



A Managed Service For Diagnostic Imaging IT

Introduction

As the engine that keeps radiology operations and business development functioning, IT must support a varied and dispersed constituency ranging from in-house physicians to client radiology techs. The issues at hand include PACS / RIS interoperability, dictation systems, application support, general systems administration such as upgrades, backups, and disaster recovery management. As part of their operations, IT also provides and supports all aspects of connectivity and telecom infrastructure.

The increase in use of diagnostic imaging creates a particularly interesting challenge for the Information Technology department in the areas of bandwidth management and telecommunications systems. Specifically, the number of VPNs is growing rapidly, bandwidth availability in the point-to-point dedicated connections linking partner sites is constrained, and the need to monitor and react to connectivity problems can put undue strains, 24 x 7, on the IT staff. In fact, IT has grown an enterprise telecommunications infrastructure over time which, as it expands, has carrier-class demands placed on its functionality which it cannot adequately meet.

The objective of this paper is to show how AG Mednet's managed telecom solution can provide IT with the leverage it needs to maintain security, increase performance and improve the functionality associated with acquiring, transferring and tracking diagnostic image studies. One of the benefits of the AG Mednet platform is that it can be integrated in phases and easily coexists with the existing VPN infrastructure.

AG Mednet: The Path To A Managed Telecom Infrastructure

As the telecom requirements increase, an enterprise-level infrastructure built in-house can become unwieldy. Managing dozens of VPNs connecting dissimilar and individually managed networks is extremely complex. In these environments, root cause analysis of network faults and outages is tricky and time consuming. Additionally, software upgrades of VPN systems in this multi-company environment is very difficult to achieve and the consequences are clear: Delays in the process create security risks, and adverse events during the upgrades (e.g., out-of-sync updates) generate cascading customer service calls.

When the in-house managed VPN network grows very large, enterprise-level solutions give way to a carrier-class, managed infrastructure. This is where AG Mednet shines. AG Mednet can be used to handle all the transport requirements of the most demanding teleradiology and diagnostic image transportation application. Additionally, our managed DICOM transport platform provides the IT department with a wide-ranging set of functions and services that mitigate and in many cases eliminate most customer-affecting outages. The IT department can leverage AG Mednet's scale to provide the client operations team with the stability, performance and security to satisfy the needs of the most demanding teleradiology client. Some of the carrier-class capabilities of AG Mednet include:

Performance

AG Mednet has centered the architecture of its network around high transfer performance of lossless images. Through our Patent Pending DICOM grooming functionality coupled with extensive leased capacity at the network core, AG Mednet is able to complete sub-second image transfers even under many strenuous conditions. Our proprietary wide area protocol virtually eliminates DICOM latency, provides tight transaction control, adding statefulness to study transfers. This eliminates the need to

ever have to re-transmit an image that had already been sent, and increases reliability and effective transfer speed, giving both senders and receivers the level of performance generally associated with dedicated, point-to-point bandwidth.

Monitored Service

AG Mednet is monitored 24 x 7 x 365. Monitoring of edge and core devices includes disk and connectivity functions. We also monitor bandwidth and transmission events to ensure that image flow is secure, consistent and efficient. AG Mednet can provide larger IT departments with direct views onto the NOC environment, enabling them to directly monitor their client's edge devices.

Redundancy

AG Mednet provides redundancy at multiple levels. Our stateful transmission and advanced queuing mechanisms provide the IT department with a high level of confidence that if there are temporary faults in the path, ranging from power failures at the edge or drop in connectivity between the edges and the core of the network, that the platform will automatically and aggressively try to re-establish connectivity until the entire study is transferred to the desired destination. Another level of redundancy is at the core, where multiple data centers, all positioned directly over 10 gigabit backbones serve as alternative routes in case of catastrophic events affecting any of them.

Tier 1 & Tier 2 Support

AG Mednet provides 24 x 7 x 365 access to Tier 1 Tier 2 support to complement the on-call IT staff. This support can be accessed directly by the teleradiology provider, and helps to diagnose and resolve issues that may come up as part of normal operations. The staff is familiar with both the telecom and DICOM infrastructures and is always conscious of the needs and demands of operations providing remote emergency medical care.

On-Going Research & Development

As a telecommunications provider dedicated exclusively to the transport of diagnostic image studies and associated data, AG Mednet has an ongoing set of advanced R&D initiatives. These initiatives continually improve the performance and reliability of the network, and add sophisticated features giving users the ability to develop competitive advantages in the market. Because of our scale, we are able to provide our subscribers with the types of features and functionality which their users ask for, and for which they neither have the time nor the budget.

AG Mednet: A Complement To Existing Infrastructure

AG Mednet is a carrier-class network designed from the start to route diagnostic image studies of all kinds. The network was devised to fit within the radiology workflow as well as to be mindful of the security, reliability, interoperability and performance required by the hospital IT environment.

AG Mednet is not an all-or-nothing solution. There are cases, particularly those where an extensive VPN infrastructure is already in place and in most instances operational, where there is no need to migrate all operations to this managed platform immediately. The AG Mednet solution co-exists with an extensive VPN infrastructure and can be used to manage special cases.

Efficient Movement of Large Studies

One of the places where VPNs become particularly difficult to manage and in some cases become ineffective, is in the transport of large studies. We define large studies as those with 800 images or more and which cannot be compressed because they are targeted for specialized post-processing such as 3D reconstructions. Moving these files using standard DICOM over the Internet is challenging because as the number of images grows, the latency associated with the protocol gets magnified exponentially.

AG Mednet's (Patent Pending) DICOM Grooming technology coupled with its extensive network and routing functionality, reduces application latencies drastically, and provides a platform for the secure, fast and reliable movement of these studies from any PACS or Modality to any other PACS or reading workstation.

Solution For Difficult To Deploy Sites

While VPNs are a simple and cost effective solution to a secure point-to-point connectivity requirement, there are certain environments where they are difficult to implement. Complications range from unreliable electric power or bandwidth connectivity to the Cloud causing the link to go down frequently, all the way to firewall compatibility and port access authorization problems. Common systems' administration events such as router firmware updates or DHCP server re-configurations can create havoc at the connection's edge, with downstream consequences on both ends of the line.

The existence of unreliable access and the need to adapt to changes at the edge are a common occurrence in the carrier world, and AG Mednet performs exceptionally in these cases. The AG Mednet network provides three very potent capabilities to handle these situations. The first of these mechanisms is Statefulness. AG Mednet has implemented an advanced capability which enhances DICOM data transfers and provides the ability to keep track of the last complete event before a fault takes place. The second mechanism is our Security Infrastructure which encrypts all traffic behind the firewall and enables data flows through multiple types of port configurations including Port 80 and 443 if necessary. Last but not least, the third mechanism provides for detailed and preventive monitoring of the network, edge devices and intervening routers to either predict or rapidly react to possible negative situations in the network. All these coupled with automatic restarts, robust queue management and 24 x 7 monitoring, provide IT with the technology and partnership necessary to support the telecommunications demands of diagnostic imaging operations.

Conclusion

The use and application of diagnostic imaging has increased steadily over the last 5 years. This growth, coupled with the surge in the number of images per study, is pushing standard VPN transfer solutions to their limit. AG Mednet, the next generation of managed services for diagnostic imaging is a powerful platform for imaging IT departments to respond to this increase as well as the demand for added stability, functionality and performance. For those companies with existing first generation infrastructures, Imaging IT can do a phased migration from their internally deployed VPN infrastructure, and progressively introduce AG Mednet for the most challenging sites cases (e.g., 3D post-processing). As new sites increase their volumes and others require technology updates, the platform is able to respond by providing a solid migration strategy. In the case of new or greatly expanded operations, AG Mednet provides the performance, reliability, and managed services to support the entire image transport requirement.

AG Mednet: Features & Benefits

Business Benefit	IT Benefit	Features & Capabilities
✓	✓	High performance with lossless transfers
✓	✓	DICOM grooming to eliminate protocol latency
✓	✓	Diversified & scalable network
	✓	Keep your network separate from that of your clients
✓	✓	Rapid deployment
✓	✓	Complete management of client connectivity
✓	✓	Redundancy option at end points
	✓	Simplified network maintenance, upgrades and operation
✓	✓	24 x 7 x 365 phone support
✓	✓	Proactive 24 x 7 x 365 monitoring
✓	✓	Tracking of study movement
✓		No capital outlay
	✓	Deployment investment cost saving (people/time)
✓		Branded subscriber portal configurable to provide teleradiology clients with up to the minute information about study status, as well as automated faxing of reports.
✓	✓	Audit trails