



Hospital Increases Productivity with Integrated Desktop Tools to Automate Workflow

Overview

Country or Region: Germany

Industry: Healthcare

Customer Profile

Ingolstadt Hospital is a medical center with 1,100 beds, 300 physicians, 3,000 employees, and 1,000 desktop computers, including 5 Tablet PCs.

Business Situation

The hospital wanted to streamline its care processes by connecting staff to data from back-end systems using familiar Microsoft® Office tools, and by making it easy to share data in legally valid digital forms.

Solution

The hospital is using Microsoft Office Professional Enterprise Edition 2003 to create dynamic links to databases within its desktop applications and Microsoft Office InfoPath® 2003 to capture digital handwritten signatures.

Benefits

- Automates paper-based workflow
- Provides desktop access to back-end data
- Increases organizational productivity
- Enables legally binding digital signatures
- Improves healthcare teamwork

“Office 2003 provides easy access to patient information from many hospital systems. Now clinicians and staffs can share that data to improve teamwork and deliver better, patient-centered care.”

Thomas Kleemann, Chief Information Officer, Ingolstadt Hospital

Recently, Germany’s Ingolstadt Hospital automated paper-based admission processes in its emergency ward with a Microsoft® Office Professional Enterprise Edition 2003 solution that uses Microsoft Office InfoPath® 2003 forms deployed on Tablet PCs running Microsoft Windows® XP Tablet PC Edition. Now, the hospital plans on expanding this Microsoft Office System solution to standardize workflow throughout the facility by using the improved XML capabilities and support for Web services in Office 2003 Service Pack 1 (SP1) to connect staff to more of the hospital’s back-end systems. And, with the enhanced digital signature capabilities and condition builder feature in the SP1 updates for InfoPath 2003, developers can quickly and easily design legally binding forms that automate a wide variety of the hospital’s processes and streamline the handling of digital patient documentation.



Situation

As a major regional health facility, Ingolstadt Hospital provides emergency and acute care services, including all major diagnostic procedures, to a catchment area of approximately 500,000 people in southern Bavaria, Germany. This busy hospital averages 25,000 emergency patient admissions a year and has 1,100 beds.

Every patient arriving at the hospital brings a unique medical history. Taking that history into account while adding new data as the patient moves through admission, various diagnostic procedures, treatment, and discharge is an essential element of healthcare documentation that provides practitioners with a complete picture of each patient at every stage of his or her hospital stay. Ingolstadt Hospital has long recognized the importance of collecting and communicating accurate patient data among attending clinicians and practitioners as a means of improving care, accelerating patient treatment, and increasing hospital-wide organizational efficiency.

Recently, the hospital worked with technology partner Siemens AG to implement a patient admission solution based on Microsoft® Office Professional Enterprise Edition 2003 and deployed on Tablet PCs running the Microsoft Windows® XP Tablet PC Edition operating system. The solution made important progress toward streamlining the flow of patient information by automating the formerly paper-based admissions process in the emergency ward. The new solution replaces paper documents with XML-based forms created with the Microsoft Office InfoPath® 2003 information-gathering program, storing these forms within a central repository using Microsoft Windows SharePoint® Services, a component of the Microsoft Windows Server™ 2003 operating system.

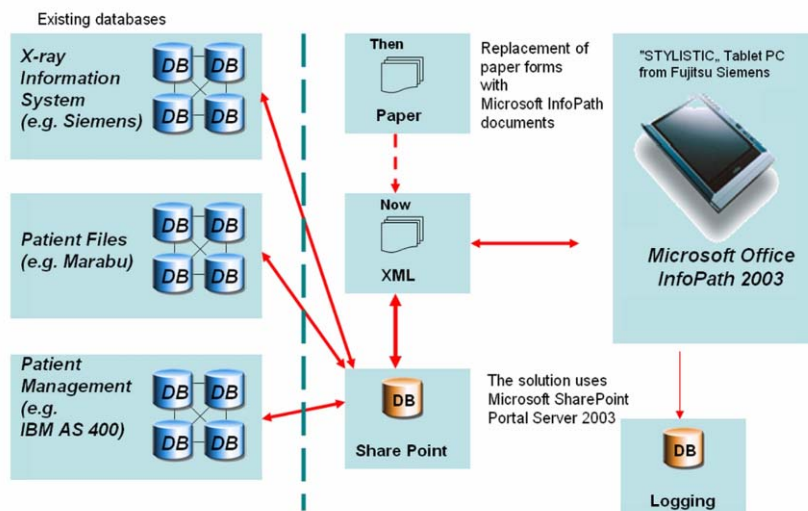
InfoPath 2003 forms are XML-based forms designed to communicate with the hospital's databases through Web services. XML is a universal language for data exchange, and Web services are small, reusable applications written in XML. The forms are stored on a Windows SharePoint Services site, where they are processed by a Web service into the hospital's back-end databases. These include repositories of radiology and medical history data as well as patient management data, including insurance, extra services, current ward, and admission data (see Figure 1).

Doctors, nurses, and clerical staff no longer have to interrupt patient care in the emergency ward to attend to paperwork. Instead, they use the pen to enter patient data into InfoPath 2003 forms stored on the Tablet PC while they are working directly with patients. They can also retrieve information using the hospital's wireless network.

The challenge now for Ingolstadt Hospital is to find ways to replicate the benefits within the emergency ward throughout the hospital

Figure 1. Patient documentation is handled with electronic InfoPath 2003 forms stored using Microsoft Windows SharePoint Services technology. The forms use Web services to communicate with the hospital's databases.

DENA – Mobile Data Capture in Emergency Rooms - The Solution -



“We are using an Office-based solution to automate a paper-based workflow by replacing hundreds of carbon copies of patient examination results printed by an expensive, outdated IBM AS/400 printer.”

Thomas Kleemann, Chief Information Officer,
Ingolstadt Hospital

to automate paper-based workflow and expedite the handling of digital patient documentation. “Our overall goal is to enable staff throughout the hospital to easily access, view, and act on critical patient and healthcare information from within the familiar interface of any of the Microsoft Office System programs,” says Thomas Kleemann, Chief Information Officer at Ingolstadt Hospital.

The hospital wanted to standardize workflow and patient documentation processing so it could increase organizational efficiency in three major ways: (1) to replace paper-based workflows with digital information, (2) to link more clinicians and staff members with back-end systems containing information they need to provide optimum patient care—not just upon admittance, but clear through to a patient’s discharge, and (3) to make it easier for teams to work together using InfoPath 2003 forms to document patient care between different departments, including enabling handwritten signatures. Often one person in a care team will initiate the processing of a patient document, which then must be completed and authorized through a signature by another person with a different role in the care team. For example, a nurse could open a patient document, a doctor could sign it to authorize a prescription, and a pharmacist could add his or her signature to the same document upon fulfilling the prescription. The hospital wanted to incorporate this “roles-based” access to different sections of health forms to automate the processing of patient documentation across departments without leaving a paper trail.

“Only digital signatures are legally recognized, however they have no visual representation on the form,” says Kleemann. “We wanted to provide a more natural way for staff to sign documents using their own signatures. We couldn’t do this by coding, and our current

solution required an additional five mouse clicks for the user. We wanted a more realistic way for staff to fill out and sign InfoPath 2003 forms that wouldn’t take time away from providing patient care.”

Solution

The hospital was already leveraging the benefits of Office Professional Enterprise Edition 2003, XML, InfoPath-based forms, and Web services in providing a new software environment for gathering, sharing, and reusing the most up-to-date patient information. Because Office Professional Enterprise Edition 2003 was so successful at achieving these goals in the emergency ward, it made sense to look at using an Office-based solution elsewhere in the hospital. According to Kleemann, expanding on the earlier successful Office Professional Enterprise Edition 2003-based solution would help fulfill the IT department’s mandate for facilitating the flow of patient information as it follows that person through his or her stay at the hospital, as well as making it available to clinicians whenever and wherever they need it.

“When Office Professional 2003 Service Pack 1 was released I began to visualize how the new capabilities within the Office System could help to increase productivity throughout the hospital,” he says. “Service Pack 1 delivers continued improvements in reliability and performance and makes it easier to build customized Office-based programs that we can use to help employees connect with information they need to automate paper-based processes and provide more efficient and higher quality patient care.”

“XML and Web services support built into Office Professional Edition 2003 erode the gap between the hospital’s systems that store operational data and the desktop programs that staff members use to act on

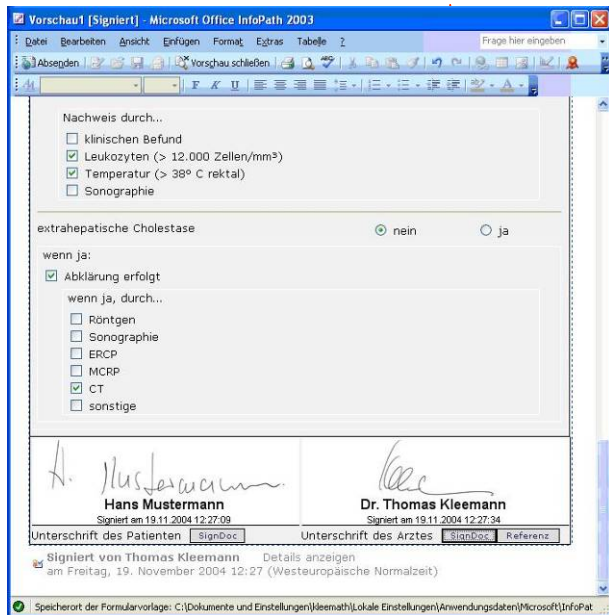


Figure 2. New digital signature capabilities within Office Professional Enterprise Edition 2003 provide a natural way of working with electronic patient documentation.

that data," he continues. "My vision is to combine the strength of each Office product by exploiting its XML capabilities. Doctors could capture structured pharmaceutical information with InfoPath 2003 forms, finance staff could calculate data in Excel, and clerical staff could automate the writing of admission letters in Word, using small semantic units from different XML documents. The end result is enhanced organizational productivity."

Connecting Staff with Information

Kleemann also plans on using the Microsoft Office Information Bridge Framework (IBF), a set of software components, tools, and prescriptive guidance that will allow developers to easily create solutions that connect the Microsoft Office System to any of Ingolstadt Hospital's databases or line-of-business applications.

Under IBF prescriptive guidelines, the Microsoft Office System can dynamically link to the hospital's databases. The link is created by calling a Web service that delivers

data and instructions or choices about what to do with the data. These instructions are encapsulated in a smart tag, a type of button that provides choices for enhancing content and layout in Microsoft Office System programs. Smart tag buttons appear when you perform certain tasks, such as pasting text or graphics, and display a list of options when clicked. Now, Microsoft Office System programs not only can consume information from an organization's back-end systems, but also display the actions that viewers must take in relation to this information. This means more can be done from within an Office desktop application than ever before.

Enhancing Digital Forms

SP1 update for InfoPath 2003 also delivers significant new functionality, including enhanced digital signature capabilities, improved inking support for Tablet PC users, and improved roles-based access to forms or portions of forms that are helping to extend the benefits of the original solution beyond the emergency room.

The hospital worked with a third-party provider, SoftPro, to develop a solution with InfoPath 2003 SP1 that allows employees to tap with the pen once to sign the form by hand. The signature is verified against a reference, and, if successful, is attached digitally to the form.

Benefits

Ingolstadt Hospital is already beginning to automate paper-based processes using Office Professional Enterprise Edition 2003. It is also planning on using IBF to facilitate the interactive flow of digital information from the hospital's back-end databases to staff members and clinicians throughout its many departments. Finally, the hospital's IT department is creating forms that make it easier for staff to process documentation and work in teams.

“We are using an Office-based solution to automate a paper-based workflow by replacing hundreds of carbon copies of patient examination results printed by an expensive, outdated IBM AS/400 printer,” says Kleemann. “Now we are using digital information accessed through an InfoPath 2003 form. Automating this process will save us time and money.”

“I’m planning on using IBF to develop powerful Office Professional Enterprise Edition 2003 solutions that enhance the functions of traditional desktop applications, enabling staff to interpret and better act on the data they need in the right context whether it’s InfoPath 2003, Excel, Word or Outlook®,” Kleemann continues. “IBF is the doctor’s silent companion. Complex data structures and relations between clinical systems are displayed in a simple view in the Office task pane.”

SP1 updates for Office Professional Enterprise Edition 2003 helped Ingolstadt Hospital provide an easier way for staff members to use their handwritten signature on different forms, eliminating distracting mouse clicks to achieve a natural way of signing InfoPath 2003 forms without interrupting teamwork or patient care.

“With our new solution there’s less interaction needed to fill out a form, and automatic digital signing occurs after the handwritten signature,” says Kleemann. “We are already incorporating the handwritten signature into Radiology Examination Reports to sign so they are ready for publishing.”

The solution also enables a nurse, for example, to log on to a Tablet PC, initiate and fill out an InfoPath 2003 form, and then hand the Tablet PC and pen to a doctor to approve the information and provide the authorizing signature. If the doctor’s signature is

successfully validated, it can then be attached to the form and saved over a Web service with the doctor’s name, even though it’s the nurse that’s logged into the Windows XP session. This sets the stage for improved teamwork among caregivers who play different roles in the care of a patient throughout his or her stay at the hospital (see Figure 2).

“Facilitating digital signatures among care team members that are busy attending to patients improves the team’s efficiency as well as a patient care,” says Kleemann. The improved condition builder feature makes it easier for the IT department to build role-based access into certain fields in forms or to the entire form. This makes it easier to tailor forms to different business processes in which more than one person in the hospital may need to interact with the form, from caregivers to administrative staff. “With InfoPath 2003, I’m very impressed at how fast I can build complex validation rules with a few clicks of the mouse,” says Kleemann. “We have faster development and better control over how we build the forms to accommodate different processes throughout the hospital.”

Concludes Kleemann, “Office 2003 provides easy access to patient information from many hospital systems. Now clinicians and staffs can share that data to improve teamwork and deliver better patient-centered care.”

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