your organization is facing or expects to experience with respect to its business analytics initiatives?*



n = 330

Source. IDC and Computerworld *Business Analytics and Big Data Survey,* June 2013

Address New Requirements

Technology management expertise is clearly needed, as are analytics expertise and the ability to address frequently changing requirements. In today's environment, operational analytics are run by analysts and data scientists and involve a significant amount of experimentation and ad hoc discovery. 45% of organizations indicated that they lack the sufficient number of staff with appropriate analytics skills. 35% indicated that defining business requirements is a top big data and analytics business challenge.

There is an opportunity to use new metrics, new analytics, and new data to derive the most value from big data and analytics solutions, and IT and business managers need to collaborate to make this happen. Best-in-class organizations don't use their data just to ask who, what, and when. They utilize a combination of descriptive, predictive, and prescriptive analytics to delve into questions of why, where, in what mood, what's next, and why now.

Table 2 highlights the impact of breaking away from the status quo and using new metrics, new analytics techniques, and new data in various combinations. When we looked at responses from organizations where quantified benefits from big data and analytics projects exceed expectations, we found that of those who do nothing new, only 6% fall into this high achievers group. This research suggests that using all three new parameters (metrics, analytics, and data) is most effective (26% of this group indicated their big data and analytics benefits exceeded expectations). Barring the resources, time, or ability to do all three, the next best option is to focus on new analytic techniques and new data.

TABLE 2

Impact of New Approaches to Big Data and Analytics

Q. *How has the type of data analysis performed in your organization changed in the past 12-24 months?*

Q. *In aggregate, what type of benefits has your organization achieved from recent big data and analytics projects?*

	Scenarios							
	1	2	3	4	5	6	7	8
New metrics or KPIs	Y		Y	Y	Y			
New analytic techniques	Y	Y	Y			Y		
New data	Y	Y		Y			Y	
None								Y
Quantified benefits exceeded expectations	26%	23%	21%	10%	15%	19%	15%	6%

n = 700

Source: IDC's *Big Data and Analytics Maturity Model Survey*, July 2013

Operational Risk and Fraud Analytics in Retail

Retail presents myriad opportunities for reducing organized crime fraud and operation and portfolio risk through operational analytics. It is among the topmost industries where the volume, velocity, and variety of enterprise, social, and external data present nettlesome big data and analytics challenges –and opportunities if these three Vs are managed. As retailers run more of their operations with real-time data and with new types of data (e.g., streaming store video), there are more opportunities to apply big data and analytics to real-time decision making. Real-time retail data and the development of real-time operational control practices are increasing the types of use cases for – and value from – fraud and risk analytics.

Table 3 provides examples of retail applications of operational fraud and risk analytics.

TABLE 3

Retail Applications of Operational Fraud and Risk Analytics

Use case	Product freshness and quality assurance	Organized retail crime (ORC)	Social media monitoring
Business issue example	Grocers and other sellers of chilled and frozen food running large and complex cold chain networks are exposed to risk from product spoilage when temperatures in trucks, warehouses, and store freezer cases exceed maximum tolerance. Risks include increased spoilage and handling costs, lost sales, and customer health and safety concerns. Real-time monitoring of thermostat data across the cold chain network can spot cold chain breakdowns and the responsible party. Real-time analysis of equipment data (condition monitoring) can predict failure to prevent spoilage and its risks.	Conducted by regional or national criminal enterprises, ORC costs U.S. retailers $30 billion, representing 1.5% of sales and $300 per household. ORC cases are complex and costly to crack and outstrip means and resources of traditional loss prevention organizations. Defeating ORC requires a big data and analytics approach: collection and analysis of streaming video, incident reports, criminal complaints, arrest records, photos, credit card and ecommerce transactions, RFID data, and product lot codes and serial numbers.	It's not enough to spot upset vocal, influential customers posting and tweeting their displeasure with a brand experience. Managing brand integrity requires quickly deciding the right approach to each instance of customer dissatisfaction and discovering and correcting the root cause of customer dissatisfaction. Crafting an optimal response requires analyzing the customers' latest transactions, value as a customer, shopping behaviors and preferences, social influence, and the root cause of the dissatisfaction and predicting the customers' response to alternative replies.
Potential benefits	▪ Reduced spoilage, recall, handling, and maintenance costs ▪ Increased sales ▪ Reduced customer health claims ▪ Supplier compliance	▪ Reduced shrink (theft) and product handling cost ▪ Increased sales ▪ Lower investigation and prosecution costs	▪ Reclaimed voice-of-brand influence ▪ Customer satisfaction ▪ Detection and correction of dissatisfaction factors

Source: IDC, 2013

Operational Risk and Fraud Analytics in Banking

Regulatory pressure and oversight resulting from the financial and economic upheavals of the past decade and the first three years of the current decade have been prime motivators for operational risk management investments. Risk IT strategies and investments remain critical as policymakers around the globe stay focused on capital buffers, trade transparency, accounting and reporting improvements, internal control and IT system continuity, third-party risk, financial crime and fraud, and the impact of cyber-threats on the safety and soundness of the banking market and the financial marketplace overall. Worldwide, of the $71.2 billion projected to be spent by the financial services industry on technologies and services for risk management in 2014, $49 billion will be spent on managing operational risks — $26 billion specifically by bankers.

Fraud management in banking, as well as the associated analytic solutions, data, IT infrastructure, and business process, is just one form of operational risk management. The increased sophistication of fraud actors, the complexity of the threats, and the possible scalability of fraud attacks and losses have place advanced, predictive analytic solutions at the center of fraud defenses and mitigation strategies for many institutions. These new capabilities allow institutions to get beyond the small percentage of transactions (real-time or otherwise) discovered and analyzed today to a much larger number with ample time to take appropriate actions.

Table 4 provides examples of banking applications of operational fraud and risk analytics.

TABLE 4

Banking Applications of Operational Fraud and Risk Analytics

Use case	Know your customer/ anti–money laundering (KYC/AML)	Predictable cyber-defenses (PCDs)	Integrated risk management (IRM)
Business issue example	The operational risk regimes surrounding AML fraud and KYC requirements continue to evolve and expand across multiple dimensions. Each year, AML compliance covers more geography, more business entities, more relationships, more transaction types, and more processes across the financial supply chain. To fulfill the increasing requirements, bankers require solutions to monitor and analyze transactions in real-time across multiple channels and identities to predict fraudulent interactions and, at the very least, spot suspicious activities in process. In real time, banks require the ability to identify entities and transactions of a suspicious nature and accurately assess the level of threat, potential loss, and compliance requirement.	Bank defenses against cyber-attacks are evolving at a slower pace than the attacks themselves, resulting in ever-increasing frequency and scale of attack and the probability of success over time. Advanced threats are increasingly targeting the digital channels of financial institutions, with an evolving set of motivations. Banks require a shift in thinking in how to defend against cyber-threats. Today's "react and remediate" approaches are becoming less effective and must be enhanced with predictive analytic solutions that enable an institution to get ahead of the attack, assessing the risk before the attack occurs.	Integrated risk management is the goal of all bank CEOs as their institutions face financial harm or exposure as a result of failures in operational business processes, breakdowns in internal control, system failures, as well as credit and market events driven by internal or external forces. To date, traditional GRC solutions have been only partially effective in managing these risks primarily because of the offline, point-in-time nature of these platforms. Banks require analytic solutions for IRM that can simplify and streamline access to structured and unstructured data in real time, govern risk analytics models, and provide personalized visualization of metrics and events, with a centrally managed repository of trusted financial risk data.
Potential benefits	▪ Improved insight into money movement ▪ Early warning of the potential of bad actors and necessary reporting requirements ▪ Reduced false positives, missed negatives, and compliance failures ▪ Risk data management	▪ Foresight into criminal elements and motivations ▪ Reduced impact of service attacks ▪ Reduced likelihood of productivity, brand, and monetary losses	▪ Correlation of risk events across disparate operational data stores and systems ▪ Holistic views of risk events and metrics that can be personalized to line-of-business, staff, or executive levels ▪ Single source of defensible operational risk data

Source: IDC, 2013

Operational Risk and Fraud Analytics in Healthcare

Fraud, waste, and abuse are estimated to constitute 30% of the U.S. healthcare industry's spending. This is a massive figure given that America's National Health Expenditure is projected to exceed $3 trillion in 2014 (according to the Centers for Medicare & Medicaid Services). While definitions vary, it is clear that the greatest leakage is not from intentional fraud; rather, it is from waste and abuse. Outright fraud constitutes between 3% and 10% of total healthcare spend. Across all three categories of leakage, healthcare payers have traditionally relied on labor-intensive, manual "pay and chase" recovery processes with limited return on investment (ROI). The healthcare payer industry consensus is that pressure to reduce medical costs and administrative costs and improve service to and satisfaction among members is only increasing, which has cast a spotlight on analytics solutions that offer health plans opportunities to reap greater benefits from pre-pay prevention and education.

Payers are increasingly adopting analytics tools in the claims pre-adjudication, adjudication, and payment processes. Rapidly evolving analytics tools and techniques include decision trees, network analysis, clustering, and anomaly detection. These solutions are particularly valuable for payers in managing their provider contracts and individual providers. Analytics engines are being supported by expanding libraries of business rules, which integrate the lessons learned from hard experience into pre-pay prevention techniques. These solutions are being integrated into case management tools that support and automate workflows by the resources that payers employ to manage claims processing and special investigations. Armed with better tools to prevent leakage, health plans can limit the impact of fraudulent providers, new fraud schemes, market disruptions, common claims errors, and ineffective medical procedures. Healthcare payers then can move with greater aggressiveness into participation with state and federal health exchanges, modification of provider networks, implementation of ICD-10, and investments in accountable care initiatives.

Table 5 provides examples of healthcare payer applications of operational fraud and risk analytics.

TABLE 5

Healthcare Payer Applications of Operational Fraud and Risk Analytics

Use case	Pre-payment claims processing	Post-payment claims processing
Business issue example	Health plans process claims within narrow, legally defined time windows. The costs of "pay and chase" recovery efforts often outweigh the benefits of maintaining expensive claims review software and special investigative units (SIUs). Analytics software (often provided as a service via the cloud) enables health plans to evaluate providers and claims for potential fraud, waste, and abuse in advance of payment.	The fraud, waste, and abuse environment is continuously evolving, and health plans can't prevent all cases of inappropriate payments. For example, the imminent transition from ICD-9 to ICD-10 code sets for medical procedures and diagnoses presents ample opportunity for errors and fraud. Following core claims processing, claims are retrospectively analyzed to gain insight into the emerging schemes and networks of fraudulent actors, as well as trends in errors and wasteful practices by individual claims codes, medical practices, provider networks, geography, etc.
Potential benefits	▪ Reduced medical costs through automated anomaly detection ▪ Reduced manual claims processing, in addition to lower interest payments and penalties ▪ Maximized SIU resource allocation and efficiency ▪ Improved provider and member service satisfaction through improved first-time payment accuracy	▪ Ability to keep pace with evolution of transaction environment ▪ Reduced manual adjudication, rework volumes, and targeted case reviews ▪ Ability to speed implementation of new claims workflow rules ▪ Automated compilation of peer or industry libraries on new fraud methods and detection techniques

Source: IDC, 2013

Operational Risk and Fraud Analytics in Telecom

Telecom fraud is an especially pernicious issue that costs the industry tens of billions of dollars every year on a global basis. Despite the perennial advances in security and preventative measures, fraud persists as a result of inertia on the part of enterprises and consumers. It also is a target of organized crime and thus a constant and evolving threat to communications service providers (CSPs). Operational analytics can assist CSPs with detecting unusual usage and traffic patterns. This has become an essential aspect of fraud analytics. The challenge for CSPs is to constantly evolve with credit card fraud practices and corporate security breaches. Another major issue is the monitoring of corporate applications on mobile devices, which is creating another opportunity for fraud in particular from inside the corporate firewall.

Table 6 provides examples of telecom applications of operational fraud and risk analytics.

TABLE 6

Telecom Applications of Operational Fraud and Risk Analytics

Use case	PBX hacking/international call fraud	Identity theft	Unauthorized account access
Business issue example	Two of the most prevalent forms of telecom fraud involve breaking into enterprise PBX or IP CPE. This type of telecom fraud can be used to compromise employee mailboxes but is mostly used to gain access to international calling utilizing the company's billing system. The intruders not only can use the company for costly international calls but also can resell access to the PBX and rack up huge bills. Regular monitoring of call patterns and maintenance of the PBX access procedures are essential. Regular updates to the PBX software or modernization, regular password management, and deactivation of unused accounts are essential.	The use of false or stolen credit card information is a major and ongoing fraud issue. Organized crime syndicates will buy prepaid cards in high volume for resale. Resale of access codes for costly international calls is another major use of corporate calling cards that can go undetected for months or even years. Regular monitoring of call patterns and automated alerts will curb fraud and flag unauthorized usage.	Unauthorized access to various programs and call detail records is a violation of privacy and can be costly to the end user if a change is made to the account. Hacking of SIM cards such as creating WiFi hotspots and access to the network for multiple devices is a costly drain to CSPs. Hacking of IP voice networks for international call fraud via unauthorized apps can be costly to enterprises.
Potential benefits	▪ Reduced risk of the loss of confidential information via voicemail hacking ▪ Reduced cost of expensive international calls by blocking unauthorized use ▪ Regular CPE monitoring that leads to reduced opex costs by modernizing outdated equipment	▪ Automated alerts that are essential to reducing long-term fraud ▪ Regular consulting with users to detect unusual call patterns and provide optimal usage plans	▪ Automated monitoring or regular audits of usage plans, mobile devices, and corporate applications to reduce unauthorized access ▪ Demographic profiles and predictive analysis to identify and curb unusual usage patterns

Source: IDC, 2013

Addressing the Issues via Workload-Specific Integrated Systems

Historically, teams deploying analytic applications have relied on manual, fragmented management processes and tools that often slow time to market, result in lost revenue and unexpected downtime, and create employee productivity problems. Customers indicate that integrated systems can radically simplify deployment by taking time, cost, and complexity out of this process. Technology must enable rapid time to market, support for a range of workload-specific use cases, and optimal use of limited human resources.

Manufacturers in the technology industry are responding by delivering workload-specific pre-integrated systems. With an integrated system, the expertise is built in, easing installation and deployment at the customer site.

Integrated systems that incorporate processors as well as storage, networking, and software components are engineered by the manufacturer for specific workloads. An analytic workload, for example, requires ingestion of, integration with, and access to large amounts of data in order to identify trends that have occurred or predict or assess the likelihood of future events. By contrast, a transactional workload requires the creation/insertion of a data record or access to an existing record via an index for update or deletion. These differences are significant in terms of the type of configuration required, including the level of scalability and availability needed.

Technology suppliers that put together and deliver such purpose-built systems incorporate expertise on usage patterns into the design and manufacture of the system. Integrated systems can become even more specialized as patterns for application usage can be built in, differentiating customer analytics from operational analytics, for example. In addition, substituting pre-built integration for do-it-yourself approaches can lead to potential productivity gains for the buyer, resulting in fast installation, easy operations, and the opportunity to leverage existing human resources elsewhere in the organization. Additional savings can result from optimized configurations that make the best use of the available system resources.

Further, for any integrated system, a key advantage is a single point of support by the IT vendor, replacing multiple suppliers where there can be no real clarity with regard to who is responsible for addressing system failures or malfunctions. The reliance on a single vendor for support when a problem arises results in faster remediation of system issues and the reduction of downtimes.

One of the workload-optimized solutions to support and enable operational analytics is IBM PureData System for Operational Analytics. This solution, along with other IBM PureData System models and related information management and analytics technology, forms the core of IBM's Big Data Platform.

IBM PureData System for Operational Analytics

IBM supplies workload-optimized converged systems — PureData Systems — that are part of the PureSystems family of expert integrated systems. One of the PureData Systems is specifically designed for operational analytics, such as risk and fraud analysis and investigation.

IBM describes the PureData System for Operational Analytics pre-configured system as "a data warehouse system for delivering insights into business operations for real-time decision making." It is designed for the continuous ingestion of operational data, even streaming data for near-real-time data access — simplifying operations for such a demanding workload. Given the need to access the system during operations, even within a transaction, system availability is a design point with integrated backup/restore provided for recoverability. Performance on analytics is enhanced by in-database processing of analytical models, based on the approach that bringing the models to the data is more efficient than bringing the data to the models. Moreover, the use of compression and columnar access designed for analytics results in the ability to store much more data per storage array — a significant cost consideration.

Further specialization is enabled through the definition of patterns at the infrastructure level and the application level. These patterns can be specified by IBM or its partners or customers. The patterns provide a means to capture the learning from projects in a manner that can be replicated at other sites. The result is the reduction of specialized expertise required and the shortening of time for configuration and installation, resulting in faster time to benefit.

CHALLENGES/OPPORTUNITIES

There is a significant opportunity in meeting demand for operational analytics workloads, especially because they differ from industry to industry. Therefore, a purpose-built system for operational analytics is valuable; layering application patterns on top would make it even more valuable.

But there are challenges. The PureData System for Operational Analytics is designed to handle "big data" sets (high volume, variety, velocity), and that's important. But we are still in early days for fraud and risk analytics with big data. Companies will need references in their industry. They will also seek ROI benchmarks to help them make a business case for this investment. In the case of big data implementations, the ROI must be incremental — that is, what is the added benefit over conventional approaches, taking into account any added costs for managing, storing, and maintaining much larger and more diverse data sets? This challenge represents an opportunity. As IBM supports more installations, it can build up a library of patterns for operational analytics within specific industries that can provide a closer fit with a customer's specific requirements, reducing the amount of tailoring required for a specific implementation.

IBM is leveraging the experience of more than 500 clients and more than 10 years of development to provide a usable blueprint for both business and IT communities to accelerate analytics solutions. It packaged this expertise and industry knowledge in the form of logical data models for specific industries (IBM Industry Models) and physical data models for specific use cases, which can be leveraged by PureData System for Operational Analytics.

For more information about IBM's industry and data models, please explore the following Web pages:

- http://www-01.ibm.com/software/data/industry-models/
- http://www-01.ibm.com/software/data/infosphere/warehouse/packs/

CONCLUSION

Increasingly, the decision to acquire and utilize the appropriate technology will be influenced by line-of-business (LOB) managers. The latest IDC research indicates that just over 50% of new IT investments in 2013 will involve the direct participation of LOB executives; by 2016, that number will rise to 80%, with LOBs taking the lead decision-maker role in half or more of those investments. This trend puts new pressure on already stretched IT resources. In today's highly demanding environment for self-service operational analytics, IT needs to be able to react quickly and be ready to address evolving requirements.

To do so, IT leaders need to:

- Assess and evaluate the typical operational analytics use cases and resulting workloads. There's a difference among tactical, operational, and strategic decision-making patterns.
- Understand the unique requirements of the various decision-maker groups: executives, managers, analysts, data scientists, customer-facing employees, and customers. Each has different preferences for technology tools, data, velocity (currency) of data, patterns of interaction with the data, and scope of decision freedom.
- Recommend the most appropriate big data and analytics technology. This should be done after workloads and use cases are defined based on variables such as data types and sources, concurrent users, query complexity, expected scalability requirements, and security needs.
- Consider workload-optimized integrated systems as a viable option in the broader technology portfolio to support operational analytics needs. Adoption of integrated systems, or appliances, is growing. IDC research shows that *14%* of organizations today have deployed an integrated system for BDA and another 15% plan to do so within the next 12 months. Importantly, the rate of adoption of integrated systems among organizations that achieve BDA ROI within 6 months is *33%* — twice the rate of the total sample size.
- Consider factors such as power consumption, capacity, scan rates, availability, performance (both query and load speeds), and maintenance and administration costs when evaluating integrated systems.

RELATED RESEARCH

- *IDC Predictions 2013: Competing on the 3rd Platform* (IDC #238044, November 2012)
- IDC and Computerworld *Business Analytics and Big Data Survey,* June 2013
- IDC's *Big Data and Analytics Maturity Model Survey,* July 2013
- *Delivering OLTP Database Technology Aimed at Optimal Business Outcomes: IBM PureData for Transactions* (IDC #242818, September 2013)

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