The IBM Health Integration Framework: Accelerating solutions for smarter healthcare

Healthcare provider edition
Deploy solutions quickly using existing health IT investments in current environments without compromising flexibility or choice

Finding the Cure: Addressing the Challenge of Changing Healthcare
While healthcare technology has never been more advanced, the industry has struggled to improve healthcare access, cost, quality of care and patient satisfaction. Governments inject additional pressure on the system by instituting public incentives and programs promoting health information technology solutions. Progress can take many forms. Forward-thinking organizations are proactively embarking on a journey of transformation.

Finding a cure involves many facets, but to move toward Smarter Healthcare® for all, healthcare organizations must focus on value, core processes and collaboration. They must concentrate on what they do best and do it more efficiently. They must seize opportunities to improve quality and safety, form new partnerships and build future capabilities. And they must act with speed to institute change, set leadership agendas and manage risk and performance with transparency.

The IBM Health Integration Framework
The IBM Health Integration Framework (HIF) is a software platform based on industry standards. By supporting comprehensive solutions for healthcare providers, private and public insurers, health plans and life sciences enterprises, the HIF helps accelerate the arrival of Smarter Healthcare. It provides the potential to:

- Improve operational effectiveness and contain costs.
- Achieve higher quality and improved outcomes.
- Deliver connected and personalized care for prevention and wellness.

This approach is superior to two traditional practices: custom development, which is lengthy and expensive, and packaged applications, which are inflexible, stand-alone and require heavy customization. The Framework enables customers to choose from various IBM and IBM Business Partner industry solutions that are pre-integrated on common middleware with industry-specific extensions. As a result, customers can deploy solutions quickly using their existing IT investments in their current environments at lower cost, without compromising flexibility or choice.

- **Speed**: Incorporates tested software foundations, healthcare industry-specific extensions, pre-built solution accelerators and implementation patterns for faster deployment with lower risk.
- **Flexibility**: Provides a road map that enables customers to build additional capabilities one project at a time, using existing environments with assurance of compatibility.
- **Choice**: Uses an ecosystem of IBM and IBM Business Partner solutions built on industry standards integrated into the Framework.
- **Interoperability**: Facilitates the integration, exchange and sharing of information from multiple applications and systems—among providers, health plans and other stakeholders—to advance healthcare delivery.

Figure 1: IBM Health Integration Framework
Combining Strengths through Partnership
The IBM Health Integration Framework includes an ecosystem of independent software vendors and systems integrators to provide a wide range of healthcare applications that run on the Framework. These applications and services are certified by IBM to ensure technical capability and Framework component compatibility. This means faster deployment, easier integration, lower cost of operations, and an ever-expanding community with powerful capabilities.

Solution Areas
By taking a comprehensive yet manageable position, the HIF supports a practical, progressive and flexible approach to healthcare business transformation. Over time, project by project, within and throughout domains, providers can move to a simplified, agile, more dynamic technology infrastructure to support changing needs. And with each project, the return on investment is realized over a shorter payback period.

The Health Integration Framework empowers providers with solutions in four domains:

- Operations Optimization
- Clinical Business Integration
- Healthcare Interoperability
- Enterprise Health Analytics

Optimize Operations
Solutions in the Operations Optimization domain focus on building flexibility into hospital operations to support cost reduction, compliance and operational resilience. Specific HIF-enabled solutions help track assets, patients and staff to improve patient safety and quality of care, while reducing risk and helping manage costs. These solutions include real-time asset management and location services as well as service management for hospitals.

IBM Real-Time Asset Locator for Healthcare
Lack of real-time visibility in hospitals has lead to the over-procurement of assets, especially mobile assets that can be easily misplaced. Technicians often spend as much time looking for mobile assets as performing maintenance tasks. In addition, regulations require hospitals to identify, record and report on all activities associated with biomed and facilities equipment in their inventory.

IBM Real-Time Asset Locator (RTAL) for Healthcare is an enterprise asset management solution that improves asset utilization and employee productivity by identifying the current location of resources. This reduces capital expenditure by reducing asset loss, theft and the resulting over-purchasing of assets. Healthcare providers can enforce business rules and address regulatory requirements with location-based events and automatic workflows, while improving patient safety.

IBM Real-Time Asset Locator for Healthcare addresses the need to:

- Automate asset location for preventive maintenance and recall isolation, report on compliance status, and mark availability for use.
- Recognize a violation when an asset moves outside a secure area, creating an automated work request for security staff, and assisting with loss prevention.
- Provide asset utilization reports, indicating the total time an asset was in service, at what location, how the asset was used and by whom.
Smarter Healthcare focuses on value, core processes and collaboration

Case Study: A Leading Academic Hospital in the Netherlands

One of the finest hospitals in the Netherlands is known for its devotion to patient care, which consumes 85 percent of their budget. A leading research center, the hospital specializes in the study of cardiovascular diseases, oncology, chronic illness, mental health and neuroscience.

With 45 employees, the hospital’s Instrumental Service is responsible for maintenance and management of about 14,000 medical and laboratory assets. The hospital needed a solution that could:

• Reduce medical errors and risk.
• Improve the responsiveness, consistency and quality of patient care.
• Deliver effective care to an increasing number of patients with limited resources.
• Improve the visibility of asset management and reduce cost.
• Provide central registration to address regulatory compliance.

The hospital deployed IBM RTAL for Healthcare for real-time asset visibility, which enhances their IBM Maximo® Asset Management solution. With Maximo Asset Management, the hospital can optimize management processes while improving the quality of patient care and research.

The hospital can now track clinical, biomedical, IT, monitoring and other high-value equipment, as well as patients and personnel. Improved asset utilization helps deliver reduced operational costs and better regulatory compliance using alerts and industry best practices. Automated processes can help solve asset management issues unique to healthcare providers.

Smarter healthcare
• Increases staff efficiency by reducing search time
• Recognize a violation when an asset moves
• Bolsters patient safety by verifying that correct drugs and doses are administered
• Enriches patient experience through staff workflow optimization
• Ensures regulatory compliance

Share Information

Solutions in the Clinical Business Integration domain facilitate the integration, exchange and sharing of information throughout your organization for efficiency, productivity and better outcomes. Clinical business integration solutions built on the HIF offer secure access to clinical systems and handling of transactions based on HIPAA and HL7 standards. Examples include clinical and patient portals, device integration to electronic medical record (EMR) and electronic health record (EHR) platforms, and the IBM Enterprise Service Bus for Healthcare.

IBM Enterprise Service Bus for Healthcare

Demand for new data integration presents many challenges for healthcare providers. In order to improve patient care and staff productivity, providers need the ability to share information across internal and external organizational boundaries. Examples include clinical and patient portals, device integration to electronic medical record (EMR) and electronic health record (EHR) platforms, and the IBM Enterprise Service Bus for Healthcare.

IBM Enterprise Service Bus addresses the need to:

• Implement intelligent interoperability among hospital information and ancillary systems.
• Support HL7 and non-HL7 messaging standards with a Common Information Model approach.

Case study: Basingstoke and North Hampshire NHS Foundation Trust

Basingstoke and North Hampshire NHS Foundation Trust (BNHFT) is a 450-bed hospital facility serving 300,000 patients in north and mid-Hampshire and West Berkshire, England. As part of a multi-phased strategy for reducing clinical risk, increasing operational efficiency, and improving the patient experience, the hospital implemented IBM ESB for Healthcare. ESB for Healthcare introduced a highly flexible interface engine into their IT infrastructure and defined reusable, standards-based services.
BNHFT’s initial project was a single-page patient care record summary for clinicians available without logins to multiple systems. As part of this project, the organization was able to:

- Create portlets for patient demographics, medications, co-morbidities, images, previous hospital stays, and other crucial data.
- Create automatically populated electronic discharge summaries and clinical correspondence forms that can be provided electronically to primary care physicians.
- Reduce redevelopment time by converting portal and form requests into proprietary formats.
- Future phases will introduce healthcare analytics capabilities, enable clinical document sharing, and establish clinical pathway management, all building on the same infrastructure used by ESB for Healthcare.

**Smarter healthcare**
- Improves patient care
- Captures more revenue
- Makes better use of limited IT development resources
- Tracks immunization data for referral patients quickly without risk of misidentification
- Prevents the ill effects of over-immunization
- Improves care for geriatric patients

**Achieve Interoperability**
Solutions in the Healthcare Interoperability domain advance more effective delivery of care by providing the ability to exchange information across organizations, regions or communities of interest. Examples include Master Data Management (MDM) solutions such as Enterprise Master Patient Index and Master Provider Index, and Software-as-a-Service based transactional data exchange for EMR integration and workflow optimization.

**Master Patient Index and Health Information Exchange**
IBM Initiate® Patient, IBM Initiate Provider and IBM Initiate Exchange foster patient-centric, coordinated care by enabling providers with the ability to identify patients at point of care, connect and share information securely, accurately and cost effectively—within and across organizational boundaries.

These information management solutions offer an innovative master person index (MPI), master provider index and transactional data exchange. Initiate delivers the industry’s most accurate MPI with a flexible data model, proven integration capabilities and data stewardship tools to meet unique governance requirements. These solutions facilitate improved clinical outcomes, lowered costs and increased provider and patient satisfaction.

Initiate Health Information Exchange technology solutions address the need to:

- Connect community physicians for information sharing.
- Deliver trusted patient identification at the point of service.
- Provide patient data when and where it is needed.
- Govern patient and provider data from multiple systems with different owners.
- Optimize workflows through closed loop communication.

**Case study: Louisiana Rural Health Information Exchange**
In the summer of 2005, the Gulf Coast region was devastated by hurricanes Katrina and Rita. Overflow patients were referred to Louisiana State University Health Sciences Center in Shreveport (LSUHSC-S), more than 700 miles away round trip.

The chancellor of LSUHSC-S and the executive director of the Louisiana Rural Hospital Coalition (RHC) established the Louisiana Rural Health Information Exchange (LARHIX) to facilitate collaboration between LSUHSC-S and the rural hospitals. LARHIX provides various services, including:

- Complete hospital information systems and a clinician portal.
- Telemedicine, teleconferencing and distance learning systems.
- An internal medicine residency program.
- A mobile mammography van.

The clinician portal provides secure access to 1.1 million patient records and enables health information sharing among rural hospitals and the LSUHSC-S. LARHIX’s interoperability platform is built on the IBM Health Integration Framework, which features Carefx’s clinical portal, IBM Initiate Patient, and IBM WebSphere’s portal technology. The HIF helps LARHIX use existing or newly installed business and clinical applications and processes for faster deployment. It benefits from the Framework’s flexibility of application and technology choice, speed to value through reuse of design templates, workflows and common services, and best practices gained from a history of IBM client engagements.
LARHIX metrics point to its success. Savings were noted across many dimensions, including days to appointment (97), average miles traveled (278), hours spent traveling and waiting room time (5), as well as patient travel expenses (US$167). LARHIX is on track to continue deployment to the remainder of the hospitals in northern and central Louisiana. “It’s not an IT project, but a patient project,” noted Jamie Welch, CIO of LARHIX.

Smarter healthcare
- Avoids unnecessary transfers and duplicate tests (98 percent reduction in duplicate test per patient)
- Improves access to primary and specialty care (approximately 85 percent increase)
- Enables the treatment of patients locally when and where possible

Turn Data into Insights
Solutions in the Enterprise Health Analytics domain help integrate clinical, financial and operational information, and apply real-time retrospective and predictive analytics to measure and monitor performance, while unlocking the insights in unstructured data.

Enterprise Health Analytics solutions address the need to:
- Aggregate and analyze information from disparate systems to improve clinical, financial and administrative outcomes.
- Transform data-rich environments into intelligent, high value information to help speed medical research, diagnosis and treatment to improve care and reduce costs.

Case study: North York General Hospital
North York General Hospital (NYGH) needed to improve patient care and hospital efficiency using new analytics software which gathers patient and business data from across the organization and presents it in real-time to doctors, administrators and selected hospital staff. To address the needs, NYGH implemented an IBM analytics system, built on the IBM HIF, that enables decision-makers to better assess trends, adjust operations to meet patient demands, and achieve strategic business goals.

With the IBM advanced analytics system, hospital administrators at NYGH can track how long a patient waited in the Emergency room, how effectively the beds were utilized, and other hospital activities. Directors, managers and supervisors can run detailed reports and queries to drill further into some of these activities. In the long-term with the new system, NYGH doctors will have a 360-degree view of a patient’s clinical treatment patterns and outcomes.

To satisfy NYGH’s requirements, IBM optimized the InfoSphere™ Clinical Analytics system to handle data-intensive workloads. Data from more than 20 diverse collection points, dispersed among a dozen internal systems across the hospital’s three sites, is digitized and consolidated into a common format in a central data warehouse. Advanced analytics are then applied to produce a simple, easy-to-read, web-based graphical picture of the hospital’s clinical, financial and administrative performance. The system runs on InfoSphere Balanced Warehouse C4000, optimized for data warehouse workload—another example of IBM’s leadership in providing integrated systems, software and storage for analyzing vast amounts of complex data.

Smarter healthcare
- Aggregates clinical and business data from 20 diverse collection points into a central data warehouse
- Provides ability to analyze massive amounts of data in real-time, and present insights via simple graphical pictures and dashboards
- Improves operational efficiency with view of hospital activities such as emergency room wait time and bed utilization
**IBM Medical Records Text Analytics**
Healthcare providers have a treasure trove of historical unstructured data that provides essential information for the study of treatment effectiveness, disease progression and long-term outcomes. IBM Medical Records Text Analytics (MRTA) helps read free-form text in medical records such as chart notes, admission and discharge notes, operatory notes, physician correspondence and consult notes, labs and more. MRTA helps providers discover content and context, and then analyze results and transform findings into actionable, context-based structured data that delivers new insights.

The IBM Medical Records Text Analytics solution addresses the need to:

- Provide meaningful data that can be used to enhance patient treatment or support transitional medicine and clinical genomics programs.
- Categorize and structure text according to standard nomenclature, helping index and search medical records.
- Automate collections of structured and unstructured data.
- Present a clinical dashboard view of patients’ information, delivering vital history at the point of care.

**Smarter healthcare**

- Improves quality of care, lowers costs and boosts operational efficiency
- Reduces errors and costs associated with claims processing and adjudication, and speeds reimbursement
- Offers administrators a view of staff performance that raises visibility of deviations and detection of educational and training needs

**Healthcare Content**
The IBM Health Integration Framework (HIF) takes a business-centric IT architectural approach to align IT capabilities with a common, prioritized set of business capabilities. The HIF helps your organization develop a solution strategy and road map that allows current investments to coexist with departmental projects and enterprise-wide initiatives.

The foundation of the Framework includes industry-specific content which integrates faster with existing systems, adds open standards, and provides new services and capabilities. Healthcare-specific content includes:

- **IBM Real-Time Asset Locator for Healthcare**: An enterprise asset management solution that helps track and monitor assets, patients, and staff in real-time to optimize business processes and asset utilization, while ensuring patient safety and security.
- **IBM Initiate Patient**: A proven EMPI that provides a single, accurate view of the patient to enable cross-domain information sharing for improved access at all points of service, with integration capabilities that speed time to market and reduce project risk.
- **IBM Initiate Provider**: A provider master index or provider registry that creates a single trusted view of care providers and provider organizations, improving data quality and access for targeted information delivery.
- **IBM InfoSphere Clinical Analytics**: An integrated data warehouse that provides a single source of trusted administrative, clinical and research information to help improve operational efficiency and outcomes.
- **IBM WebSphere Message Broker with support for HL7**: An advanced Enterprise Service Bus providing connectivity and universal data transformation for assured delivery and message interchange between multiple applications.
- **IBM Healthcare Industry Toolbox for WebSphere Portal**: Helps hospitals and clinics provide their patients with personalized, anytime access to on-demand services such as appointments and payments, improving satisfaction and loyalty while increasing efficiency.
- **IBM WebSphere Transformation Extender Industry Pack for Healthcare**: Reduces risk and integrates a range of industry-standard data formats into your enterprise infrastructure using support for HIPAA EDI (including 5010 and NCPDP), with predefined templates, tools, and conversion and validation maps.
Why IBM
The IBM commitment to Smarter Healthcare is evidenced by more than 60 years of experience in the industry—helping healthcare organizations like yours realize business value today as you progress toward transformation. IBM actively supports the development of Smarter Healthcare around the world by driving standards, working with policy makers, building consensus, helping define the future of the industry, and creating unique, innovative technologies that deliver measurable business value.

For more information
To learn more about the IBM Health Integration Framework, contact your IBM representative or IBM Business Partner, or visit:
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