It's all About Context

CONTEXT-DRIVEN APPLICATIONS FOR HEALTHCARE

The next generation of healthcare investment must focus on a **CONTEXT-ENABLED ENTERPRISE** using context-driven architectures and solutions to revolutionize how information is delivered to and used by consumers.

Pega

THE BUSINESS ISSUE

Large-scale, continuous change is disrupting the global healthcare market. Aging populations, increasing chronic illnesses, more demanding consumers and higher costs are stressing healthcare systems and driving the search for new business models. In response, healthcare organizations are redefining their strategies around a consumer-centric business model that focuses on incentives and engagement for better coverage, health and chronic disease management decisions.

Consumer centricity demands that health plans adapt and invest in technologies and processes that enhance, automate and digitize consumer interactions and information exchange. Seeking a rapid and cost-efficient market response and the means to effectively manage investment costs for new technology and business capabilities, healthcare organizations are increasingly adopting new business relationships, including partnerships and shared services agreements. And they seek technology solutions that will support consumer-centric healthcare delivery, enabling interactions with customers that are personalized and timely and which promote better health decision-making. In essence, health plans must find solutions that support the triple objective of improved cost, quality and outcomes.

THE SOLUTION

Consumer centricity and engagement requires that customers have timely access to relevant and accurate information with which to make healthcare decisions. However, one of the great and unabated conundrums across all global healthcare markets is the abundance of data and information, but an inability to use it effectively within the specific context of a consumer interaction.

The next generation of healthcare investment must focus on a context-enabled enterprise using **context-driven architectures and solutions** to revolutionize how information is delivered to and used by consumers. Leveraging the integration of business process management (BPM) applications, rules-based architectures and analytics, context-driven architectures can deliver, meaningful information that is relevant to the specific consumer and provides actionable insights—not just data, but insight into how to use information to make an informed decision. With a context-driven architecture, this meaningful information can be delivered within the context of each consumer interaction and using multi-channel delivery strategies.

Technologies exist today that provide relevant and actionable information specific to the unique consumer and interaction. These technologies enable healthcare organizations to transform largely blunt, one-size-fits-all engagement models into more refined, context-driven strategies that foster improved consumer engagement and decision-making. With agile technology, small, focused efforts can produce dramatic results which can serve as the building blocks toward a more comprehensive strategy. Using actionable, context-driven information embedded into each step in a healthcare process and a consumer interaction, healthcare organizations can achieve the triple objective of improved cost, quality and outcomes.

In this paper, we examine the requirements for a context-driven architecture. This discussion will help you understand the important components that will enable you to rapidly achieve the potential benefits of consumer-centric healthcare delivery.

INTRODUCTION

In 2015, the global healthcare market is changing faster than ever. For years, the revolution in healthcare was driven by advances in treatments and cures for complex diseases. While these trends continue, other equally impactful and fundamental changes are driving spiraling costs without the return of continued improvement in overall health. Consider that:

- Aging populations around the world require more and different models for customer service, care and care management.[1][2]

- Consumers seek healthcare services that leverage the myriad digital platforms and telematics accessible in their pockets—SMAC'T (social, mobile, analytics, cloud and Things) technologies and services that reach beyond the traditional healthcare ecosystem to directly engage the consumer in managing health, health care and healthcare expenses.[3]

Rising global rates of chronic diseases and improved treatment place new and costly burdens on healthcare organizations. This trend is not limited to developed countries. Some of the highest rates of increase for obesity, cardiac issues and diabetes are being seen in developing countries. Obesity has overtaken hunger as the greatest nutrition problem of our time. It is expected that by 2020, more than half of all deaths (57 percent) will be attributed to the impact of chronic disease. [4]

We are entering a new era of healthcare with the very context of healthcare changing. This transformation is creating new and more complex requirements for healthcare organizations. It is no longer enough to provide insurance administration or acute care targeted at curing specific disease. Healthcare organizations must use every tool to deliver appropriate healthcare customer service to all consumers—young, old, newly insured, healthy, chronically ill, health care delivery teams like PCMH, employees, and governments. For example:

- Adherence programs are an area of growing interest for all populations. These programs engage consumers with managing their own chronic diseases, providing information to help them make healthy choices and prevent them from experiencing the worst and most costly side-effects of disease.

- The rise of the Internet as the source for patient health care information and insurance shopping drives demands for healthcare organizations to become healthcare advisors. [5]

RETAIL, INTERNET OF THINGS

HEALTHCARE ORGANIZATIONS
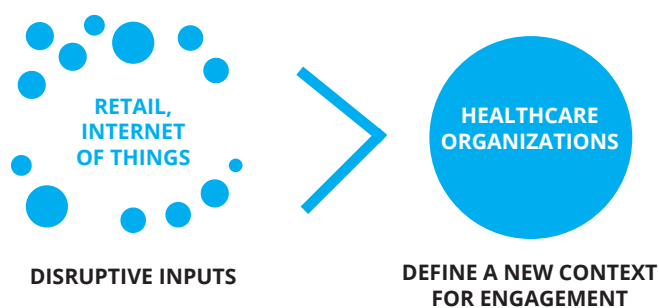
A myriad of disruptive factors are changing the way healthcare organizations engage with their customers, requiring interactions that are targeted and specific to the context of the individual and the situation.

DISRUPTIVE INPUTS

DEFINE A NEW CONTEXT FOR ENGAGEMENT

The cost of care continues to skyrocket around the globe, creating economic burdens on all healthcare systems and governments. These costs are driving the development of complex health insurance benefit and reimbursement strategies that redistribute risk among patients, providers, insurers and governments. Complex benefits and reimbursement, along with the above health trends, are creating greater administrative burdens on healthcare organizations. Unfortunately, many of today's healthcare organizations struggle with legacy technologies that have been in place for decades and which thwart change. In addition, addressing customer service and operations burdens requires investment in a climate where investment opportunities are constrained by changing regulations.

With all these challenges, there is also unparalleled innovation and opportunity, creating unplanned and unknowable additional requirements. Leading healthcare organizations look to create new ways to monetize existing technologies by offering shared services to their partners and competitors. Business units within healthcare organizations seek similar approaches to creating revenue based on existing excellence in operations, and partnerships are emerging to create communities to manage customer and patient healthcare service delivery and management. [6]

3 KEY INDUSTRY TRENDS

In this business climate, IT departments in healthcare organizations struggle to support the expanding business needs with fewer and more focused investment dollars as well as an aging workforce. ROI demands for all IT investments further restrict choices and create additional requirements. A point solution is no longer a compelling value proposition. Technology investments must be multi-faceted in the capabilities they enable, with every new project delivering along multiple dimensions.

In our work with Pega healthcare customers, we have identified three key trends that industry leaders are adopting:

- **Consumer First:** Healthcare organizations using a "Consumer First" strategy understand that they are custodians of the health information belonging to their customers. They seek to create complete transparency of all relevant healthcare information and are mindful of security concerns and obligations. Their customer service solutions try to engage consumers where they are—in the stage of the customer journey, across channels, with their devices and information, in their healthcare experience. The customer experience creates two-way learning to enable customer interactions that build "sticky" relationships. Content is curated and provided to create rich self-service experiences that satisfy customer needs and eliminate calls to the contact center. The information is not simply administrative: advanced service technology anticipates consumer-directed care decisions with financial impact on the consumer and financial/operational impact on the healthcare organization.

- **Context-driven:** In traditional architectures, a single system is used to define the business process and its variations or alternatives. Organizations adopting "context-driven" BPM create smart business processes that learn by deriving actionable information from data integration and external systems. They leverage a wide range of analytic capabilities at the moment of impact to create context-driven interactions and next-best-actions. The variability of context, and therefore the personalization capabilities of these applications, expands exponentially, enabling existing technology to participate in the creation of new user experiences.

- **Nimble redefinition of the enterprise:** Redefining the enterprise for healthcare organizations means providing support for complex "beyond the border" business models to flexibly leverage new partnerships in an expanding ecosystem that is personalized for each customer and trading partner. It requires the ability to deliver new platforms with agile and less expensive projects and to enable business users to leverage the same modern technology and experiences in the office that they use in their personal lives. Redefinition focuses technology investments to simplify and streamline operations using a thoughtfully integrated platform to deliver tactical and strategic enterprise results with all IT investments.

CONTEXT-DRIVEN ARCHITECTURES

As an aggregate, these capabilities define Context-Driven Architecture for healthcare organizations. Context-driven architectures have been discussed for some time now, and there are plenty of success stories in other industries. Context-driven architectures—also called context-aware systems—perceive the context and provide services that are adapted to every interaction. [7]

Unlike traditional architectures which address integration and analytics as infrastructure "applications" in separate functional silos, context-driven architectures position a range of analytics capabilities as the drivers of business processes. Pervasive analytics of all types and from all systems, including external sources, are used to drive user experiences. Analytics in the context-driven architecture is a framework that delivers actionable information to define the user context. Actionable information is defined as that which is:

- Accessible (meets user experience needs for immediate recognition and comprehension)

- Meaningful (uses all information regarding the context of an interaction to predictively and adaptively personalize both content and presentation to fit the user context)

- Actionable (provides analysis of the benefits of clearly defined and distinct alternatives)

To create context-driven architectures, organizations need to move away from the currently disconnected world of back-end business intelligence/analytics which is isolated from customer service and engagement. There is a need for context-aware analytics solutions to enable truly context-driven architectures. Key characteristics of context-aware solutions include:

- Seamless plug-and-play integration with diverse unanticipated data sets (genomic, fitness, social media, etc.)

- Generation and delivery of actionable insights in real time

- The ability to leverage customer interactions and workflow context to continuously update analytics insights

However, investing in big data infrastructure and high-end analytics tools doesn't guarantee realization of business value.[8] Specifically, the data needs for healthcare organizations (in comparison with Google or Facebook) do not always justify the need for Hadoop-based big data platforms,[9] and the focus needs to be more on using existing tools to realize the value of data.
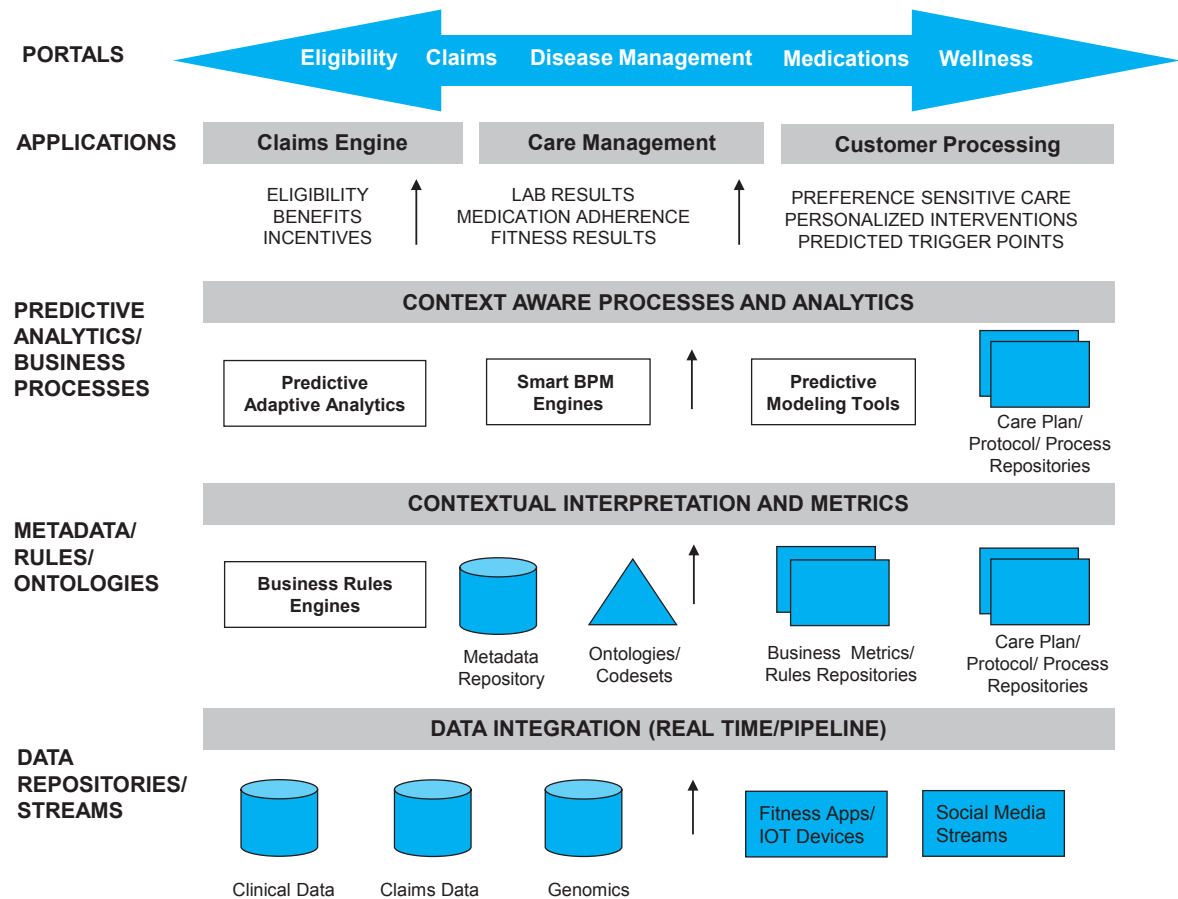
REQUIREMENTS FOR A CONTEXT-DRIVEN ARCHITECTURE

There are three key capabilities required for a context-driven architecture as follows.

FOUNDATIONAL INFORMATION AND DATA MANAGEMENT

Organizations need to build up foundational information and data management capabilities that enable specification and computation of analytics across multiple contextual dimensions. Ensuring data quality requires identifying a single source of truth and establishing governance mechanisms. In addition, new and conventional data, such as genomics, fitness and social media, need to be exploited with analytics solutions that can leverage these and other yet unknown data types that emerge in the future in a seamless plug-and-play manner.

Capturing the semantics of the underlying domain explicitly requires a robust metadata management layer which creates, reuses and manages healthcare taxonomies and ontologies (for example, ICD-9 and SNOMED, respectively). This is needed to enable semantic integration and contextual inferencing across multiple dimensions. Finally, the need for real time insights requires novel federated data integration pipeline architectures that deliver (partial) results as they become available as opposed to waiting a long time for the final result.

METRIC PLATFORM

After establishing foundational information management capabilities, the next need is to establish a platform for creation, management and deployment of metrics and scorecards. This includes business-friendly tools for defining critical metrics and scorecards along with their business rules. There is a need to store, manage and reuse these business rules, associated metric definitions and their business impacts along with traceability and links to knowledge management sources to provide meaningful explanations for all users. This provides the basis for configuration and deployment of deep context-aware analytics.

MULTI-DIMENSIONAL, DYNAMIC PREDICTIONS

A key component of context-aware analytics is the ability to understand the customer across multiple dimensions and detailed granular segments and evolve this understanding longitudinally, over time. This includes a stratifying theme based on an accurate understanding of the customer's risk (enabled by genomic data) and segmenting customers based on their attitudinal and behavioral characteristics. This enables prediction of trigger points at which customers are likely to deviate from optimal/normal behavior, such as non-adherence to a medication. Real-time updates based on new data and changing customer interaction contexts can enable adaptation of the predictions. Finally, the promise of context-sensitive architectures is achieved by the ability of the analytics platform to suggest personalized interventions based on the current knowledge and context of the customer, such as identifying opportunities for proactive outreach for high-risk customers at the most probable stage of medication non-adherence.

SUPPORTING KEY HEALTHCARE ISSUES

Context-driven architectures can be used to address important challenges in healthcare including consumer-driven health plan selection; making diagnostic examination protocols more efficient and compliant with healthcare organization policies; and engaging remote consumers in chronic disease leveraging their personal electronic devices.

CONSUMER HEALTH INSURANCE PLAN SELECTION

Consumer-driven health plans (CDHP) provide lower-priced health insurance while putting the consumer at the center of care delivery decisions. Specific choices are encouraged or discouraged with financial incentives. In theory, CDHP consumers are able to make choices that balance their own health, financial and risk profiles. Originally offered in the 1990s, there was great expectation that these plans would rapidly gain market share. Nearly two decades later, significant barriers exist in selection of CDHP, and basic literacy of health insurance benefits and policies remains low.[10] Consumers need transparent information about choices they must and may make, and the information presented must be relevant to their individual choices, such as the context of consumer location, complete benefit plan options, total health condition and financial circumstances.

As health insurance benefits begin to resemble other kinds of insurance (such as auto or home insurance), the science of consumer engagement can be used to help healthcare organizations segment populations. Segmentation can be used to drive customer service applications that behave differently, depending on consumer choices and desires for decision support.[11] Leading organizations are beginning to utilize context-aware technology that simultaneously creates a common experience (health benefit plan selection) with personalization to reflect the best choices available for both the consumer and the health plan. It is collaborative, two-way learning that takes us in a direction of informed consumers who can make more effective choices. Such technology is employed today in other areas like communications. (See Use Case One below for an example.)

PATIENT-DRIVEN CARE PROTOCOL

Care of patients with complex medical conditions is confounded by the myriad information that is needed. Data collected by various physicians in a variety of practices needs to be integrated to develop the set of overarching information required to treat the whole patient. Insurers require specific data to support claims and referrals to providers may be restricted to a limited set of services which will be reimbursed. As a result, tests can be missed or duplicated with consequent impact on patient care. Patient examinations are fragmented as practitioners explore each potential condition in sequence, creating longer clinical time with lower value for the patient.

Leading healthcare organizations are creating context-driven architectures to dynamically generate examination protocol. A set of current conditions (context for care) is derived from information supplied via integration (referrals, records, ADT messages, telematics devices owned by the patient, etc.) Each condition is associated with a codified protocol. The work associated with condition is coordinated across the care team with each clinician "assigned" work that is appropriate to the patient and the clinician's expertise. All practitioners have access to the complete diagnostic record. Treatments are optimized, foundational tests are not repeated, comprehensive examinations are completed and information captured during the evaluation is analyzed to dynamically adapt to the context of the patient. When an anomaly is detected by the clinician or the analytics, the additional data is immediately available to the organization. Organizations can extend this capability to include preventive services and health-system business policies, such as offering all customers a flu shot in the autumn. (See Use Case Two for an example.)

Use Case One:

OPTIMIZING THE CUSTOMER EXPERIENCE THROUGH IMPROVED RELEVANCE, INTELLIGENCE AND CONTROL

While this use case is not for a healthcare organization, its lessons are applicable. It shows how understanding the customer's context can improve customer experiences in ways that benefit both the customer and the company.

A major U.S. Communications Service Provider (CSP) envisioned combining real-time context about the customer, gathered from all channels including social, with sophisticated analysis of the customer's behavior to improve the experience across every channel. This would enable the CSP to optimize each interaction as well as tune their interaction strategies to drive business results in real time.

Using a context-driven architecture, the CSP launched a browser-based customer service representative (CSR) portal for over 20,000 agents that guides all credit request interactions. The user experience provides a comprehensive view of the customer's profile, guides the CSR to locate a charge in question, presents personalized options for preventing the situation in the future, and guides the CSR through a negotiation to arrive at the best alternative for the customer and the CSP.

The solution has resulted in a greater than 50 percent reduction in the CSP's monthly spending on courtesy credits (versus control group performance) with no impact on the customer churn rate. They have lowered their handle time on credit-related calls by 2 percent and re-balanced their credit spending to focus spending on appropriate customers. Based on feedback for the initial context-driven solution, the CSP has tuned its credit strategies to modify overall corporate performance.

With an agile, iterative solution, a change that would have taken weeks or months to roll out manually across contact centers nationally can be done in minutes through configuration. The success of the first implementation has led the company to aggressively use the context-driven technology to improve the relevance, intelligence, and control of additional customer service interactions in retail channels, on the Web, and within the IVR.

Use Case Two:

CONTEXT-DRIVEN CARE IMPROVES PBM'S PATIENT SATISFACTION AND HEALTH OUTCOMES

After significant international expansion and growth beyond core PBM business to areas like Medicare and specialty drugs, this top five Pharmacy Benefits Manager (PBM) targeted personalized medicine as key to engaging patients in their own health improvement. The PBM envisioned a clinical engagement and personalization engine that would prompt and guide real-time, patient-centered opportunities based on up-to-date clinical, engagement, cost, and compliance rules and data across all communication channels.

Using a context-driven architecture for its market-facing processes, the PBM can provide personalized care at all patient touch points. A clinical engagement and personalization engine combines intelligent routing, alerts and notifications with extensible patient workflows and assessments. These capabilities facilitate differentiation, compliance and efficacy by making it easy for the PBM's experts to author and maintain clinical rules and engagement protocols.

The deployed application senses and responds to patient events, such as claims, survey information and real-time activity with the PBM's devices and channels. It also identifies and activates best-fit clinical strategies and supports patient-centric care through its comprehensive clinical patient composites. The application orchestrates patient-specific clinical counseling and physician-directed guidance including real-time Medication Therapy Management, care gap detection and prevention, adherence, and cost savings programs.

The PBM has realized both productivity and customer satisfaction improvements by leveraging Pega for its clinical engagement and personalization engine. Opportunity prioritization and automated processing helped increase pharmacist productivity by 30 percent. Differentiated care programs have improved health outcomes from 10 to 15 percent, generating adherence gains and their corresponding cost savings. Speed to market for new programs and program enhancements was slashed in half, and both employee and customer satisfaction scores soared as the PBM focused clinician support to provide personalized care where it was needed.

CREATING THE CONTEXT-ENABLED ENTERPRISE

The good news is that agile, responsive context-driven technology is available today. Healthcare organizations seeking to leverage context-driven architectures can benefit from the agility and adaptability this technology offers to sharpen their focus on specific, critical problems and incrementally deliver solutions. Projects can be sized to deliver business value over time.

There are several important points to keep in mind when beginning a journey with context-driven technology. These will help you reap the biggest benefit for your customers, delivering engagements that are rich, satisfying and effective, while increasing the efficiency and adaptability of your organization.

- **Take the view of the consumer:** Understand and manage the dimensions of context for all consumers and users in all interactions. Operationalize this complete view and make it accessible across all channels and internal departments. Expect the view to take on new levels of individualization as consumers seek to create their context in the cloud, and expect your organization to leverage this context in customer service.

- **Create reuse and specialization:** Understand your consumer segments, and use context-driven technology that enables you to create common solutions which can be specialized when needed to address specific consumer context. Leverage dynamic business rules and workflows to define, execute and manage these different contexts.

- **Create new growth opportunities on existing technology platforms:** Leverage the underlying capabilities of the enterprise to create new value. Using real-time analytics and context-driven architectures can enable new arrangements with trading partners as information from the enterprise and the world of SMAC'T becomes the new operating context.

CONCLUSION

Disruption has become a way of life for the modern health care organization. In a 2009 interview with CNN, Bill Clinton pointed out that with the passage of Patient Protection and Affordable Care Act, the challenge to the US healthcare system is to improve cost, quality and outcomes. This is a challenge faced by healthcare systems around the globe.

Meeting this challenge requires a new model for healthcare technology with architectures that can create customer-in-the-center models for care delivery and administration and deliver the flexibility and adaptability required to succeed in a world of unrelenting change. Context-driven architectures provide a framework to create compelling new experiences and new growth platforms by supplementing existing technologies with focused investment. The challenge is great. The opportunity in 2015 is even greater.

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[10] http://kff.org/health-reform/poll-finding/assessing-americans-familiarity-with-health-insurance-terms-and-concepts/

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