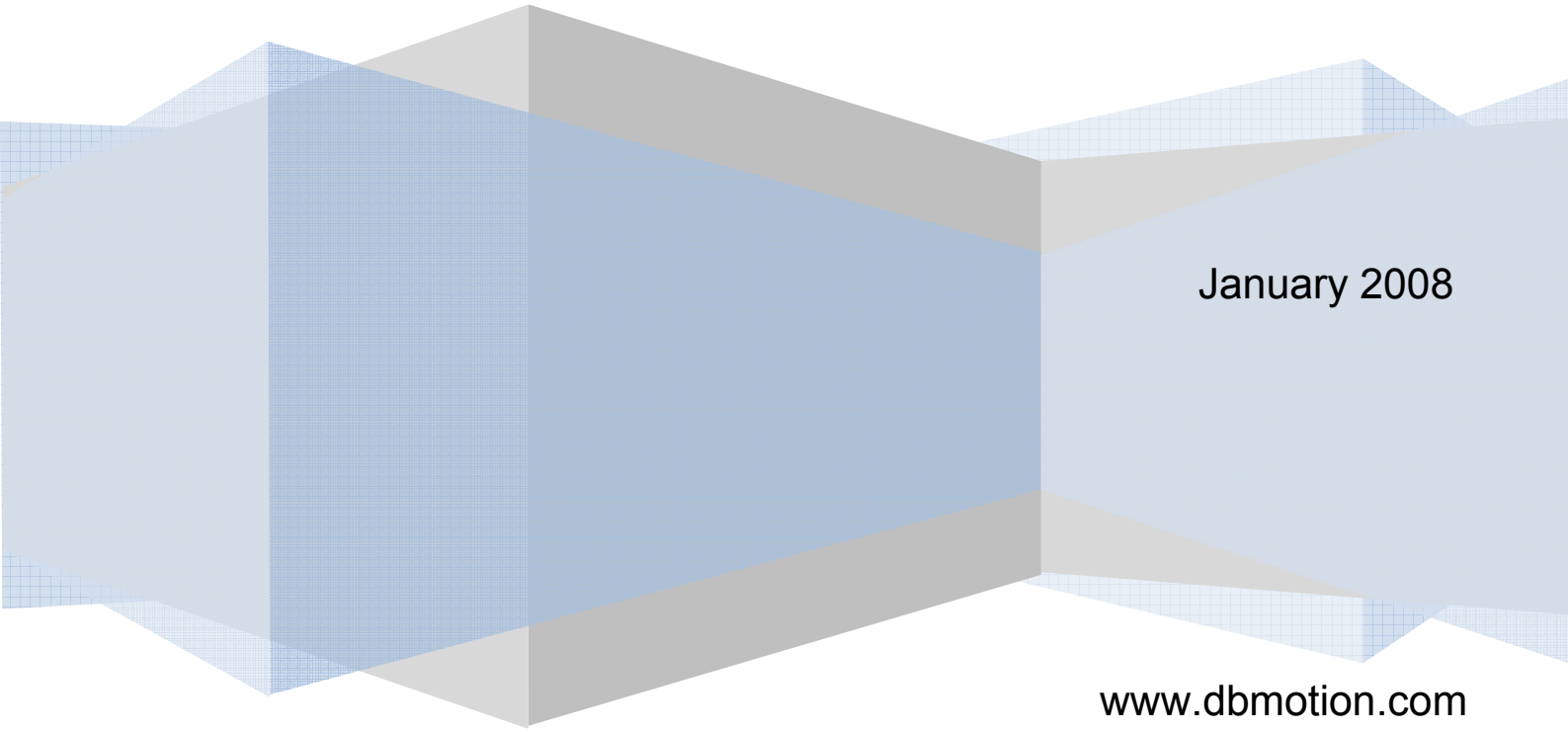
White Paper:

The Critical Role of Integrated Patient Information in the Delivery of High Quality Healthcare

A service oriented architecture (SOA) based solution for health information exchange (HIE) and interoperability provides both caregivers and applications comprehensive and accurate medical data



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Executive Summary

The medical world is making astounding, constant progress. Tools available to caregivers are continually improving, increasing diagnosis and treatment options. This trend has significantly increased total patient medical data. Concurrently, patients are becoming increasingly mobile and seeing more caregivers than in the past. Together, these trends have resulted in numerous partial medical records scattered among physicians, systems and institutions; as opposed to a single, comprehensive medical record kept in a single location.

Different medical institutions, and often departments within the same institution, use a wide variety of systems for storing medical information (sometimes referred to as 'information silos') that are rarely well-integrated. This data dispersion typically results in time-consuming and painstaking efforts to obtain a patient's complete medical record, or make use of the information obtained.

Healthcare organizations have a vested interest in creating an infrastructure that delivers integrated patient information. Not only is the outcome of care improved when caregivers have complete, usable data, but additional benefits are immediately acquired. These benefits include improved operational efficiency, easier compliance with regulatory requirements, a reduced need for investment in IT systems and implementation, the ability to measure and manage quality of care and participate in research, and much more.

Information systems available to healthcare organizations until now have not been able to fully to deliver these benefits. This is primarily due to IT systems lacking a common or standardized method of representing clinical data (nomenclature, terminologies, coding systems, etc.). In addition, the high degree of specialization demanded by clinical practices, as well as the tendency of healthcare organizations to adopt a best of breed approach for IT systems implementation, has increased the level of diversity and disparity of data. Consequently healthcare organizations have been forced to settle for basic, limited levels or integration of their clinical applications.

Overcoming the challenges of non-integrated data and systems, and creating a holistic view of a patient's care, can be done by building a patient-centric infrastructure based on interoperability. This enables disparate data information systems that store data in different formats, and potentially at different locations, to communicate and make use of integrated data that provides caregivers, institutions and applications with an accurate, longitudinal view of the entire medical history of the patient. Such a system also sets the foundation for true semantic interoperability that enables further interpretation and understanding of the data.

Based on service oriented architecture (SOA), the dbMotion™ Solution enables effective exchange of health information between and within organizations, while maintaining the highest levels of security and privacy.

The dbMotion Solution is designed to overcome data integration barriers and provide caregivers online access to a patient's comprehensive medical history, subject to privacy safeguards, while enabling policy-makers maximum flexibility to implement desired strategies for patient information management.

The inability to efficiently and accurately create a patient's integrated health record from disparate sources is detrimental to the healthcare system – to the individual patient, to the caregiver, and to a healthcare industry that is expending vast resources trying to improve healthcare delivery.

Two commonly cited reports that examine this situation are:

- *"To Err is Human: Building a Safer Health System"* (1999 – Institute of Medicine) indicates that in the United States 44,000-98,000 patient deaths are caused annually by preventable human medical errors. These errors also result in total costs of between $17-$29 billion annually in hospitals alone. One reason cited for these losses is the decentralized nature of healthcare provision, preventing any single caregiver from receiving complete patient information.
- *"The Value of Healthcare Information Exchange and Interoperability",* a 2005 study from the Center for Information Technology Leadership (CITL), reported possible annual savings to the US economy alone of $78 billion from information exchange in the US healthcare system.

The Need for Integrated Patient Information

Medicine is an information-rich field. Medical information is created and consumed at every level of care – from admissions, where patient demographic data is recorded, through initial care encounters when vitals are taken, to complex tests and procedures such as MRI scans and nuclear isotope testing.

In addition, patients are increasingly mobile: they visit different caregivers in diverse locations and healthcare organizations, travel nationwide, and move freely between hospitals, community clinics, specialized care centers and other parts of the continuum of care. Also, medical and technology developments have led to greater specialization, leading to patient treatment by an increasing number of caregivers.

These factors create a reality in which medical records are scattered in various locations and formats, and among multiple providers – making it practically impossible for any single healthcare professional to obtain a patient's complete medical record. Treating physicians and other healthcare professionals attempt to collect the patient's relevant medical background in various ways: from the patient, by telephone or fax, and sometimes electronically. Under the best circumstances, these information collection methods are problematic. They are inefficient, requiring excessive time and effort and often run into barriers caused by objective and subjective reasons, patients might not always be aware of a condition or have the communication skills to share their knowledge and disparate information sources make it virtually impossible to ensure that all relevant data has been collected. Furthermore, even if many of the data sources are accessed, the task of assembling all the discrete portions of data into one cohesive "patient record" can be daunting, if not practically impossible.

Consequently, many medical care encounters take place without all the relevant medical information thus impairing adherence to quality and reporting initiatives.

In addition, two important and influential recurring issues – both in research and the media – result from this situation that have logical conclusions but are quantitatively immeasurable:

- **Patients' trust in the healthcare system** is severely harmed when they face healthcare system inconsistencies, must answer questions over and over, and/or repeat recent medical tests.

  Creating an integrated patient record – thereby addressing system inconsistencies – saves patients' time, bolsters credibility in caregiver services, and improves patient-caregiver relations.

- **Medical staff performance and satisfaction** both suffer from the disproportionate need for administrative tasks at the expense of providing patient care.

  Reducing the administrative burden clearly allows medical professionals more time and lessens stress, enabling them to pay more attention to patients and provide better care.

It is indisputable that an integrated view of a patient's history provides value to clinicians. The history of medical conditions and tests, medications, sensitivities, and more, enables medical caregivers to be more effective in both diagnosis and care.

But clinicians are not the only beneficiaries of an integrated patient view – comprehensive information about patients and their care history helps meet the needs of all stakeholders in healthcare organizations. A solution that provides this ability is agnostic to whether an organization is public or private, and if information is assembled and stored in a centralized or distributed system.

Without doubt the most effective method today for providing a real-time view of patient data is through health information exchange (HIE) that is based on service oriented architecture (SOA) and interoperability. So why isn't this approach the standard today?

Health Information Exchange (HIE) Benefits:

- **Caregiver support**
- **Quality measurement and management**
- **Compliance & Reporting**
- **Continuity-of-care**
- **Leverage existing IT infrastructure**
- **Enterprise decision support**
- **Research and analytics**

The Challenge: Disparity of Data, Locations and Formats

In spite of the broad consensus on the benefits of health information exchange, few inroads have been made towards actual adoption and implementation. The essence of the challenge before any organization seeking to integrate patient data into comprehensive, usable records lies in gaining access to the data, integrating it and enabling interoperability between the systems where the data resides.

Two major types of obstacles – technical and policy - have hindered the creation of effective healthcare information exchange:

Technical Obstacles

Different departments and specialties within the medical profession tend to select best-of-breed information systems that address their particular needs. By their very nature, transfer of information between these disparate systems is challenging – even within an organization. And when considering integration of medical records between different organizations or even among independent facilities within a single organization, the complexity increases even more amid the increased variance in types of systems. This also corresponds with a decreased likelihood of a single IT administrator/department able to deal with the challenges these varied systems present. Furthermore, coding vocabulary, lexicons, patient identifiers and data structures which are neither uniform nor standardized also contribute to the complexity of meeting the obstacles of successful information transfer.

Policy Obstacles

Handling medical information is a very complex and sensitive issue, from patient privacy and exposure of medical information, to issues such as ownership of information and potential misuse of medical records. As more organizations/caregivers participate in a health information exchange network, the greater the benefits that can be derived as more information becomes available to the network's users. However, the involvement of more parties increases the complexity due to differing individual views, opinions and management styles. These policy issues create a need for a specialized technical approach and tools that ensure that the specific interests of member organizations are preserved and flexibility is maintained to allow for changes and developments.

Evidence shows that successful health information exchange solutions can be achieved if implementation is combined with a forward thinking approach that maintains the independence of its multiple stakeholders where needed and applies a proven model that addresses the technological and policy aspects outlined above.

Existing Approaches to Health Information Exchange (HIE)

An organization (or group of organizations) that is considering undertaking a health information exchange project should evaluate several issues before selecting a solution. First, the organization must understand the variables involved in any choice – from costs, to implementation issues, to future-readiness. Second, careful consideration should be given to both the short and long term goals of the project. And third, the organization should understand the strengths and weaknesses of each solution and its approach to information sharing from a structural point of view: what does the proffered solution provide, how does it provide it, and most importantly – what does it *not* provide?

Variables to Consider in Selecting a Solution for Information Sharing

The following table briefly covers the main points to be considered when evaluating a solution:

Variable to Consider	Details
Financial	What are the costs of the proposed solution? Both start-up costs (implementation, preliminary training, necessary hardware and software) and long-term operational costs (maintenance, upgrades, etc.). Will it require unforeseen financial investment?
Utility	Is the sole goal of your initiative the creation of a portal view of patient information, or do you have additional needs that could be satisfied by access to comprehensive and integrated data, such as quality measurements and compliance/reporting? Does your IT strategy call for an infrastructure that allows rapid creation and deployment of new applications as new needs emerge?
Adoption by Caregivers	How will the new system affect current workflow? What will be required of users to start using the system? How likely are the users to reject the system?
Scope	How does the proposed solution deal with challenges relating to patient identification? Does the solution accommodate the network's choice of patient opt-in or opt-out approaches? Is the solution capable of truly supporting complex auditing functionality that enables operational transparency?
Scalability	How complex is the addition of new data sources, systems and/or organizations? How can new applications be added to the system? Does the proposed solution offer a natural path for new services to be added on?
Flexibility	Different organizations often have different requirements - can the system support this diversity? How much variation can be supported among different systems contributing or consuming data? Once the system is up and running, how much freedom to change can be accommodated?
Integration	How is the medical information integrated? Is the caregiver provided with a consistent patient record or a collection of documents and other pieces of information? How are duplications and/or data inconsistencies handled? Does the caregiver receive a single integrated patient record or a list of references to partial records stored in different systems?
Regulatory	How well is the solution adapted to comply with national laws and regulations (such as HIPAA in the USA)? Which security features does the system support? Who controls the information in the system?
Semantic Interoperability	To what degree does the system provide a foundation to go beyond "basic" interoperability and reach true semantic interoperability, as it evolves, with all the benefits that entails?
Reliability	What is required in order to make the solution reliable? How likely is it to fail? In case of failure, what are the consequences?

Current Approaches to Information Sharing

Portals

This type of solution involves the creation of a user interface that can work with information from different sources and manipulate the way it is presented. Typically, it involves a bottom layer that is responsible for aggregation of information, and a top layer in which the information is presented to the caregiver. For example, such a portal can divide the screen into parts and show data from a different source in each part, or it can provide access to the data in a hierarchical structure.

Portals provide advantages in areas such as flexibility, availability, and to a limited extent security, because information remains where it is created and each organization is free to administer its resources as it sees fit. However, portals offer limited use of the information. Usually, display is the only possible feature with limited advanced functionality and no option to serve as an infrastructure for the development of other applications. Because information is only handled in the presentation tier, the type and depth of data manipulation, cross-reference and analysis are limited. Furthermore, minimizing the solution to only presentation and data access fails to fully address the complex system-wide challenges that relate to issues like patient identification and auditing.

Portal Advantages	Portal Disadvantages
▫ Easy to view available information ▫ Immediate availability ▫ Basic security	▫ Limited information integration ▫ Limited scalability ▫ Cannot serve as a platform for applications ▫ Highly limited ability to apply rules and business logic

Single Vendor (Monolithic/Suite)

This approach involves replacing the majority of information systems used by network participants with a product line from a single vendor, centered upon their EMR solution. The rationale behind this approach is that a single vendor can provide connectivity and full synchronization between different parties, as well as uniform workflow for all participants. This can resolve major IT concerns of the organization – which might be worthwhile, no matter how expensive in time and money resources the adoption process may be.

However, a project that involves replacing multiple existing systems poses major implementation challenges, expenses can be very high, and participants are required to adapt work methodology to the new system and workflow. This complex and all-encompassing approach increases the probability of not meeting the project's goals. Incidences of low adoption rates by end-users are common in the medical software marketplace and rejected software is an outcome any organization wants to avoid. The enormous cost this approach's complexity is likely to bear – both in payments to vendors and in implementation efforts – is a factor that cannot easily be dismissed. Moreover, this approach often cannot scale to the current or future needs of large enterprises. The typical lack of SOA functionality means that the solution is not future-ready and has limited ability to address an organization's specific need for new applications. Furthermore, single vendor systems are often the product of acquisitions made by the vendor, or by independent internal development efforts, resulting in a limited degree of integration that thereby negate this approach's original goal.

Adoption of this approach is often considered by healthcare delivery organizations, but is typically inapplicable to a community aiming to share medical information across independent organizations.

Single Vendor Approach Advantages	Single Vendor Approach Disadvantages
▫ Member systems are generally synchronized, sharing workflow and methodology ▫ Benefits from vendor's EMR core capabilities regardless of HIE	▫ Costly and lengthy implementation ▫ Requires major change management with risk of end-user resistance ▫ Commitment to one vendor = low flexibility (current and future functionality) ▫ Successful implementation often not fully attainable

Personal Health Record (PHR): The Patient as Information Conduit

Another approach relies on the patient to maintain and deliver medical information. This is done in one of two ways – either patients carry information on a portable media device such as a Smartcard or USB drive, or patients use a website where their information is stored (this usually involves a centralized database).

The advantage of this approach is clarity of medical information ownership and the simple access it offers to information. However, it is often mistakenly assumed that this approach eliminates problems of policy and cross-organizational integration. A serious issue exists with defining who manages the information in practice – patients usually lack the expertise required to manage their own medical records, creating additional workload for the physician who is expected to maintain this "private" record in parallel to existing requirements for clinical documentation. Issues such as backing up data and maintaining privacy also require serious consideration because USB devices with full medical records will inevitably get damaged or lost.

Upon careful examination, this approach is superficial and fails to meet the requirements relating to information backup, consistency and synchronization. Therefore, it is realistically relegated to serve as an extension of one of the other approaches, and not a solution in itself.

PHR Advantages	PHR Disadvantages
▫ Clear ownership of information ▫ Simple access to information	▫ Privacy not easily maintained ▫ Who manages the information? ▫ Policy conflicts ▫ Backup issues

A Different Approach: Create a Single Patient Record through Interoperability

The realistic and "future proof" way to achieve an actual, real-time picture of a patient's medical history is with a solution that provides interoperability – creating a unified patient record from the various sources holding patient data, no matter where they are located, or in which format. The solution must accomplish this while adhering to privacy and security policies as well as auditing requirements of the organization/s and relevant regulating authorities. Moreover, the solution must be able to resolve issues of identity (name with/without middle initial, married/maiden names, and so on) and to deal with situations in which one patient may have more than one registered identity within and across information systems.

Furthermore, the true benefits of interoperability will only be realized when the integrated patient information is used not only by means of having it presented to the caregiver via a portal of some sort but rather by leveraging the data as a key clinical asset and using it to meet the needs of quality, compliance and management initiatives such as Pay-for-Performance (P4P), JACHO/ISQua reporting, Medications Reconciliation, Public Health Monitoring, Clinical Research and more. The challenges that most organizations deal with in their quest to execute these initiatives mainly revolve around dealing with the lack of access to the broad set of medical data required for successful implementation. A robust interoperability solution holds the key to unlocking this information and turning such initiatives into a reality.

Today, this vision is made possible by dbMotion. The core ability of the dbMotion™ Solution lies in creating a single, unified patient record based on data from different information systems, formats, sites and if needed even across organizations, enabling the data to be integrated, analyzed and used – without affecting the systems in which information is stored.

A Complete Solution: Transparent to Users, Agnostic to the Need It Serves

Based on service oriented architecture (SOA), the dbMotion Solution enables health information exchange (HIE) and interoperability and sets the foundation for semantic interoperability. It does not mandate any particular data architecture because it supports any degree of data centralization or distribution. It provides a platform that serves as a foundation for organizations to develop and deploy applications that make use of integrated patient information.

The dbMotion Solution not only performs the complex task of setting up the infrastructure for the communication or exchange of clinical data, it also provides users a holistic and comprehensive view of the patient's medical history. The Solution creates a Virtual Patient Record by aggregating medical records from different sources of information and integrating them into a usable format. To caregivers, however, this process is transparent; they receive a single medical file with all the information they need through a convenient web interface.

> "Service-oriented architecture (SOA) is an approach to building applications that enhances code reuse and agility, and it provides a good framework for integration with legacy applications. Moreover, healthcare-specific SOA toolsets should contain, at least, a clinical data repository capable of maintaining complex structured clinical data with full fidelity, an application programming interface that provides services to support healthcare-specific functions (such as managing patient identity, accepting and tracking complex orders), and the ability to provide the data interactions necessary to build complex composite applications, such as producing a summarized patient health status screen."
>
> **Gartner Industry Research, Hype Cycle for Healthcare Provider Technologies and Standards, 2007**
> *Wes Rishel, 11 July 2007*

The dbMotion Solution goes beyond simple presentation of patient data. It is not limited to serving as a physician portal; rather, it provides an infrastructure for interoperability – within and between enterprises, and across various enterprise systems. It creates a Virtual Patient Object (VPO) and functions as a virtual or physical clinical data repository. With no active intervention on the part of the respective owners of the various data elements, it compiles a well-organized, security-controlled collection of medical information that includes results from medical domains such as labs, medications, patient administration (ER visits, inpatient and outpatient episodes, and so on), diagnoses, procedures, discharge summaries, ER data, imaging and pathology reports, hypersensitivity information, and a variety of other medical domains from primary, specialty, and acute care settings.

These capabilities lay the foundations for a variety of services that can be developed according to each organization's needs, for example: public health monitoring, patient-centric medical consultation and advanced alerting rules.

A Solution that Accommodates any Information Architecture

In a **centralized configuration**, the dbMotion Solution creates and maintains a persistent central repository (CDR) for clinical data integration. The CDR, combined with defined business logic and SOA, enables any authorized consumer (whether a user such as a caregiver, or an application) to view and use the integrated data and services.

In a **distributed/federated configuration**, the dbMotion Solution eliminates the need for centralization of either data, or components of the information-sharing system. In the distributed configuration, network members continue to control their own information and systems, and also determine their own policies for sharing information. Upon request by an authorized user, the dbMotion Solution collects the relevant data from wherever it resides, and then integrates it and delivers it to the requestor. The data in the original location remains intact, with its original format, location and ownership.

Even those components that were once considered necessary to centralize in order to achieve interoperability and enable HIE, such as a Master Patient Index (MPI) or Security & Authorization mechanisms can, in many cases, remain distributed with the dbMotion Solution.

The dbMotion Solution also comfortably accommodates **hybrid configurations**, which require some centralized and some distributed components – to any degree of hybridization required by the organization.

Solution Features

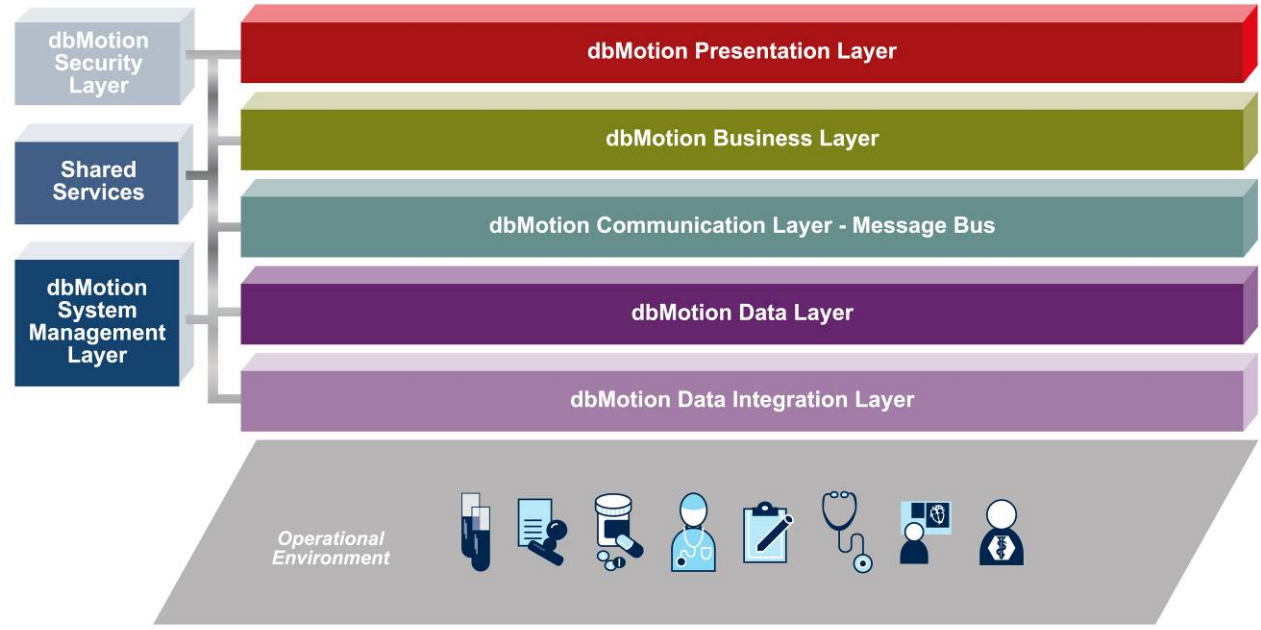
- **All-encompassing solution:** Facilitates access to a comprehensive medical record based on a complete product set – ranging from data integration tools to a clinical viewer.
- **SOA-based platform for interoperability:** Enables the utilization of existing systems and the development of new applications to address key healthcare business issues such as quality measures, compliance, disease management and more.
- **Robust healthcare-centric platform:** Covers a broad set of needs and use cases, developed by and for healthcare professionals.
- **Open system for data integration:** Integrates applications with no dependency, limitations or need for modifications, whether based on standards, guidelines (e.g. IHE) or proprietary interfaces.
- **dbMotion™ Unified Medical Schema™:** Based on HL7 V3; enables true integration of clinical information, the creation of advanced policies, and integration with 3rd-party applications.
- **End-to-end security:** Addresses issues such as authorization, authentication, patient consent as well as secure data transfer, encryption and digital signatures.
- **Tracking and auditing:** Provides logs, tools and applications that record the system's and caregiver's activities.
- **Scalability:** Can be deployed in any single healthcare organization and easily expands and connects to regional and national networks.
- **dbMotion™ Clinical Views™:** This web-based viewer is used at the point of care to display integrated medical information. Clinical Views enables users to view data in a variety of ways ranging from aggregate views, e.g. summary page, annual review, etc., to detailed views created by drilling down into each medical domain (Allergies, Labs, Medications, etc.). It incorporates profiles, personal preferences and advanced sorting and filtering functions.
- **EMR and Workflow Integration:** dbMotion's Presentation Layer framework complies with the CCOW standard and supports Single Sign-On (SSO), enabling streamlined context synchronization. It also enables the embedding of clinical data and web components into existing applications such as an EMR.
- **Foundation for Semantic Interoperability:** Exchange, integrate and display data that represents the clinical information's 'inherent' meaning.
- **Vocabulary management:** Enables harmonization and unification of medical information from disparate data sources and systems by mapping industry standards and coding systems.
- **'Business Process' approach:** Applies flexible and powerful rules throughout the data acquisition, storage, exchange and information viewing processes.
- **Software Development Kit (SDK):** dbMotion's SDK provides tools, methodologies and code samples to enable the development of applications that leverage the integrated clinical information created by the dbMotion Platform to respond to specific needs unique to an organization or environment. A rich set of tools and exposed web services enables the development or enhancement of applications enabling development teams to rapidly respond to an organization's unique and changing needs.

Solution Architecture

The dbMotion Solution architecture is comprised of multiple layers, each responsible for a different aspect of the system's functionality. Based on specific organizational requirements, the dbMotion Solution can be configured with the desired functionality.

Each dbMotion layer incorporates a number of subsystems designed to optimally carry out the multiple functions of each specific layer. dbMotion's service oriented architecture (SOA) provides the framework for effective and efficient communication between these layers, as well as for the provision of services to external consumers.

The dbMotion Solution is constructed of one or more dbMotion nodes (shown below).



dbMotion Node Architecture

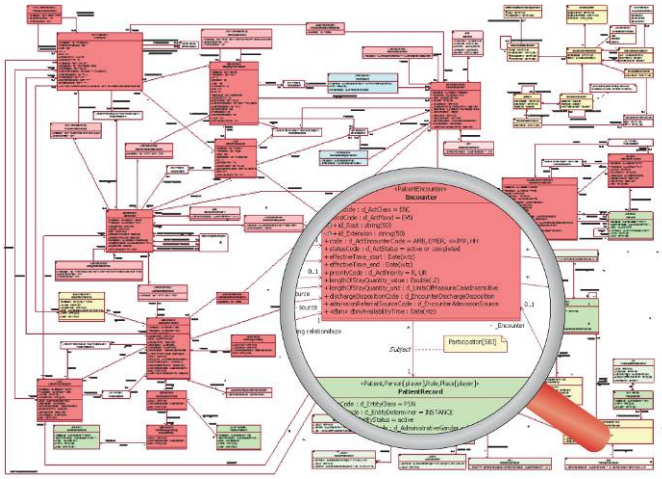
As shown, a node (typically) includes the following layers:

- **Data Integration Layer:** Responsible for data acquisition from disparate sources and initial transformation into dbMotion's Unified Medical Schema (UMS).
- **Data Layer:** Manages and/or stores collected data and interfaces with the Business Layer.
- **Communication Layer:** Collects information from dbMotion nodes in response to requests for data.
- **Business Layer:** Integrates and provides the medical data to the consumer requesting the information.
- **Presentation Layer:** Provides a web-based viewer used at the point of care to display integrated medical information.
- **Security Layer:** Defines and enforces security safeguards throughout the solution's layers.
- **System Management Layer:** Incorporates applications and tools for managing solution subsystems.

Data Integration Layer

The Data Integration Layer is responsible for data acquisition from clinical/operational systems and its transformation into dbMotion's Unified Medical Schema (UMS). This transformation means clinical data, irrespective of the source or format, is mapped to the UMS, establishing the relationship between discrete, patient-specific data elements. This layer aggregates medical information from different code systems using

libraries of clinical terminologies/vocabularies, content mapping tools and other elements that integrate, orchestrate and harmonize the data.



dbMotion's Unified Medical Schema (UMS)

dbMotion's Unified Medical Schema

A cornerstone of true medical information integration

The **Unified Medical Schema,** also known as the UMS, is a patient-centric data model that defines the medical information elements and the logical relationship between them.

The Data Integration Layer manages the retrieval, aggregation and harmonization of all types and formats of information, regardless of how and where it is generated, as modeled by the UMS.

The UMS is based on HL7 V3 Reference Information Model (RIM). It enables the delivery of data driven functionality ranging from security aspects, logical functionality and advanced interoperability.

Data Layer

The Data Layer acts as dbMotion's Clinical Data Repository (CDR), a persistent database responsible for management and storage of patient information retrieved by the Data Integration Layer. The CDR resides within the organization's physical domain with data ownership, security and privacy controlled and defined by the organization. This layer also provides a single interface, based on the UMS, for all data retrieval requests; regardless of the original data format, location and collection process.

Communication Layer

The Communication Layer is responsible for the collection of clinical data from the various dbMotion nodes and/or other remote data providers (such as pharmacies). Upon request, it collects the relevant data and forms the building blocks of a Virtual Patient Object (VPO) – the patient-centric data object used to contain and mobilize the integrated patient information.

dbMotion Network

In a federated implementation of dbMotion, the Communication Layer's catalog maps the various data sources associated with disparate nodes and manages the network's information flow.

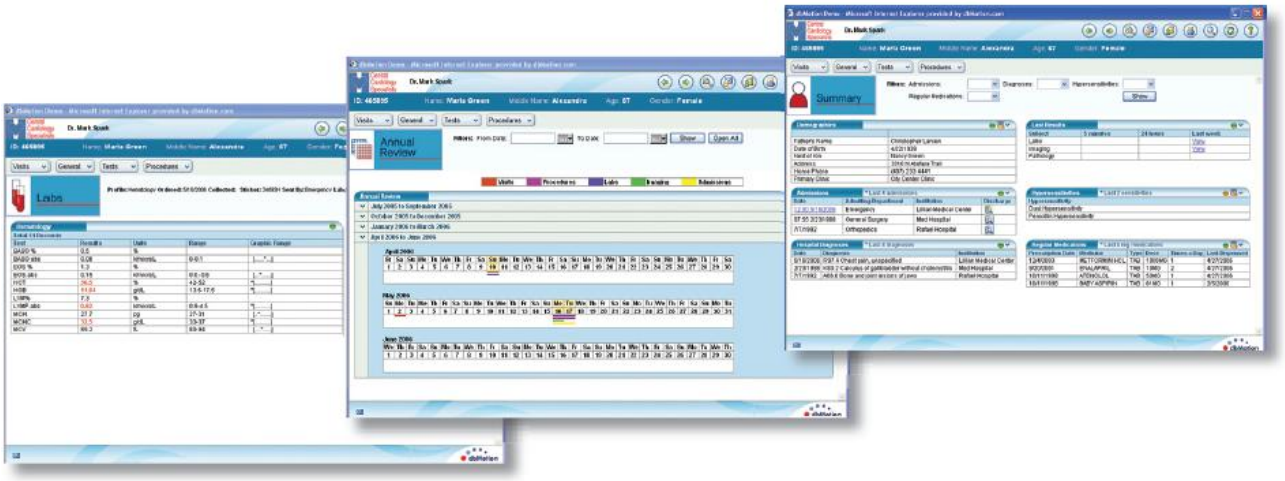
Business Layer

The Business Layer provides medical data to its consumer – either a viewer/portal such as dbMotion Clinical Views or any third-party application/service. It is the "brain" behind the platform's processes and one of the key enablers of its SOA capabilities. In this layer medical information is aggregated, analyzed and integrated

according to the consumer's request using embedded business rules related to data, user role and profile, organization and more. This results in an integrated patient record that can be delivered to the requestor of the data, either a portal for caregivers or an application that will use the data for other purposes such as public health monitoring, reporting, etc.

Presentation Layer

The Presentation Layer presents integrated medical information using dbMotion Clinical Views, a web-based viewer, with context synchronization, that is accessed at the point of care.



dbMotion Clinical Views

The Presentation Layer framework can also be integrated into third-party applications such as an EMR system or portal – this ensures that the data is delivered to caregivers within their preferred environments and workflows. Furthermore, it enables data to be consumed by different research or analytical applications such as dbMotion™ SmartWatch™, decision support systems and business intelligence applications.

Shared Services

Security

The Security Layer defines the aggregate of safeguards, both technical and administrative, that prevent prohibited access to electronically Protected Health Information (ePHI) by unauthorized parties – whether from inside, or outside, an organization. It delivers a comprehensive approach to security management and covers issues such as authorization, authentication, patient consent and secure data transfer. Its services are used pervasively throughout the system's layers, with safeguards implemented through sub-systems, each dealing with a different aspect of information security.

Patient Identification

In environments that lack unique patient identification, the ability to correctly recognize a patient identity in different information systems is a critical prerequisite for interoperability and health information exchange. Data sources must be searched to determine where a person has previously received care. Only after identification has been confirmed can core clinical data be retrieved.

dbMotion combines an Enterprise Master Patient Index (EMPI) system with additional technologies to locate and link a patient's identifiers across multiple systems. This overcomes duplicate and fragmented records, multiple identifications, transpositions, misspellings and more.

System Management

The System Management Layer incorporates applications and tools for managing dbMotion subsystems, modules and services; handling configuration, testing and monitoring. Examples include the Event Viewer, a tool for monitoring and configuring system logs and the Security Management Application, a web-based application used to define users, roles, permissions, profiles and more.

Summary

The dbMotion Solution is designed to access medical information across a variety of sources and locations, integrating a patient's medical information into a single record. The resulting integrated patient record can be used in several ways, for example: displaying a medical history to caregivers, enabling healthcare management applications such as quality measures, reporting and streamlined inpatient and outpatient handoff. Designed by and for clinicians, dbMotion addresses a wide variety of technical and business challenges that arise from health information exchange and interoperability. Its service oriented architecture enables flexibility, scalability and future-readiness.

The platform's multi-tiered architecture supports any approach to data architecture – centralized, distributed/federated, or hybrid. No matter where medical information is located, and in which format or system, the dbMotion Solution can aggregate it into a clear, usable format, without affecting the original data. Moreover, it is uniquely suited to deal with the privacy, security, and ownership issues inherent to medical information.

Interoperability and a flexible, scalable platform that enables specialized application development are increasingly recognized as crucial features of any health information exchange solution hoping to meet the increasingly sophisticated challenges of safe and quality healthcare delivery in the 21st century. Building upon this architecture, the progression to semantic interoperability, and the promise it holds, can be realistically achieved.