

WHITE PAPER

SIX WAYS WIRE DATA ANALYTICS ENABLES REAL-TIME HEALTHCARE SYSTEMS

Abstract

Healthcare organizations face a transformational shift with the rise of what Gartner has dubbed the “real-time healthcare system.” ExtraHop equips healthcare organizations with unprecedented visibility, including the industry’s first real-time HL7 analytics capability. Today, organizations such as Sutter Health, Seattle Children’s Hospital, and Steward Health Care System use ExtraHop to support IT teams that are more aware, more agile, and more in control over the performance of applications and infrastructure.

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“The real-time healthcare system represents an IT and operational paradigm that uses up-to-the-minute information to reduce response times, introduce efficiencies, adjust priorities and balance resources with demand to improve service levels.”

Barry Runyon, Research Vice President, Gartner

The ExtraHop wire data analytics platform equips healthcare IT organizations to make real-time healthcare systems a reality. With ExtraHop, IT teams can harness the massive amounts of wire data flowing through their environments, such as HL7 messages, for operational intelligence.

The ExtraHop platform offers real-time transaction analysis at up to a sustained 40 Gbps, deploys without agents, and delivers insights immediately upon installation.

Introduction

Healthcare IT organizations grapple with a growing number of challenges, from managing privacy concerns to keeping pace with a quickly shifting regulatory landscape to supporting mobile device proliferation. The latest trend, known as the Internet of Things, connects computers and medical equipment across hospitals, clinics, and patient homes, and promises to reveal vast amounts of data that can improve patient outcomes if managed properly.

No other industry stands to reap as much benefit from information technology as healthcare: More intelligent, adaptive healthcare IT systems can increase employee productivity, reduce medical errors, and enable organizations to use their data to improve the effectiveness of treatment. In addition, hospitals can also receive significant financial incentives from the U.S. government for meaningful use of electronic health record (EHR) systems.

The Rise of the Real-Time Healthcare System

To respond to these opportunities, healthcare organizations can adopt what Gartner calls the real-time healthcare system¹, which supports an increased focus on collaboration and integration across healthcare settings (from inpatient to outpatient to home care), more reliance on mobile devices, and pervasive awareness of and visibility into patient-related data. This real-time healthcare system “will be required to meet future standards of care and patient experience and remain strong in competitive markets,” according to Gartner Research Vice President Barry Runyon.

So how do forward-looking healthcare organizations decide where to make IT investments, and how do they balance the integration and maintenance (and eventual decommissioning) of legacy systems against the promise of newer technologies? How do they leverage limited IT resources to meet day-to-day operational goals while simultaneously transitioning to a more collaborative, interconnected, and mobile footing? ExtraHop’s wire data analytics equips healthcare IT organizations with the visibility and insight they need to accomplish these tasks.

Key Benefits of Real-Time Healthcare

ExtraHop has enabled dozens of organizations across the healthcare industry to adapt to new demands, including growing hospital networks and major healthcare service providers. We understand the intersection of IT and healthcare delivery, and have worked with IT directors, executives, and architects in making the real-time healthcare system a reality. ExtraHop equips organizations to embrace the future of real-time healthcare delivery by providing unprecedented insight into all of an organization’s data in flight. This analysis presents performance, optimization, and security issues in context so they can be quickly understood and resolved.

¹ See “2014 Strategic Road Map for the Real-Time Healthcare System,” Gartner

Improved Quality of Care Through IT

Healthcare providers are increasingly being measured on patient outcomes rather than services provided. By freeing up additional IT resources and streamlining the rollout of new systems, ExtraHop enables IT departments to better support initiatives that improve patient outcomes, including patient portals, mobile projects, and computerized physician order entry (CPOE) systems.

By integrating ExtraHop into its IT operations, McKesson Managed Services, the largest health care services company in the United States, now supports new sites with less than half of the engineers that were required before. “ExtraHop enables us to solve incredibly complex problems in a matter of hours,” says Scott Checkoway, Director of Application Hosting for McKesson Managed Services. “Extrapolated across our business, we’re saving at least \$400,000 annually in terms of time spent troubleshooting.”

ExtraHop’s wire data analytics platform also enables healthcare organizations to derive new real-time insights into their operations and clinical workflows. For example, details extracted from web transactions and HL7 messages can help organizations understand how physicians are using applications, track patient flow through hospitals, and monitor wait times across facilities.

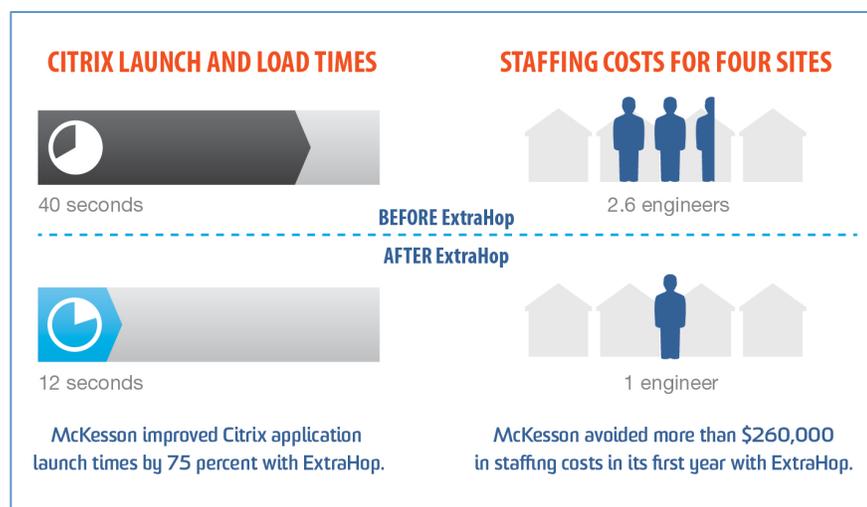
Robust Application Performance and Availability

Application performance and response time are critical to both employee productivity and quality of patient care, especially for front-line medical staff and computer-centric departments such as imaging and radiation oncology. By optimizing application performance with ExtraHop, healthcare IT organizations are saving caregivers time that they can spend with patients.

“With ExtraHop, we’re letting the doctors and nurses spend more time with patients instead of waiting for the application, or even worse, resorting to paper and then manually re-entering data later,” says Adam Hanson, Senior Director of Enterprise Infrastructure and Solutions Engineering for Steward Health Care System, a Boston-based organization with 11 hospitals and over 100 ambulatory clinics.

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Scott Checkoway, Director of Application Hosting, McKesson Managed Services



More Intelligent Security and Compliance

ExtraHop provides a more efficient and effective way for healthcare IT teams to accomplish the security and compliance tasks demanded by HIPAA and HITECH, so they can identify threats and simplify audits. For example, ExtraHop equips IT teams to quickly see which servers and clients are using weak SSL certificates and verify that systems that should be using encryption are, in fact, doing so.

Continuous Data Leakage Watch: CIFS - Access and Frequency

```
cifs_large_file_access: 1,977 cifs_access_denied: 0
```

ExtraHop can monitor file directories containing sensitive information, including failed login attempts.

By analyzing all communication on the wire, ExtraHop also provides the visibility needed to identify data leakage and the context that is missing in IPS/IDS. For example, IT teams can track access to sensitive data on networked storage systems with details for all read and write transactions, including the client IP, username, and file path. ExtraHop can also identify both high- and low-intensity attacks against authentication servers by monitoring LDAP success/failure rates, total failed attempts, and frequency of failed attempts per user. This wire data analysis from ExtraHop can be easily integrated with SIEM vendors or other log file and machine data analysis systems.

Six Ways ExtraHop Empowers Healthcare IT

Deployed non-invasively, without agents, ExtraHop gives healthcare organizations the ability to derive insights from their data in flight, the communications between systems that are a definitive record of application and infrastructure activity. With this new contextual insight, IT teams are able to troubleshoot issues more quickly and efficiently, correct systemic issues in the environment, and prevent future problems—leading to a positive cycle of fewer problems, better performance, improved experiences for medical staff, and increased quality of patient care.

1. Real-Time Analytics for All HL7 Communications

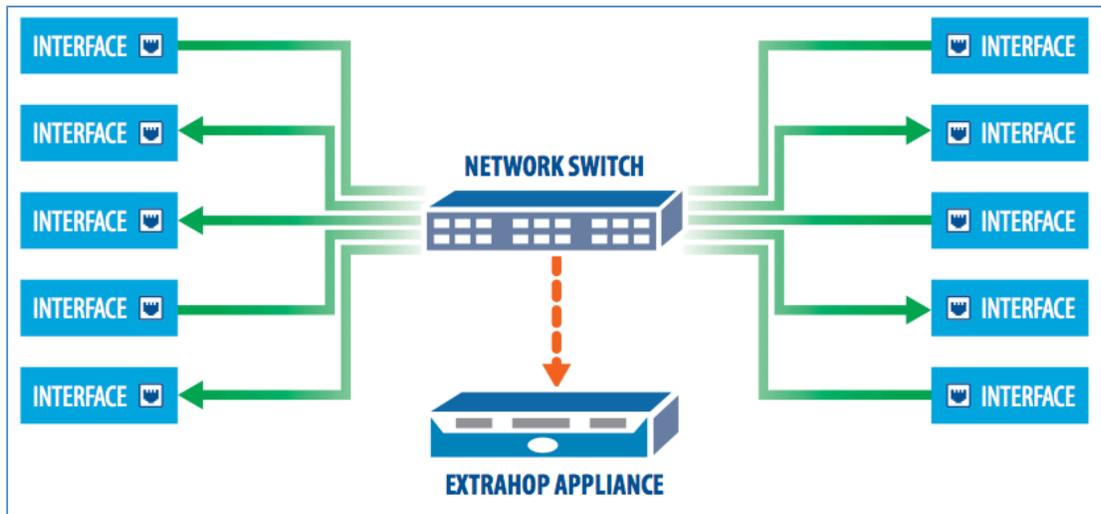
Today, nearly every healthcare organization relies on the HL7 messaging standard to exchange information between systems and applications so that each HL7 message is a critical link in healthcare workflows. If HL7 messages are not delivered or generate errors, then patient admission information, billing details, laboratory results and other important data cannot be passed from one system to another.

Traditional methods of monitoring HL7 interfaces are limited in terms of functionality. HL7 operations teams must rely on inconsistent server logs and basic dashboards from interface engines to monitor the health and performance of HL7 communications. As a result of this piecemeal approach, these teams often do not know of an issue until they receive complaints from users.

ExtraHop has introduced a new paradigm for HL7 monitoring that provides real-time insights from all HL7 communications passing over the network.

- **Troubleshooting** – With the ExtraHop platform, interface teams can start with the summary dashboard that provides an auto-discovered list of all the active sending and receiving interfaces with corresponding activity metrics. From there, they can drill down

- to the performance of each individual interface to get detailed HL7 transaction metrics.
- **Dynamic Interface Mapping** – Operations teams and HL7 analysts can use the ExtraHop platform to easily keep track of and report on HL7 activity. ExtraHop automatically maps activity between all sending and receiving HL7 interfaces, as well as the applications dependent on those interface connections, all in real time.
 - **Early-Warning Alerts** – Interface failures and performance issues can impact workflows and the quality of care provided to patients. The ExtraHop platform continuously builds baselines for HL7 communications and automatically fires alerts when performance deviates significantly from historical patterns. For example, if an interface is modified, and that modification causes a spike in errors, ExtraHop would alert on that. In addition, the ExtraHop platform can alert on the success or failure of high-priority orders, including Stat, ASAP, and others.
 - **Business Analytics and Clinical Informatics** – Because of the flexible nature of the HL7 standard, HL7 messages carry a tremendously rich trove of operational data. The ExtraHop platform can extract, analyze, and visualize any data field contained within an HL7 message in real time, from message IDs to valuable operational information such as admission time and symptoms to provide operational, business, and clinical analytics.

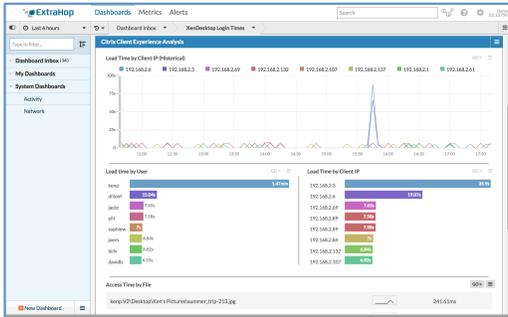


The ExtraHop platform deploys non-invasively to provide vendor-agnostic visibility into the performance of all active sending and receiving HL7 interfaces. .

2. Faster Desktop and Application Virtualization Performance

Steward Health Care System manages a wide range of mobile devices, from more than 900 workstations on wheels (WOWs) used by front-line hospital staff to tablets and laptops used by doctors and nurses in ambulatory care clinics. Steward delivers nearly 50 applications to these devices through Citrix XenApp, including MEDITECH and eClinicalWorks electronic medical record (EMR) applications.

“If a nurse pulls a patient’s medical records, it’s typically not a very linear communication path,”



IT organizations use ExtraHop to gain correlated insight across the web, database, network, VDI, and storage tiers.

says Hanson. “That single mouse-click involves calls to multiple data sources, across the 30 or so fileservers that hold code for the application, and then reassembling and presenting it through Citrix XenApp. None of our other monitoring tools enabled us to correlate those inter-server communications and especially Citrix delivery—and that’s the type of issue we’re using ExtraHop to really understand.”

ExtraHop has also helped a large research hospital that had spent weeks trying to isolate the cause of extremely slow Citrix logins every morning around 8:30 a.m. With ExtraHop, the hospital identified severe contention at the storage tier—a single doctor was unintentionally pulling down 2GB of photos stored in his My Pictures folder every time he logged in, causing login times to go from a few seconds to as long as 15 minutes. By deleting the My Pictures folder from user profiles, the IT team at the research hospital solved the problem, helping to earn goodwill from users and paving the way for an expansion of the hospital’s VDI deployment.



ExtraHop enables IT teams to extract real-time business insights, such as ER wait times per facility.

3. Greater Accountability from Vendors and Hosting Providers

Network engineers and system administrators can spend a great deal of time responding to user complaints and troubleshooting slow performance issues that are difficult to diagnose or replicate. Resolving those issues can be especially problematic if those applications are provided by a third-party vendor or hosted by third parties, such as SaaS EMR applications, claims processing applications, and practice management applications. Often, IT teams do not have enough visibility to determine root causes or to counter claims from third-party vendors and managed service providers that host applications. With real-time insight into end-user experience for these hosted applications, including application-level transaction details, IT teams can hold vendors accountable and identify root causes faster.

4. Detailed Visibility Across Distributed Facilities

As a result of mergers and acquisitions, hospital networks face the IT challenge of ensuring performance and availability across geographically distributed hospitals, clinics, and ambulatory care practices. With ExtraHop, IT teams can compare performance between locations to prioritize troubleshooting and better understand where to make investments.

While other monitoring tools may offer simple bandwidth and latency metrics for these distributed facilities, ExtraHop provides full-stream reassembly and L2–L7 analysis so IT teams can correlate actual user experience directly to events in the datacenter, right down to the precise application, workstation, and servers involved. With more streamlined troubleshooting, IT teams can move away from a reactive help-desk approach and focus more on proactively improving service delivery.

5. Insight to Support Legacy System Maintenance and Decommissioning

Another consequence of mergers and acquisitions is that healthcare IT environments have become sprawling and complex, with many different legacy applications and services built on older technologies. Often, organizations aren't even aware of all of the systems and applications they are responsible for.

"Originally, we had six semi-connected hospitals, and adding five more compounded the complexity," says Mat Demers, Director of Systems Engineering for Steward Health Care System. "We've got diverse technology environments that aren't always glued together well—and when you're trying to provide stability and the best end-user experience possible, troubleshooting can become extremely tricky."

ExtraHop automatically discovers devices and identifies dependencies based on heuristic analysis of device communications. This insight into which systems are being used, and how they are used, helps organizations to identify and safely decommission legacy systems, reducing unnecessary consumption of network, compute, and storage capacity.

6. Simplified HIPAA Audits and Reduced Data Leakage

Through passive analysis of all data in flight, ExtraHop enables healthcare IT teams to easily flag problems, track anomalous events, and prove enforcement of compliance measures. ExtraHop also passively analyzes all transactions passing over the wire, so IT teams have a complete, immediate record of database, storage, and directory services activity by user and client.

In addition, ExtraHop offers an extensive security and compliance solution, enabling organizations to quickly gain visibility into potential weaknesses and data leakage. This solution includes many difficult-to-monitor metrics out of the box, including locked-down VDI monitoring, SSL encryption auditing, and storage access monitoring. It is also extensible, so that IT teams can easily add custom metrics, alerts, and dashboards.

Conclusion

The rise of the real-time healthcare system is already placing extraordinary demands on IT, and that trend will only continue. ExtraHop can help by giving healthcare organizations the proactive, real-time operational agility so they can control IT complexity and thrive in this new paradigm.

ExtraHop helps IT organizations better support critical business goals, such as improving patient outcomes, increasing application performance and availability, complying with security and patient privacy regulations, and deriving business and clinical insights from the wealth of data produced by their systems. As their IT operations become more adaptive and efficient, these organizations will be able to embrace a future in which the healthcare delivery system is more agile, more mobile, and more collaborative than ever.

ExtraHop is the global leader in real-time wire data analytics. The ExtraHop Operational Intelligence platform analyzes all L2-L7 communications, including full bidirectional transactional payloads. This innovative approach provides the correlated, cross-tier visibility essential for application performance, availability, and security in today's complex and dynamic IT environments. The winner of numerous awards from Interop and others, the ExtraHop platform scales up to 40 Gbps, deploys without agents, and delivers tangible value immediately upon deployment.

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