

Real-Time Health System Vision

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Initiatives: [Healthcare and Life Science Digital Optimization and Modernization](#)

The COVID-19 pandemic has tested global healthcare delivery organizations and their ability to adapt to a profound disruption. Healthcare delivery organization CIOs should use the real-time health system vision to drive digital transformation, as priorities and business models shift in real time.

Overview

Key Challenges

- Creating a compelling and practical digital vision and strategy to transform care delivery operational workflows, while managing persistent revenue demands and harsh cost optimization realities.
- Leveraging the real-time patient event data, operational intelligence and predictive analytics necessary to transform workflows and business processes, and capitalize on new opportunities to create value.
- Optimizing the utilization of enterprise resources to reduce waste, latency and costs, and redirect resources to high-value business opportunities.

Recommendations

Healthcare provider CIOs advancing healthcare and life science digital optimization and modernization should:

- Frame your vision for the next-generation healthcare delivery by using real-time health system (RTHS) concepts, characteristics and capabilities. Your vision should compel the organization to act and change by increasing the awareness of the reach and agility of your digital capabilities.
- Assess your enterprise application portfolio against Gartner's Hype Cycle for Real-Time Health System Technologies. All solutions and technologies should support the overall RTHS vision and demonstrate RTHS principles.
- Garner interest and support among healthcare delivery organizations (HDO) leadership for the RTHS vision by identifying successful, real-life examples and tangible benefit statements, such as those identified in this research.

Introduction

As societal, compliance and financial demands on HDOs increase, the role of the HDO CIO becomes that of a navigator from the traditional, disjointed operations to a more streamlined and digital healthcare delivery model – one that possesses pervasive and sophisticated situational awareness and operational intelligence and the means to leverage it. The RTHS represents the transformation of the HDO into an efficient, consumer- and patient-friendly enterprise that will create innovative care options and an improved healthcare experience.

Healthcare provider CIOs are responsible for ensuring that their enterprises possess the resilience to surmount critical industry challenges and the agility to exploit new business opportunities as they present themselves.

This requires a compelling vision and a practical strategy. The clearer the vision, the more effective the resulting strategy will be in fulfilling enterprise business objectives. An industry vision is an essential reference model that informs leadership and drives the critical initiatives necessary to adapt to a fast-changing present and an increasingly uncertain future.

An industry vision is a view of how the industry will evolve to surmount the critical challenges it faces and position itself to exploit new opportunities. It establishes a target to inspire enterprise initiatives and transformation efforts. It is one of many possible visions for a given industry. Its purpose is to disrupt thinking about what is possible, and reimagine how value is created and delivered.

The aim of the RTHS vision is to describe an HDO that is:

- Accessible, inviting and nurturing
- Collaborative and devoid of unnecessary clinical toil
- Safe, secure and compliant
- Responsive to individual preferences and needs
- Operationally efficient and sustainable
- Situationally aware, smart and appropriately autonomous

HDO Current Versus Future States

For some time now, healthcare providers have been investing in information systems, primarily to automate existing administrative, business and clinical workflows, and to extend the reach and usefulness of the electronic health record (EHR). More recently, they have invested in information technology aimed at the digital transformation of the enterprise.

Healthcare business model change is now the rule rather than the exception. Thirty-one percent of HDO CIOs surveyed, across various verticals, plan on increasing their investments in digital business initiatives and digital transformation (see [“The 2019 CIO Agenda: Securing a New Foundation for Digital Business”](#)).

This survey also highlighted the shift from delivering IT “projects” to “products” – a product being a higher-order collection of work that relies on integrated teams doing iterative work, assumes a longer life cycle of continuous release and delivers tangible business outcomes. The digital transformation of the HDO, based on the RTHS vision and ensuing strategy, is a product that the HDO CIO must deliver.

The RTHS is a response to the current state of the healthcare provider where awareness is often limited, information is not easily shared, and workflows and business processes are disconnected.

Table 1 outlines the enterprise, management, operational and technology metamorphosis that must take place in order to fully realize the RTHS vision. When executing against the RTHS vision HDO CIOs should ensure that all IT products, services, and technologies exhibit future-state characteristics and capabilities.

Table 1: RTHS Transformational Shifts

↓	<i>Current State</i> ↓	<i>Future State</i> ↓
Enterprise	<ul style="list-style-type: none"> ■ Disjointed ■ Myopic ■ Latent ■ Clinician-centric ■ Automated 	<ul style="list-style-type: none"> ■ Collaborative ■ Aware ■ Real time ■ Patient-centric ■ Autonomous
Management	<ul style="list-style-type: none"> ■ Reactive ■ Retrospective ■ Departmental 	<ul style="list-style-type: none"> ■ Proactive ■ Predictive ■ Enterprise

↓	<i>Current State</i> ↓	<i>Future State</i> ↓
Operations	<ul style="list-style-type: none"> ■ Siloed ■ Constrained ■ Scheduled ■ Opaque 	<ul style="list-style-type: none"> ■ Integrated ■ Scalable ■ Event-driven ■ Transparent
Technology	<ul style="list-style-type: none"> ■ Static ■ Connected ■ Systems ■ Secure 	<ul style="list-style-type: none"> ■ Mobile ■ Interoperable ■ Services ■ Compliant

Source: Gartner (July 2020)

Analysis

Describe the Next-Generation HDO in RTHS Terms

The RTHS vision describes a multidimensional conceptual, operational and technology framework for the next-generation HDO. This vision will enable the CIO to employ digital solutions and technologies to solve persistent industry challenges and successfully adapt to a rapidly changing and competitive healthcare provider market.

HDO CIOs must increase the relevance, reach and agility of their existing application portfolios. The RTHS includes a purposeful collection of solutions and technologies to form an industry archetype that acquires and synthesizes information, determines action, and orchestrates resources and workflows based on this operational intelligence.

The RTHS vision encapsulates our understanding of the next-generation, digitally transformed HDO. It is a useful and compelling abstraction that calls out the critical characteristics and capabilities that must be cultivated and enabled in the next-generation HDO (see Figure 1).

Figure 1. RTHS Defining Capabilities

RTHS Defining Capabilities



Source: Gartner
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Realize the RTHS Vision

The RTHS vision consists of the following four parts:

1. Concept
2. Capabilities
3. Assets
4. Research

Concept

An industry vision seeks fundamental change and will affect many dimensions of the business and its operations. The RTHS represents the future of the healthcare provider enterprise, as it leverages specific digital technologies and solutions to become more situationally aware, collaborative and smart (that is, it makes the best use of real-time operational intelligence). The RTHS also possesses real-time workflow orchestration capabilities to enhance operational efficiency and optimize costs.

Capabilities

CIOs will need to implement new solutions and technologies to realize the RTHS vision. This vision requires a healthcare provider enterprise to be:

- **Aware** — The RTHS possesses enterprise-level situational awareness and visibility into critical patient events and clinical data so that its workflows and business processes can benefit from up-to-date operational intelligence. Situational awareness is perhaps the defining characteristic of the RTHS.

- **Collaborative** – RTHS capabilities extend its reach and influence across the inpatient, outpatient, long-term and homecare settings. It provides the means for care team collaboration that goes beyond care coordination, enabling patients and the care team across health entities to engage and share patient information in real time.
- **Smart** – The RTHS does not derive the bulk of its intelligence from explicit, preprogrammed instructions provided by humans. Instead, it can acquire and analyze data from many sources and use this information to adjust to changing circumstances, and over time, learn from their experiences. It is a healthcare delivery smart machine that evolves along with its learning opportunities. In the context of the RTHS vision, “smart” also refers to the ability to make the best use of operational intelligence, no matter how it is acquired.
- **Real Time** – This namesake RTHS dimension refers to how the enterprise responds to events – patient-related and others. It acquires and analyzes up-to-date operational intelligence, derived from care activity, and uses it to optimize and orchestrate critical clinical, business and administrative workflows. It uses artificial intelligence (AI), machine learning (ML) and advanced analytics to achieve its objectives.

Other distinct characteristics and capabilities have been ascribed to the RTHS vision, such as mobile, event-driven, adaptive and resilient. While the RTHS is extremely mobile, is animated by patient-related events, and adapts in real time to rapidly changing circumstances, however, these attributes do not uniquely define RTHS.

Assets

The HDO includes software systems and technologies from many generations that are as much impediments to, as they are enablers of, progress. The CIO will need certain digital assets to execute the RTHS vision and will require the implementation of technologies such as those outlined in Table 2. All of these solutions and technologies can be found in the [“Hype Cycle for Real-Time Health System Technologies, 2020.”](#)

Table 2: RTHS Digital Assets

<i>Aware</i> ↓	<i>Collaborative</i> ↓	<i>Smart</i> ↓

Aware ↓	Collaborative ↓	Smart ↓
<ul style="list-style-type: none"> ■ Alarms and Notifications ■ Crisis/Emergency Management ■ Internet of Things (IoT) in Healthcare ■ IoT Security in Healthcare ■ Medical Device Connectivity ■ Patient Throughput and Capacity Management ■ Real-Time Location in Healthcare ■ RTHS Command Center ■ RTHS Platform 	<ul style="list-style-type: none"> ■ Care Team Collaboration ■ Clinical Communication and Collaboration ■ Health Information Exchange ■ Healthcare Interoperability ■ Interactive Patient Care ■ Next-Generation Nurse Call ■ Next-Generation Contact Center ■ RTHS Supply Chain ■ Vendor-Neutral Archive 	<ul style="list-style-type: none"> ■ API Management in Healthcare ■ Content Services Platform ■ Digital Twins in Healthcare ■ Experiential Wayfinding in Healthcare ■ Next-Generation Enterprise Master Person Index (EMPI) ■ Patient Privacy Monitoring ■ Patient Self-Scheduling ■ Patient Self-Service Kiosks ■ Positive Patient Identification ■ Process Simulation Modeling in Healthcare ■ RTHS Healthcare Costing ■ Smart Care Venues

Source: Gartner (July 2020)

Research

HDO CIOs should maintain an ongoing research program to monitor and adapt their vision of the RTHS. The CIO will need to experiment with new digital business possibilities.

For example, the concept of the “digital twin” has begun to gain traction. It is a useful construct for expressing the characteristics and behavior of a purpose-built IT ecosystem, such as the one that the RTHS envisions. A digital twin is a convenient way of thinking about the IT systems and technologies that are required to automate and operationalize an HDO. A digital twin is an object-oriented way of expressing what we believe a real-world “thing” is, how it should behave, the data it possesses, how to interact with it, and what services and outcomes it should deliver (see [“Three Use Cases of Digital Twins”](#)).

Another useful relevant concept to advance your vision of the next-generation health system is the composable enterprise. A composable enterprise is an organization that delivers business outcomes and adapts to the pace of business change. It does this through the assembly and combination of packaged business capabilities (PBCs). PBCs are application building blocks that have been purchased or developed (see [“Future of Applications: Delivering the Composable](#)

Enterprise”). The composable enterprise conforms to RTHS concepts and principles and promotes the need to evolve from their current state of inflexible, monolithic applications, toward a portfolio that is more modular and adaptable to business change.

There is also the digital health platform (DHP). DHP is an architectural approach that enables a healthcare provider to nimbly adapt its business and operating model in response to external disruption and change in business strategy. The DHP orchestrates assets such as patient and provider-generated data and insight, algorithms, and workflows across a range of individual and population-level events to compose digital-first healthcare experiences and capabilities for end users (see “Healthcare CIO Top Actions for 2020”).

Identify RTHS Examples for Inspiration

CIOs can better understand what an industry vision for the RTHS might look like by looking at organizations that have already embarked on one. These companies use the RTHS vision, or one similar to it, as a kind of blueprint and build it out gradually as they acquire knowledge and ability. Table 3 provides inspirational and aspirational examples.

Table 3: RTHS Examples

Company ↓	Country or Region ↓	Description ↓
Butler Memorial Hospital	Butler, PA www.butlerhealthsystem.org	To provide timely and personalized care, Butler Memorial Hospital (BHS) implemented and integrated its real-time location services (RTLS), clinical communication and collaboration (CC&C), and patient throughput and capacity management (PTCM) solutions. Using Wi-Fi-based tags, these RTHS technologies collect patient and equipment location data as they move throughout the hospital. This data is processed through a rule engine, which drives critical notifications and alerts to the CC&C and PTCM systems. Real-time operational intelligence is delivered to mobile devices and team dashboards to inform in-the-moment decisions, automate workflows and enhance care team collaboration.

Company ↓	Country or Region ↓	Description ↓
Chelsea and Westminster Hospital	London, U.K. www.chelwest.nhs.uk	Chelsea and Westminster Hospital (CWH) has one of the largest maternity centers in the U.K. It improved the patient discharge experience by tackling the care coordination issues that were prolonging the time taken to discharge new mothers and babies. CWH worked closely with clinicians to create a digitized version of its discharge pathway (digital twin), which coordinates the optimum sequence of tasks for mother and baby, and visualizes progress across key milestones. The manual coordination of discharge-related tasks has been replaced with real-time dashboards on mobile devices and desktop computers. This approach enables multidisciplinary teams to easily share real-time operational intelligence to help care teams quickly prioritize patients and patient-related activity.
Fairview Health Services	Minneapolis, MN www.fairview.org	Fairview Health Services (FHS) operates 12 hospitals and medical centers and nine emergency departments in Minnesota. Its digital transformation strategy is to deliver high-quality care to an increasing number of patients in a more efficient and consumer- and/or patient-centric manner. To that end, it aligned its digital transformation efforts with RTHS principles. FHS uses real-time analytics, AI and ML to monitor and predict demand and utilization across all of its facilities. Operational barriers are identified and real-time interventions are recommended to frontline staff, optimizing patient placement, interfacility transfers, in-patient discharges and surge coordination.
Humber River Hospital	Toronto, Ontario, Canada www.hrh.ca	Opened in 2015, this healthcare provider facility was designed and constructed from the beginning based on RTHS concepts and technologies. Notable features include experiential wayfinding and location- and condition-sensing services, real-time EHR integration with mobile point-of-care systems, bedside interactive patient care, closed-loop medication management and automated building system controls. Automated guided vehicles (AGVs) are used to assist staff by carrying and delivering medical supplies and food throughout the facility.

Company ↓	Country or Region ↓	Description ↓
Natividad Medical Center	Salinas, CA www.natividad.com	Natividad Medical Center's (NMC's) goal was to optimize hospital operations through ML and real-time analytics, starting with patient flow in the emergency department (ED). NMC uses RTHS real-time health system technologies (e.g., patient throughput and capacity management) to allow hospital executives, managers and frontline staff to prioritize behaviors in real-time, ensuring hospitalwide efficiencies. NMC combines ML and AI to key performance measures such as leave without being seen (LWBS) and length of stay (LOS). Its RTHS command center makes performance metrics and trends transparent and actionable and provides prescriptive nudges to modify staff behavior.
Roy and Patricia Disney Family Cancer Center	Burbank, CA www.provideance.org/locations/saint-joseph-medical-center/cancer	Clinicians, administrators and IT leaders had a vision of a patient-centric cancer center that would be designed from the outset to reduce the fatigue, anxiety and stress commonly associated with cancer treatment and therapy. Notable features include automated workflows based on real-time patient location and movement, up-to-date clinical context derived from real-time integration with the EHR, and an ambient experience where patient room lighting, sound and decor (wall and overhead digital displays) are based on individual patient preferences.

Source: Gartner (July 2020)

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