nGeniusONE Platform for HL7 in Healthcare Organizations

The advancements, innovation, and maturity of Healthcare IT technology continues unabated as organizations shift to a more patient-care centric approach to delivering healthcare services. Prompt, secure, cost- effective interaction with patient Electronic Medical Records (EMRs), imaging services (DICOM), and diagnostic test results for collaboration with specialists and/or communication with patients are common place in hospitals and clinics. As Health Layer 7 (HL7) solutions are widely deployed in leading healthcare providers' IT environments for standards-based interoperability between the many applications, devices and services involved in transferring information related to patient care and treatment, it is critical that it operates flawlessly.

Measuring a patient's experience within a healthcare organization is directly dependent on the efficient operation of that organizations HL7 implementation. HL7 in turn is dependent on a broader IT environment that includes network infrastructure, applications providing functions like EMR and Radiology , individual applications servers, their backend Databases, and all the necessary service enablers such as DNS, DHCP, authentication like LDAP, Active Directory or RADIUS. The impact of degradations or outages in communications with patient information, admissions, diagnostic tests, insurance coverage and billing can mean delays in administering treatment or worse. With so many possible areas that could contribute to performance degradations, IT teams need a robust triage, performance management, and service assurance solution capable of quickly identifying participants and isolating faults across multiple domains and vendors. This information is enriched with data from individual HL7 fields.

The nGeniusONE® Service Assurance platform provides real-time analysis for visibility of both patient care and business application traffic flows throughout the network. nGeniusONE is powered by Adaptive Service Intelligence™ (ASI) technology, a patented, highly scalable deep packet inspection engine that leverages rich traffic-flow data for extracting key performance metrics from across all the service domains. nGeniusONE helps to quickly triage performance issues impacting HL7 services providing significant reductions in Mean Time to Repair (MTTR) as well as in Mean Time to Innocence (MTTI) by providing proof of what is NOT the problem.

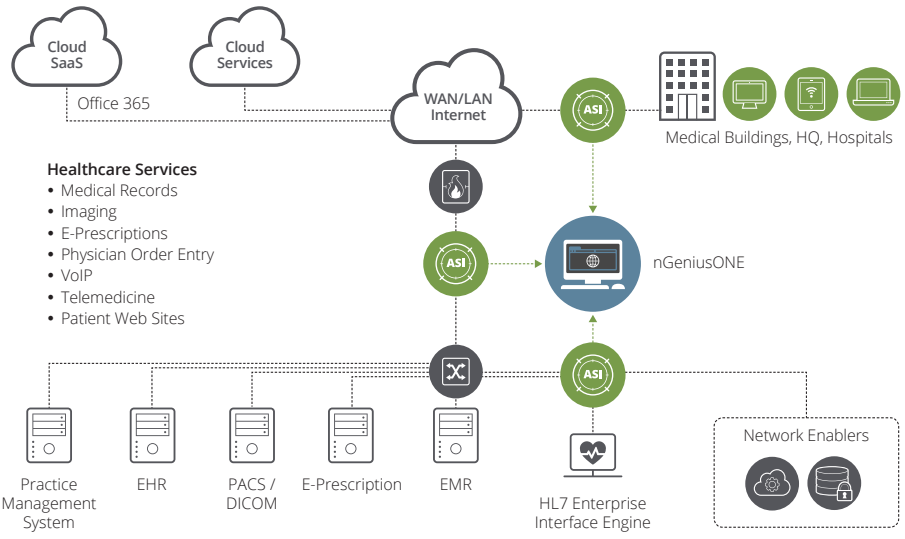

Figure 1: The nGeniusONE platform supports Healthcare services that depend on HL7 interfaces for interoperability and communications including Application Servers, Database Servers, and other common systems like LDAP, Active Directory, Radius, DNS, e-mail and Citrix for end-to-end service delivery assurance and management.

Benefits of nGeniusONE Solution for HL7 Healthcare Services

Many of the world's largest healthcare organizations rely on the nGeniusONE platform to deliver end-to-end visibility into the performance of their multi-vendor, application environments that typically include HL7. nGeniusONE uncovers the full context of service anomalies across multiple layers which may be contributing to slow application response times and poor user experience in transmitting health information such as administrative and clinical data between hospital information systems including:

- Reduce time to pinpoint source of interoperability issues
- Troubleshoot network slowdowns rapidly
- Improve analysis of HL7 interoperability services
- Decrease analysis time of message sender and receiver issues

nGeniusONE Support for HL7 Services

In order to help IT teams resolve performance issues, nGeniusONE relies on the power of ASI. The platform continuously monitors application communication traffic in healthcare environments, including deep recognition, classification and measurement of individual sessions and transactions for the many application protocols found in healthcare networks. ASI data enables nGeniusONE to provide a holistic view into the performance of traffic between users / clients and applications traversing the network. When in use, the nGeniusONE solution also monitors HL7 transactions, to assure information is seamless delivered.

This highly structured data provides operational insights and visibility into the potential causes for degradations impacting healthcare services. The nGeniusONE platform identifies HL7 sending and receiving facilities and associated errors are involved to determine if they need to be addressed.

Further, when H7 is not the source of the trouble, the nGeniusONE solution provides rapid troubleshooting analysis and intelligent workflows to determine which application servers are delivering services to users as expected; if servers are overburdened; which communities of users are most impacted by an issue; what errors are being generated; and the behavior of other applications and protocols running over the same infrastructure that may be affecting network performance.

The affect in healthcare environments, where dependence on HL7 services is high for swift, safe application access by doctors and nurses, is that the nGeniusONE platform ultimately improves triage and reduces MTTR with the ability to:

- Identify cause of slowdowns in patient care application transactions like admissions, scheduling appointments, and/or billing services
- Isolate a widespread slowdown accessing patient information over HL7 interfaces
- Discover if the source of "network is slow" problems is due to the infrastructure, third-party WAN providers, application / database servers or HL7 services
- Pinpoint if a message sender or receiver degradation in a clinician's office is the result of network congestion over the remote WAN links or incorrect QoS Settings

With a consistent set of service-oriented workflows, the nGeniusONE platform enables seamless, contextual transitioning across multiple layers of analysis. This facilitates efficient and informed hand-off of incident response tasks across the different IT groups involved in delivery of the HL7 service, as well as other healthcare applications, from one end to the other.

The nGeniusONE platform streamlines performance management for HL7 services by providing the following key analysis layers:

- **Service Dashboard** – The dashboard delivers health status, metrics, alarms, and intelligent early warning of activity and issues impacting HL7 and other healthcare services. IT teams can use this to quickly spot performance issues related to a variety of elements necessary to deliver a holistic service in a single view for the EMR and DICOM imaging services alongside HL7 interface engines, and other elements throughout the healthcare enterprise.
- **Service Dependency Map** – The service dependency map visualizes the current state of the HL7 service and application environment with discovery and mapping of the conversations with the observed HL7 gateways. Protocols, locations and server relationships are also revealed to provide visibility into the dependencies among various components throughout the healthcare network.
- **HL7 Service Monitor** – The HL7 Monitor analyzes the standard protocol (Health Level 7) used to transmit health information, such as administrative and clinical data, between hospital information systems. It provides metrics that measure the transfer of administrative, scheduling, and record keeping information. Comprehensive analysis of HL7 activity tracks and displays successes and failures, latency, retransmissions, and response times of the HL7 message types Administrative (admission, discharge and transfer), Scheduling, Documentation and Other to identify the root cause of patient-care impacting performance issues. For rapid problem resolution, the HL7 monitor also provides analysis of errors, such as misordered message segments, and rejections, including message type not supported.
- **Session Analysis** – Session-level analysis provides ladder diagrams, with hop-by-hop analysis of message exchanges using HL7. This helps IT teams evaluate transaction latencies, network statistics, Average Round Trip time, the number of TCP retransmissions, timeouts, as well as detailed session and traffic-flow information.
- **Packet Analysis** – Using packet analysis, IT teams gain deep-dive visibility into HL7-based services as well as other healthcare applications, such as EMR apps, imaging application protocols, web-based applications, etc., for protocol level analysis and forensic evidence collection.

For many healthcare organizations, a majority of HL7 impacting performance issues can be efficiently triaged by using the Dashboard and Service Monitor screens specifically. However, should deep dive troubleshooting be required, IT teams can drill down further to Session and Packet Analysis layers.

Benefits of nGeniusONE for HL7 in Healthcare Environments

- **Quickly and Efficiently Triage Service Degradations for HL7 and Other Healthcare Applications** – Comprehensive service delivery platform covers HL7 and the broader healthcare IT environment including the multivendor hardware, application and service enablers so IT teams can efficiently pinpoint root cause of performance issues and reduce MTTR.
- **Assure High Quality Patient-care User Experience** – The passive packet-flow monitoring methodology and in-depth HL7 service monitors put powerful capabilities in the hands of IT teams to rapidly troubleshoot issues with HL7, EMR, imaging and other patient impacting application services.
- **Improve IT Team Collaboration** – Using the common nGeniusONE workflows, the platform improves quick mean time to knowledge across all aspects of the healthcare service delivery chain including the HL7 interfaces for collaboration between application development, network engineering, operations and third party vendors.
- **Reduce Monitoring and Vendor Management Complexities and Costs** – Combined visibility of data, voice, and video for service assurance in the single nGeniusONE platform helps healthcare organizations optimize the performance of a converged IP network while simultaneously reducing OPEX and CAPEX costs with a complete solution.

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