



# A complete networking and data management solution that maximizes performance and productivity

**Brookhaven Memorial Hospital Medical Center – A Case Study**

Answers for life.

**SIEMENS**



# Designing an innovative healthcare IT initiative

“NOVIUS® Lab will perform for another ten years without our worrying about hardware issues. I would recommend NOVIUS Lab wholeheartedly.”

Joe Bak  
LIS Manager  
Brookhaven Memorial Hospital Medical Center

Brookhaven Memorial Hospital Medical Center (Brookhaven) is a 306-bed, acute-care, voluntary, not-for-profit, independent community hospital located in East Patchogue, Long Island, New York. Established in 1956, the Medical Center has grown over the years to serve the needs of 28 communities throughout central Suffolk County and a population of 350,000. The Medical Center employs more than 2,000 people at the main campus; two community multi-disciplinary health centers; and a modern, state-of-the-art facility located in downtown Patchogue. The facility accommodates a hemodialysis program, home health and hospice/bereavement services, an off-site ambulatory women’s imaging center, bariatric wound care, and breast health services.

Brookhaven’s main focus is to provide leading-edge healthcare solutions through a compassionate team and technologically advanced facilities, including a certified Level II Trauma Center. With this goal in mind, Brookhaven’s hospital laboratory has adopted an innovative perspective with its IT initiative. Brookhaven is now better prepared to provide its medical professionals with the vital information they need to improve the management and delivery of healthcare services well into the next decade, while delivering cost and resource savings to the institution along the way.

For this initiative, Brookhaven turned to Siemens – and the company’s comprehensive portfolio of performance-driven healthcare IT products and solutions – to help ensure the right balance of technology, performance, and productivity.

## **Streamlining lab processes for better TATs, with less tech effort**

Brookhaven’s lab currently runs about 3.3 million tests per year. In the past decade, the lab’s volume has increased five percent annually. The majority of this work is generated by the hospital’s emergency department, which receives about 70,000 visits per year.

To maximize productivity and simplify the technician’s workflow, Siemens recommended NOVIUS Lab, an innovative laboratory information system. Through NOVIUS Lab, Brookhaven’s lab would be able to improve its turnaround times, deliver quicker clinical results, and expedite patient care. Brookhaven agreed to install an information system and become a beta test site for Siemens NOVIUS Lab.

In 2000, Brookhaven installed NOVIUS Lab as a next-generation replacement for Turnkey Lab, a MUMPS-based mini LIS system. With its steadily rising test-volume requirements, Brookhaven had reached critical mass: it needed to update the lab to meet growing demands and continue providing quality care for years to come.

“Our original goal was to have lab techs spend less time on the computer, releasing results manually,” notes Joe Bak, LIS Manager. “We wanted to streamline the process.”

NOVIUS Lab provided the tools and functionality that Brookhaven needed for workflow optimization and seamless interoperability between multiple lab settings, facilitating the rapid exchange of information.

A feature that has proven particularly valuable to meeting Brookhaven’s objectives is a near real-time turnaround monitor that follows lab processes from collection to reporting, providing access to, and notification of, critical information and test results – directly and remotely – across the lab or the campus. This feature has improved Brookhaven’s ability to deliver high-quality results quickly and consistently.

At Brookhaven, NOVIUS Lab is currently configured to handle hematology, chemistry, urinalysis, coagulation, microbiology lab workflows, and reporting. NOVIUS Lab also interfaces with Brookhaven’s independent pathology and blood bank systems.

Specimen ID	Snpl ID	Test	Result	Instr Flag	QA Flag	Previous
202 00057	1707	HA	140			
202 00057	1707	K	3.3		L	
202 00057	1707	CL	50		L	
202 00057	1707	CO2	28			
202 00060	1710	WBC	3.4		L	11.5 (7/2)
202 00060	1710	RBC	5.55			3.01 (7/2)
202 00060	1710	HGB	16.9		HDF	11.1 (7/2)
202 00060	1710	HCT	49		H	33 (7/21)
202 00060	1710	MCV	92			88 (7/21)
202 00060	1710	MCH	32.1		H	33.1 (7/2)
202 00060	1710	MCHC	32.1			32.1 (7/2)
202 00060	1710	PLTCT	300		DF	100 (7/21)
202 00060	1710	NEUT-M	73.0		H	81.0 (7/2)



“NOVIUS Lab has great scalability,” notes Bak. “It has been able to grow with us to meet our needs and has given us great flexibility in configuring the system, especially with reporting. Each department has its own search sets, and we use customized management reports.” The search sets are unique and powerful, allowing lab staff members to customize their workflow and access their criteria with a single keystroke.

**An enterprise-wide solution**

In 2007, Brookhaven deployed Siemens Soarian® Clinicals, a web-based hospital information system (HIS) that helps ensure a seamless flow of information between the laboratory and the rest of the hospital enterprise. “We currently have NOVIUS Lab interfacing with our Soarian Clinicals, a dialysis system, a pharmacy system, and an e-clinic (an outpatient facility) across the street,” states Bak. NOVIUS Lab also has the ability to interface with any adjunct private practices, although Brookhaven currently does not yet require that capability.

“The hospital also has installed another Siemens product – Soarian Enterprise Document Management,” says Bak. “This is a document imaging system that interfaces with NOVIUS Lab and Soarian Clinicals where, instead of medical records getting thousands of sheets of paper on our discharge patients, the imaging system takes a snapshot of a report, then sends a picture via FTP.”

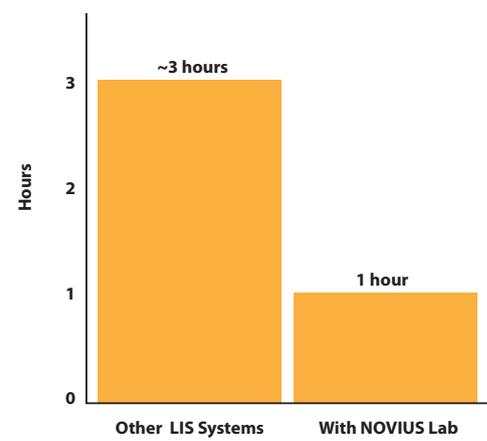
Today at Brookhaven, increased work volumes are managed easily with existing personnel by the time and productivity gains that NOVIUS Lab helps achieve – the goal of every LEAN operation.

By measurable standards, NOVIUS Lab has helped Brookhaven to streamline lab processes across the facility, allowing for faster turnaround of test results and helping maintain the highest level of quality even at higher test volumes.

The Brookhaven team also has been impressed with how easy and cost-effective NOVIUS Lab has been to maintain. With the lab, there is minimal downtime and consistently high performance.

“Maintenance takes about an hour per month – one third the time it takes with other LIS systems,” adds Bak. “And, in nearly ten years, there has only been five hours of unscheduled downtime.”

**LIS Monthly Maintenance**



“To ensure its continued peak performance, we do index rebuilds once or twice a year to defrag our database, which is nearly ten years old,” comments Bak. “We have over 85 gigs of data, so we installed new hardware last year and purchased disk tapes to store the data because memory is cheap. NOVIUS Lab will perform for another ten years without our worrying about hardware issues. I would recommend NOVIUS Lab wholeheartedly.”

# Maintaining the highest-quality results, while freeing up resources

“If someone were to come in and say they were removing NOVIUS Lab and EasyLink™ from the lab, we’d have to hire more staff.”

Jim Carr  
Administrative Director  
Brookhaven Memorial Hospital Medical Center

In July 2009, Brookhaven complemented its LIS infrastructure with the fully integrated, web-based EasyLink Informatics System to manage quality-control data and maximize the performance and productivity of the laboratory, which runs about 1.5 million chemistry tests per year.

As a middleware IT solution, the EasyLink software provides a multi-system, multi-discipline review of both patient and QC data from a single location – across the hospital lab or across multiple hospital sites – and immediate access for up to 25 concurrent networked users. Not only does EasyLink give Brookhaven a degree of control it has never had over its information before, it also:

- Ensures greater consistency in the review of patient results
- Offers time- and workflow-optimizing features such as advanced auto-verification and the ability to tailor and prioritize rules, as well as filters for result and sample holds

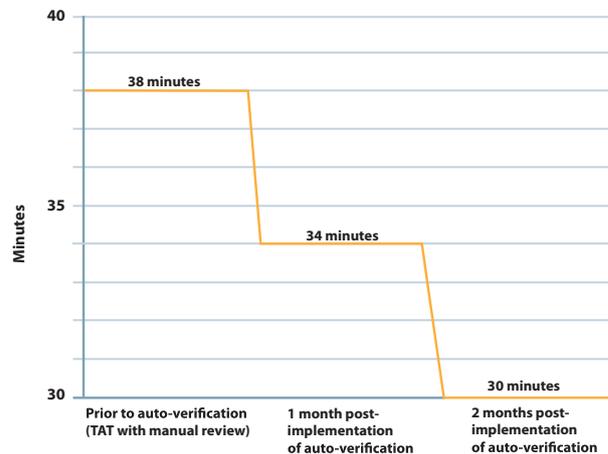
“We were looking for a way to move to auto-verification of results,” says Jim Carr, the laboratory’s Administrative Director. “That allows our techs to spend their time on the important tasks instead of spending hours reviewing results that won’t impact patient care. Prior to implementing EasyLink, we had two lab technologists, one on each of the Dimension® RxL analyzers, releasing results manually. We wanted to free up these resources for other tasks.”

Carr goes on to say, “We constantly look at turnaround time: the speed at which we can get the specimen to the laboratory, generate results, and get those results to the physicians so they can take care of their patients. That’s what we were looking for EasyLink to do. By having the system release results, we can free up a tech to do other things, like expand our blood bank capabilities. This will have a positive effect on our lab and reduce TAT on other tests.”

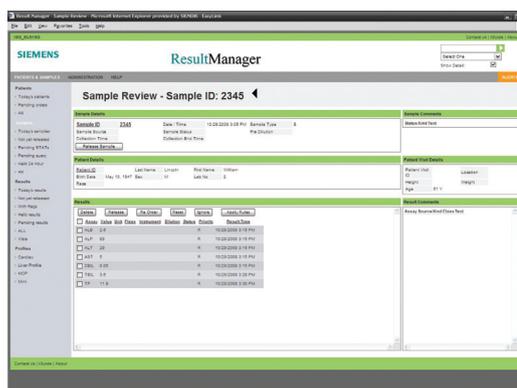
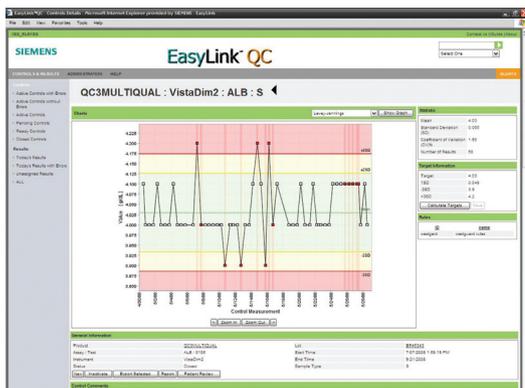
“Now that we’ve gone to auto-verification, we’ve achieved a 19 percent improvement in STAT turnaround times,”

Carr says. “That’s one of the biggest changes we’ve ever seen, and it’s significant because, predominantly, our work comes out of the ED. With auto-verification, we were able to improve STAT TAT while being able to free up one tech to spend time on more important, value-added tasks.”

## Average STAT BMP Turnaround Time



The advantages of implementing EasyLink have far exceeded Brookhaven’s initial objectives – as well as their expectations. Because EasyLink is a web-based application, it allows Brookhaven to take advantage of immediate access to data for troubleshooting or external analysis to better manage the lab and monitor instrument performance. “Prior to the installation of EasyLink, the techs in the off-shifts were running back and forth to Chemistry. Now, they can check the status of samples and even access data from where they are because the information is available on any networked computer screen,” notes Carr. “In fact, Siemens can also dial in and troubleshoot, or even help us change a rule, and it imports it right away.” RealTime Solutions<sup>SM</sup> by Siemens helps monitor and predict many service issues before the laboratory is aware there may be a problem.



“EasyLink has been especially advantageous in the second and third shifts because that’s when there’s less staff,” says Mindy Moskowitz, Chemistry Supervisor. “Now, they can see what’s going on from where they are and can focus on true sample issues and resolve them. That makes everyone a lot happier.”

Lab staff can also easily view QC data multiple ways with EasyLink. A simple highlight or click provides staff with a quick view of QC results for easy monitoring by assay or control, along with a preview of the Levey-Jennings chart or graph. Calculation of patient median and QC alerts offer laboratory staff real-time tools for issue recognition and faster resolution.

“There’s a lot of information on one screen, and there are many options to choose,” says Moskowitz. “I can see a QC problem in near real time, without having to wait, go up to the instrument, or review paperwork later. I can see the trend, right from my office, day to day.”

“If there is a problem,” notes Bak, “we can stop the techs from releasing results right away. Other systems wouldn’t stop you if QC was out. The techs would just be releasing all day. Now, they get a notification and have to manually address it.”

By connecting the lab’s multiple instruments to its LIS through EasyLink, Brookhaven can now consolidate patient data management. In addition, Brookhaven has gained greater control over its workflow and operational performance. This has more than heightened productivity – it has increased the lab techs’ satisfaction.

### An easy-to-use, web-based solution

It took time for the lab’s technologists to get used to auto-verification. “In the beginning,” says Bak, “we didn’t know what rules we wanted, so we had to write and rewrite them. Prior to implementing EasyLink, our techs were used to seeing the deltas, which we did not include in the rules, initially. They were afraid of abnormal test results getting through, so, for

the first couple of days, they were watching everything, and nothing was automatically released. With time, the rules have been expanded, more results were automatically released, and the techs are now very confident. Now, we have built rules in EasyLink for delta checks.”

The technologists at Brookhaven’s lab were seeing three to four contaminated samples per day. With EasyLink, the delta checking rules have now been able to highlight result discrepancies to catch these specimen issues immediately, before the results go to the physician.

“With the complex delta rules we’ve incorporated,” Bak goes on to say, “we’re jumping ahead of what we could do before EasyLink was connected to NOVIUS Lab. We can have the techs focus on resolving true sample issues, so NOVIUS Lab and EasyLink are complementary and provide expanded capabilities.”

Scalability and adaptability are two other features EasyLink offers that have made it a good fit for Brookhaven. As Brookhaven’s volume continues to increase, it can easily expand its connectivity by adding more instruments and connections to multiple locations on a network. EasyLink also gives each lab the opportunity to customize the system based on individual needs, with user-defined rules, trigger rules, and flexible reporting options.

The combination of EasyLink and NOVIUS Lab has become indispensable to Brookhaven’s lab operations. “EasyLink runs 24/7,” Bak says, “including the ‘off’ shift. Now that we have the rules where we want them to be, I can’t see why a tech wouldn’t be thrilled with EasyLink.”

The investment has been worth the outcome. “The techs were apprehensive at first, but they now say the system is great,” Carr acknowledges. “If someone were to come in and say they were removing NOVIUS Lab and EasyLink from the lab, we’d have to hire more staff.”

# Putting it all together, with a dedicated partner

“Siemens had top-notch people on site, installing the instruments and building the files. Since we were a beta site for EasyLink, they were able to identify some issues that they hadn’t found in their research and development of the system. They attacked and solved them quickly. Siemens has been great. The service and lab support have been phenomenal.”

Joe Bak  
LIS Manager  
Brookhaven Memorial Hospital Medical Center

Bringing together connectivity solutions, document imaging, information technology, and laboratory diagnostics, Siemens devised a plan to maximize the production and performance at Brookhaven’s lab.

To provide Brookhaven the tools to quickly build interfaces and enable the exchange of complex information between EasyLink and NOVIUS Lab, Siemens recommended the implementation of Siemens OPENLink™, an application-independent interface engine.

Siemens OPENLink can bridge lab, clinical, imaging, financial, administration, and other systems that require online data, enabling users to transfer data between heterogeneous systems and applications, even when they utilize different communication standards and protocols. “The flexibility is fantastic,” Bak says. “If an instrument or process is sending out a data stream, you can tweak it to match anything you want. You can translate any language, whether it is HL7 or ASTM.”

Bak further notes, “Siemens OPENLink can easily develop hundreds of interfaces, with no defined maximum allowable number of processes per cluster.” When Brookhaven first implemented Siemens OPENLink, the lab began with 15 processes; they now have successfully deployed 40 processes, some of which are piggybacked. “Anytime we have a new instrument or process,” Bak says, “we contact Siemens and they build the interface process. They work with our Siemens OPENLink IT administrator to troubleshoot it.”

Brookhaven’s decision to purchase another Siemens product progressed naturally. “The decision makers were happy to be a ‘Siemens Shop,’ given the company’s breadth of products, commitment to excellence, and KLAS® award-winning service and support,” affirms Carr. Brookhaven appreciates Siemens proactive approach to maintenance and customer satisfaction.

“Siemens really made my job easier,” says Bak. Siemens provided Brookhaven with dedicated consultant service and

project management to make the lab run as seamlessly as possible. In addition, Siemens provided technical and IT support, education, and training.

Siemens uncompromising standards also made an impact on the Brookhaven lab’s IT project leaders. “Siemens had top-notch people on site, installing the instruments and building the files,” Bak reports. “Since we were a beta site for EasyLink, they were able to identify some issues that they hadn’t found in their research and development of the system. They attacked and solved them quickly. Siemens has been great. The service and lab support have been phenomenal.”

## An IT solution for the future

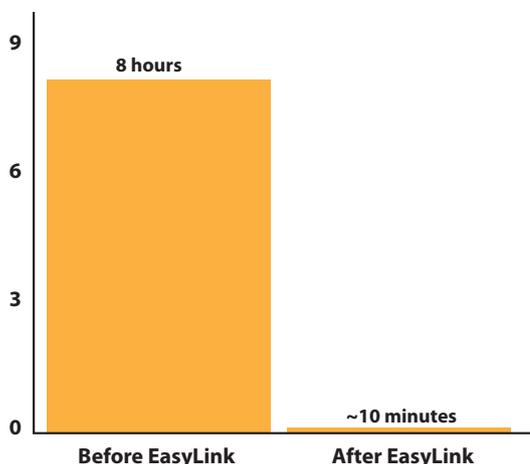
Each step in the Siemens solution – NOVIUS Lab, Soarian Clinicals, EasyLink Informatics System, and Siemens OPENLink – has helped Brookhaven improve performance and productivity, connecting every patient touchpoint across the care continuum.

With its newly acquired technology, connectivity, and workflow solutions, Brookhaven is focusing on becoming a more LEAN enterprise. Brookhaven will reallocate staff, shifting personnel away from tasks that previously had been time-consuming, and expand testing to include new specialty chemistry tests such as vitamin D, PTH, and Total T3. “Without additional labor costs, we can generate savings and revenue – and TATs will be faster,” says Carr.

Brookhaven can also capitalize on EasyLink system’s QC export compatibility with the BioRad Unity™ Interlaboratory Program. “By using the QC file export feature and uploading our QC results electronically,” says Moskowitz, “we can save two technologists from having to work eight hours each month to submit QC manually, as we had been doing. Since EasyLink can collect all the QC data automatically, we can reduce the labor requirements for a task that previously had been time-consuming, allowing valuable resources to be reallocated and optimized.”



### Monthly QC Submission Time

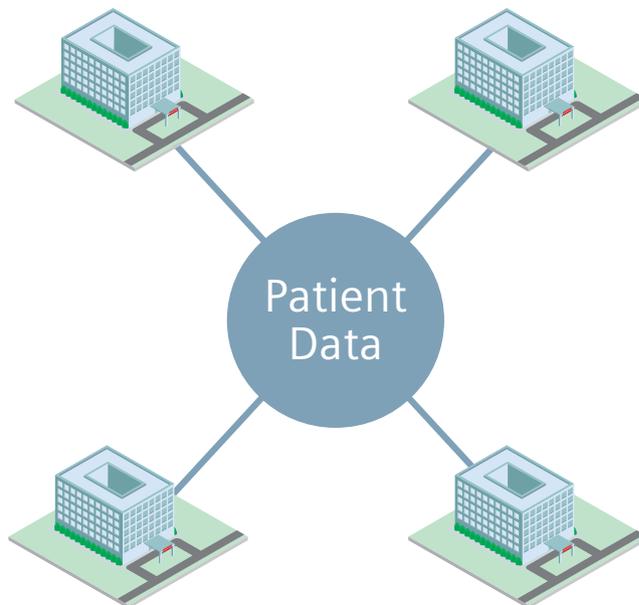


The exceptional interfacing capability Brookhaven now has with EasyLink has created a wish list. "We are interested in interfacing our IMMULITE® 1000 and our BCS® XP coagulation analyzer, plus other instruments that aren't currently interfaced with NOVIUS Lab," says Carr. "Further, the ability to interface with the smaller instruments that send streams of data could help significantly. We wouldn't have to go to each instrument and review the QC."

Although there are no immediate plans for re-engineering workflows, the choice of Siemens EasyLink makes Brookhaven highly upgrade-compatible and provides the lab with plug and play advantages to scale up to the higher-volume Dimension Vista® system, when this becomes a priority. The lab now also has the ability to track samples in its information system, should the volume merit its implementation.

In striving for innovation for its IT initiative and looking toward the future, Brookhaven is currently on the ground floor in working with LIPIX, an independent, not-for-profit corporation that was established to develop a regional health information organization (RHIO) or health information exchange (HIE) on Long Island that is designed to improve the quality and efficiency of patient care. Together with other hospitals in the region, they are building a web-based, computerized repository where patient results are securely stored so that all relevant patient information is instantly available to caregivers, no matter where the patient presents in the healthcare system.

Through their partnership, Brookhaven and Siemens are well equipped for whatever challenges the future may bring.



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