ISSUE 44

LANSA®
ADVANCED SOFTWARE MADE SIMPLE

Review

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IT Challenges Organizations Face

Mobile applications and data security

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Reliability and innovation for **Baustoff Union**

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Mind the Gap: addressing ambiguity in requirements

APPLICATION DEVELOPMENT & MODERNIZATION | BUSINESS PROCESS INTEGRATION

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THE LANSA REVIEW

Issue 44: September 2014

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PUBLISHER:
LANSA Pty Ltd
122 Arthur St, Nth Sydney
NSW 2060 Australia

LANSA®
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In this issue:
Technology Change

A WORD FROM PETE DRANEY
Founder and co-owner

Heraclitus of Ephesus, the 'weeping philosopher' from Greece, famously remarked "**Nothing is Permanent Except Change**". Over 1100 years later, François La Rochefoucauld, a French writer, confirmed this with a similar statement "The only thing constant in life is change".

Our business is built on enabling our customers to adapt to change in business and technology with consummate ease – a claim supported by our twenty five year track record. We are proud of our continuous achievement of providing a smooth transition path for our customers to take advantage of new technology quickly, while minimizing risk.

We do this by shielding LANSA customers from the low level technical details, such as operating system, database, integration protocol and other specifics.

As successive waves of new technology have been introduced over the years, our customers have been relatively protected from having to rework their solutions. By not having to do the low level 'plumbing' tasks, LANSA developers can focus more productively on the business issues they need to solve. Moreover, LANSA customers don't get stuck in indecisive maintenance mode when they plan to leave their current technology platform, because they can take their applications and skills with them.

Our promise to simplify information technology is reflected in our logo 'Advanced Software Made Simple".

The showcase article identifies some of the most common challenges related to application architecture and application development. It explains how LANSA simplifies the solution to meeting these challenges by:

- Providing mobile solutions to a progressively mobile workforce.
- Exposing server side business functions and data via industry standard interfaces.
- Embracing the web browser, cloud and SaaS models for commercial applications.
- Minimizing the ongoing cost of application development and maintenance.

The omnipresence of mobile devices has changed the way companies interact with customers and provide information to employees.

Mobile Security is easily overlooked when businesses are rushing to deliver mobile apps. The Architects corner in this issue puts mobile applications and data security in perspective, and contains many tips and techniques to improve security in an increasingly mobile world.

Mobile applications empower staff of every job description in every industry to do their job better. Low-cost mobile devices are being integrated into all areas of business to provide significant savings and better customer service. The key to achieving these gains is to develop mobile apps that fully integrate into a company's core line of business system.

LANSA Review 44 contains several examples of mobile success stories:

- Quality inspectors at Fruberica, a fruit and vegetable distributor, use a mobile app to capture their findings. The solution allows Fruberica to send inspection reports with photos to prospective customers, while the trucks with produce are still unloading.
- Customer service reps of Baustoff Union, a provider of buildings materials, have pricing, stock and order information at their fingertips, helping customers to avoid expensive building delays.

In conclusion, this magazine is not only about mobile technology. This issue also contains articles about:

- GS1 implementation at Godiva, the famous chocolate maker.
- Application modernization at Yamachu in Japan and Baustoff Union in Germany.
- NTE's balancing act of providing a B2C Web site in addition to a traditional dealer channel.
- How on-screen exam marking ensures that marking is impartial, consistent and fair to all.
- How to address ambiguity in IT project requirements.

Announcing:
Mobile Apps for IBM i that function without a network

Interest in LongRange, our mobile application development tool, has been extremely high. However, a number of customers told us, "*For the most part, as soon as I lose connectivity, my mobile apps are useless.*" They asked that apps developed with LongRange be able to operate without or without a network connection.

We've listened to their requests. LongRange now includes the ability to operate when not connected to a network as well as providing access to local data storage on mobile devices.

Mobile apps simplify data collection and data validation and reduce the time lag between data capture and saving it in a corporate database. Before the advent of mobile apps, data was collected on paper or by using built-for-purpose hardware devices, such as scanners, which were often far more expensive than mobile devices are now. The data was then re-keyed by data-entry staff or downloaded from the hardware device to a computer in the corporate office.

Collecting data on paper doesn't need a network connection, but data collection on mobile devices is more productive and accurate. For a mobile data collection app to be reliable it requires the ability to operate whether connected to a network or not.

It is an overly optimistic design choice to assume the presence of a reliable network connection at all times. Design your apps with local use in mind and use a network connection as and when required – then the apps will operate whether connected to a network or not.

Let's look at what you need in a 'sometimes-connected' mobile business app and how easy it is to develop this type of app with LongRange. The requirements are:

- Local storage
- Ability to operate without a network connection
- Ability to operate when connected
- Data transfer between a mobile device and a server

Storage options are folders and documents, files with data stored as key-value pairs, a local database or a combination of storage options.

LongRange provides local storage using a relational database (SQLite), which contains the tables and data that the app requires to operate offline.

The local (offline) forms allow users to interact with the app when no network connection is available. The forms define how to display, collect, alter or delete data in the local database. Developers can use local forms to create solutions that deliver the best performance and user experience, even when reliable network access is not available. LongRange apps can operate in three modes:

1. always local
2. local with data transfer
3. both local and online

Developers should choose the architecture for their apps that is most appropriate.

Always Local

Apps that operate in 'Always local' mode use and store data on the device without ever needing a network connection. Typically, these apps are self-contained and the local data is the only data needed.

We have very few customer examples of 'always local', as most mobile business apps require a regular exchange of data.

One of our customers uses LongRange in a semi 'Always Local' scenario. Product catalogs are uploaded to the mobile devices periodically, providing sales staff with a convenient way of looking up product information while on the road, including images, prices and standard delivery times. When actual inventory levels or delivery times are required, the sales rep needs to find a network connection and start a different app to work online.

Local with Data Transfer

Apps that work 'Local with data transfer' operate offline and include features for downloading and uploading data that are initiated by the app user. Data required by the app resides on the device.

One of our customers, the vehicle repair division of an insurance company, uses a mobile app to manage delivery and return of replacement vehicles for customers whose cars are in for repair. The app manages the registration of fuel levels, mileage, bodywork damage and driving licence, and includes signature capture upon customer acceptance. Most staff download their delivery assignments in the mornings and they upload car rental details and customer signatures in the evenings.

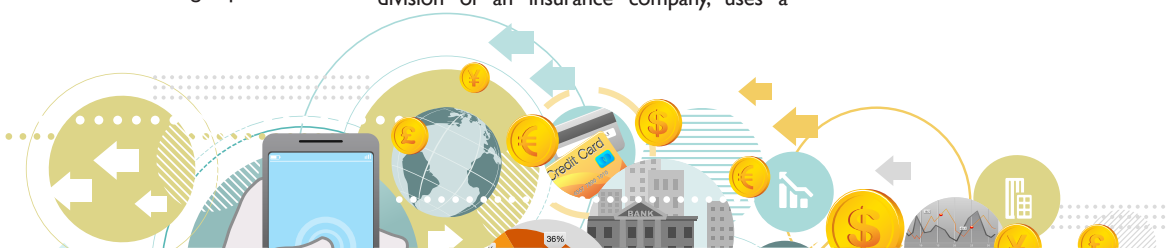
Both Local and Online

'Both Local and Online' means that the app uses data from the server when a connection is available, or locally stored data when unavailable. The app brings data down from the server and stores it locally as required. The data transfer is initiated automatically by the app, there is no need for the user to take action.

One of our customers, a grain grower, has provided its quality inspectors with a mobile app that works both offline and online. The quality inspectors visit the fields where the crops grow and use the app to register the grain rediness and other quality details. Some of the growing areas have no internet connection. When a connection is available, the app validates the inspection details against the data stored in the corporate ERP system and saves the inspection results to the ERP system. When no connection is available, the data is only checked against locally stored validation rules and the inspection results are stored locally. When a connection becomes available again, the app synchronizes locally stored inspection results with the ERP system, at which point the data is validated against the ERP system.

Finally, here's the advertisement: LongRange provides IBM i developers with the tools to quickly build mobile apps for both iOS and Android devices from a single code base, without having to learn HTML5, CSS3, PHP, JavaScript, Java, or Objective-C. LongRange developed apps can operate online or offline.

Find the documentation and tutorials at: www.longrangemobile.com/documentation.htm

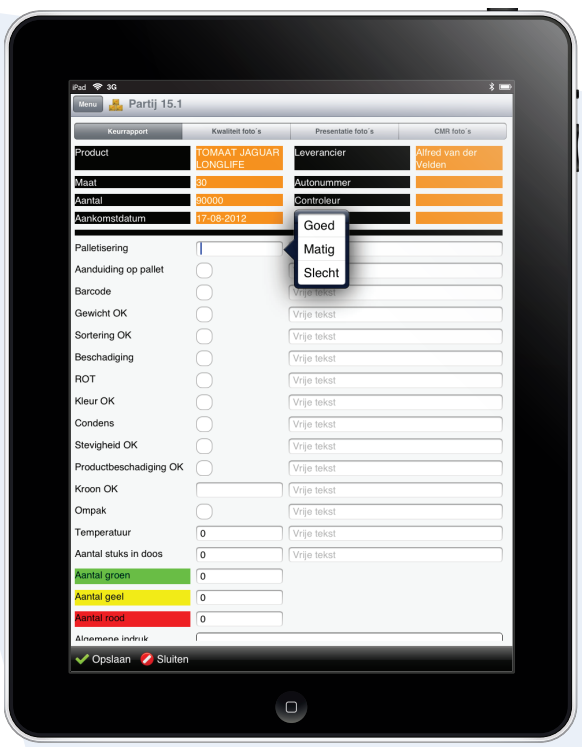


Fruberica is using iPads for its quality inspections

This Fruberica case study is based on a case study published by RPO ICT Solutions, a LANSA and IBM business partner in the Netherlands. RPO is an all-round ICT services provider and has been a leading software solution provider in the fruit and vegetable distribution sector for over 25 years. Initially RPO offered AGF/ng, as an IBM i and RPG-based ERP solution, extended with LANSA for Web access. Now called Freshng, the solution has been completely redeveloped in Visual LANSA and is available on IBM i, Windows and Linux servers or as a Cloud solution. Freshng is used by nearly 100 organizations in the Netherlands, Germany and Spain.

Fruberica, using the ERP solution on IBM i, was one of RPO's first customers to extend its implementation with a mobile app for quality inspectors. The mobile app, developed with LongRange from LANSA, allows inspectors to use their iPads to view real-time ERP back-office data about the batches of produce that have been received in the delivery hall. They then use their iPads to enter their inspection findings for these batches. The inspection result is immediately validated and updated in real-time to the ERP system on the IBM i and available to sales staff.

Fruberica, based in the Netherlands, imports greenhouse vegetables, such as tomatoes, eggplants, zucchinis and peppers, from Spain and Morocco. From Fruberica's distribution center, located in De Lier, these products are then delivered to customers in the Netherlands and elsewhere in the world. The company's peak period is in the winter, when there are less greenhouse vegetables being harvested in the Netherlands. Fruberica's annual growth has been around 10% for several years in a row. To continue to support its strong growth, Fruberica decided to automate the flow of information, starting with its paper-based quality inspection reports. Fruberica's quality inspectors are now equipped with custom-developed mobile apps on iPads to carry out their work. This has resulted in efficiency gains and more effective communication with customers.



The app allows quality inspectors to enter a formal value for each of the 14 quality control criteria, as well as adding their free format comments for each.

Keeping up with Growing Volume

The purchased vegetables are delivered by truck and are, immediately after unloading, assessed on a range of quality characteristics, such as ripeness, weight, color, temperature, size and firmness.

"Each batch is different," says General Manager Michael Holslag. "There are quality differences between the pallets, and sometimes even between the packed units on a pallet. It is of the utmost importance in the fresh industry that we promptly classify the produce we receive, in order to be sure we can swiftly deliver the right product to the right customer. This effectiveness of delivery has significantly contributed to our success. Ten years ago we were relatively small, but today we're one of the major players in our industry."

"It now only takes a few seconds to email the inspection report and photos."

Until recently, Fruberica's quality inspectors recorded their findings on notepads and order forms. Communication between the inspectors, who carry out their work in the receiving hall on the ground floor, and office staff, located on the top floor, was mostly verbal. Due to Fubrerica's continuous growth, that way of working came under pressure.

"It happened regularly that when a customer called with a question about a batch of produce that had arrived earlier that day, I had to put that call on hold and run downstairs to find out the details about that batch. Especially for large orders, you need to provide the right price and details straight away, because you will not get a second chance," explains Michael.

During the winter peak of 2011/2012, Fruberica's team had a hard time keeping up with the volume of business. Karel Holslag, father of Michael and consultant to the company, called in RPO ICT Solutions, Fruberica's regular ICT provider, to collaborate with the team and come up with a solution to improve efficiency on the warehouse floor. Together the two organizations came up with a plan. ➔

Use the iPad as Input Device

As a first step, Fruberica upgraded its digital network in order to provide a solid infrastructure for further automation and innovation. Secondly, cameras were installed to provide office staff with a direct view of the unloading trucks and the produce on the floor. The cameras can zoom in to the smallest level of detail.

Next, Fruberica and RPO explored what options were available to replace the paper-based inspection reports with digital recordings. Their decisions was to use iPads to capture and transmit quality inspection data. Karel Holslag, explains "The intuitive nature of the iPad was the main decision factor. Everyone knows how to use them. The challenge was how to make the Apple iOS talk with our IBM i-based Freshng ERP solution from RPO. Fortunately that turned out to be straightforward."

In the summer of 2012 RPO developed a quality inspection app, based on the 14 quality control criteria that Fruberica uses. RPO used the LongRange development tool for this. LongRange is a native mobile app builder from the LANSA organization. The solution consists of a server-based component (LongRange Server) and a native mobile App that runs on the mobile device. LongRange server calls the associated program on Fruberica's IBM i server (this can be an RPG, COBOL, CL or LANSA program). The program performs its processing and issues a send screen command. LongRange Server sends the screen to the mobile app, together with instructions as defined with LongRange Studio. The mobile app interprets the instructions and presents the data on the mobile device. LongRange supports both Apple and Android devices.

Using this LongRange bridge, inspectors can use their iPad to view real-time Freshng ERP back-office data about the batches of produce that have been received in the delivery hall. They then use their iPads to enter their inspection findings for these batches of produce. The inspection results are immediately validated and updated in the ERP system on the IBM i.

Inspection New Style

Michael says, "The inspection App touches the heart of our business. That's why we've spent sufficient time to make sure we define the right criteria, using pick-list and checkbox fields. There is also a free format field, which allows the inspectors to express their opinion in words. Often half a word is enough to qualify a product."

Fruberica also changed its business procedures. Upon the arrival of a batch, the inspectors now use their iPads to take two photos: a photo to document the overall quality of the batch and a presentation photo with a more commercial purpose. In the past, photos were taken only occasionally and it was a manual task to associate the photos with the actual batch of produce. Today the photos have become an integrated part of the inspection procedure and a link to the photos is automatically stored in the ERP system. The iPads are also used to take and store a picture of the CMR delivery note.

Immediately after unloading, the purchased vegetables are assessed on a range of quality characteristics.

"Inspection results are immediately available to sales and admin staff."

Once an inspection report its finalized, it is immediately transmitted from the iPad through WiFi to the IBM i ERP system and so is available to sales and admin staff. There is no running up-and-down any more to get inspection reports from the warehouse to the office. Fruberica's inspection cars (battery-powered inspection platforms on wheels from Robur) have also been adjusted and are now equipped with a power socket, so that the iPads are continuously charged.

Efficiency Gains

Since October 2012, all inspections have been carried out using the iPad App and Fruberica is very pleased with the results of the project. "At first I was hesitant about using iPads, because my top priority is to protect the bond my team has with the product and the company. Using iPads, instead of verbal communication, could have resulted in putting up a barrier. But the implementation went smoothly and the results exceeded our expectations," says Michael.

"The team very quickly got used to the iPad app. It may seem a huge transition, but we are using exactly the same inspection criteria as before. We just moved the data entry from paper to the iPad. One of our part-time inspectors, the father of the current owner, is 81 years old and he was productively using the app within a week."

"The inspection team can now handle a much bigger workload, without any sacrifice in the quality of their work or team spirit. Communication is now not only faster and more accurate, it has also contributed to a calmer atmosphere in the workplace. No one has to run up and down any more to get the inspection reports and photos from the warehouse to the office."

"When a customer enquires about the quality of a specific batch of produce they are considering to order, it now only takes a few seconds to email the relevant inspection report and photos," concludes Michael. ■

Snapshot

Customer: Fruberica, based in the Netherlands, imports greenhouse vegetables from Spain and Morocco, and distributes these worldwide. www.fruberica.nl

Challenge: Speed and quality of communication about produce with customers.

Solution: iPad app for quality inspections integrated with IBM i-based Freshng ERP system.

Key Benefits: Significant gains in capacity and speed of processing incoming produce. More effective communication with customers.

Product Used: LongRange

NTE Electronics in control of its destiny with new B2C site

Suppliers who sell exclusively through a network of independent distributors often have a hard time to getting their products promoted the way they want. Large distributors may pick and choose whatever products suit them best and small distributors may be reluctant, or constrained by finances, to try anything new. Having a B2C channel would open up a world of opportunities for these suppliers, but it may also upset their traditional distribution channel.

NTE Electronics, a prominent supplier of electronic components and accessories, found a perfect balance with its B2C Web site NTEPartsDirect. The site's sales prices are above recommended retail, but it gives NTE the opportunity to promote its broad line of products and analyze consumer preferences. NTE developed its Web site in 3 months with LANSA Commerce Edition, a framework of customizable eCommerce components. The Web site and NTE's IBM i-based ERP system are tightly integrated and share all data in real-time.

Avoiding Disintermediation

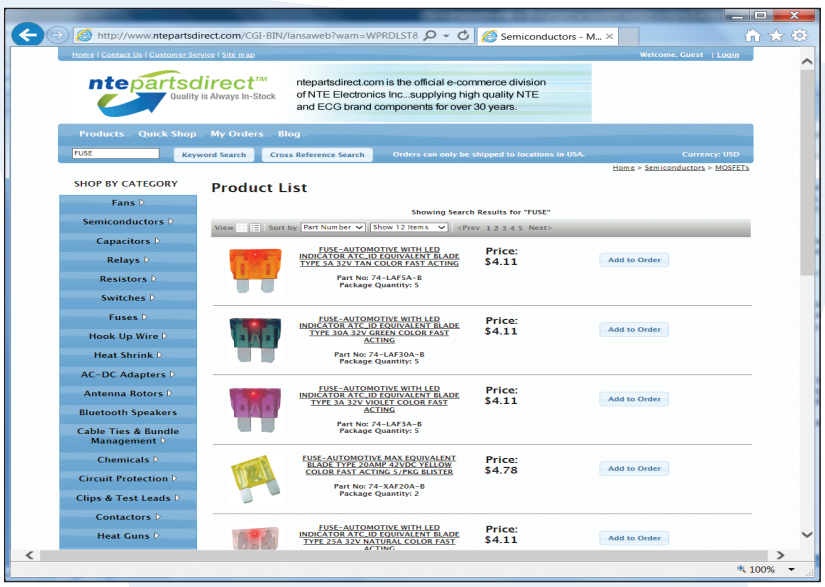
NTE Electronics, Inc., founded in New Jersey, USA in 1979, is a leading supplier of electronic components and accessories, such as semiconductors, capacitors, resistors, fuses, and much more. With the acquisition of the ECG division of Philips North America in 2001, NTE became the industry leader in supplying private label aftermarket electronic components to the industrial, commercial, consumer and medical marketplace. NTE is also a master distributor for some of the industry's major manufacturers of electronic components and accessories.

NTE sells its products strictly through a channel of about 800 authorized independent distributors across the USA, Canada, Latin America, the Caribbean and 49 other countries. The distributors range from small family run stores to large retail chains and national catalogue stores.

NTE values the support of its distributors, but found that it was hard to get its products promoted through that channel. William Horstmann, Vice President & General Manager at NTE Electronics, Inc. explains, "With the larger distributors and the online catalogue stores, it is a struggle to get NTE products properly and prominently represented on their Web site. We don't get the share of mind on their websites that we would like. For them we are just one vendor out of 300 or more. They pick and choose what suits them best and their homepage shows what they think is the latest and greatest. They may not pick us, and even if they do, they may choose a different product from what we would like to see promoted."

"With many of our smaller distributors the problem is a lack of innovation. They are just comfortable to keep doing the same thing the same way. It's hard trying to get them to take on a new product or broaden their product line," continues Horstmann.

For almost everyone the Internet is a first point of research. We wanted some kind of Web outlet for our products that is primarily NTE, something that we are in control of."



Customers can search products by keyword, or drill down through category and sub categories. They can also do a cross reference search on an industry part to find the NTE replacement.

"Tight Integration with our ERP was the reason we selected LANSA."

"NTE had been toying for years with the idea of offering its products online on a Business-to-Consumer (B2C) platform directly to the consumers and trades people that use its products. But it was a tightrope to walk, because NTE didn't want to alienate its distributors. "In 2013, we finally decided to bite the bullet and make the leap into the B2C market channel" says Horstmann.

"We came up with a new business model and created a separate B2C division, called NTE Parts Direct. To ensure that we were not going to undercut our distribution network, we made our prices 15% above the suggested resale price. With that hurdle out of the way, we started to look for an eCommerce solution to realize our plans."

No Duplication of Data

NTE evaluated several solutions and selected LANSA Commerce Edition, a framework of customizable B2C and B2B components. "We had used one of LANSA's older Web development products in 2001 to build a Web portal for our distributors, which is still working fine today. At that point in time the major reason to go with LANSA was its tight integration with our IBM i based ERP system," continues Horstmann.

"And although LANSA Commerce Edition is a very different product, the same tight integration was again the reason to select LANSA. The other vendors looked cheaper on paper, but they didn't include any details about

the time or the cost that would be required to integrate their Web front solution with our backend system."

Most of the project was carried out by a LANSA Professional Services consultant with the occasional help of NTE's RPG contractors. For example, the RPG developers would specify in what format an order had to be sent to the ERP system and which existing programs could be re-used for price calculations and other standard routines. "This close working relationship between LANSA and NTE worked out ideally and saved both parties time and money," comments Horstmann.

NTE's product information was already in very good shape. A few years earlier, when a large US retailer partnered with NTE and placed over 6,000 products on its Web site, images, long descriptions, short descriptions, datasheets, and dimensions and weights had all been added to the product database.

NTE's B2C site offers very extensive product search facilities and secure credit card payments. It uses Commerce Edition's multilingual facilities for site navigation in English and Spanish.

Status settings at item group and item detail level in the ERP system determine which products are made available to the Web site. "There is no duplication of data between the ERP system and Commerce Edition. This was a critical requirement from the start. We did not want to have to maintain duplicate databases," says Horstmann.

The project was estimated to take 3 months and was indeed finalized within 3 months. The site was launched in the USA in 2013. The rollout to Canadian and Mexican consumers is expected as soon as customs, shipping, tax and other regulations are dealt with.

Brand Awareness

"Now that we have our own outlet to promote the products we want to see promoted, we have taken control of own destiny and feel better prepared for the future," explains Horstmann. "The site allows us to analyze consumer preferences and purchase trends, cross-sell and up-sell, and monitor product performance."

"With this new B2C site we are reaching a much larger market than before. By giving our products a better Web presence we are creating brand awareness. Not just for the traditional products, but for a much broader line of products. We expect this increase in brand awareness to also boost the sales of NTE products for our distributors."

"The B2C site also allows NTE to get more advantage from its advertising, which is targeted at the consumer. Previously consumers first had to find the store or Web site of a distributor and then search for the advertised product,

NTE Electronics is a leading supplier of electronic components and accessories, such as semiconductors, capacitors, resistors, fuses, and much more.

"The site was delivered on time and within budget. This was a pretty painless project."

which they may or may not find. With so many impediments in the way people were likely to give up. That was advertising money wasted," continues Horstmann.

"From an IT point of view, the tight integration with our core ERP system is a major advantage. We only have one set of files to maintain. When we change a product description in our RPG-based ERP system, our LANSA-based B2C and B2B Web sites are instantly up-to-date. When we process an order – whether a phone order, Web order or EDI order – the inventory is immediately updated. The ERP system and eCommerce site share the same data in real-time. We don't have to duplicate or synchronize any information. We don't have to worry about multiple severs communicating with each other. And we don't have to worry about speed or performance. We have an integrated and simple to manage RPG and LANSA solution on a fast and reliable IBM i server."

"A few years ago we looked into replacing our in-house developed RPG-based ERP system with a package, but the costs were prohibitively high. In addition, we would have to redo years of customization and convert massive amounts of data. The risk for business interruption was huge. It was far more efficient to enhance and extend what we have," says Horstmann.

Conclusion

"The eCommerce site was delivered on time and within budget," says Horstmann. "I have been involved in a lot of IT projects and this was a pretty painless one. That's not just because of the LANSA software, it's also due to the fact that the LANSA consultants took great effort to analyze our business needs and investigate what data and programs we already had that could be re-used."

The number of Web visitors and buyers is growing well and the margins are high, but the volume of sales is not as high. "That was to be expected and was not what we were aiming for," concludes Horstmann. "People want a discount when they purchase a large quantity and when they ask for a better price, it is our policy to refer them to a distributor. We don't discount, that's our commitment to our traditional distribution channel." ■

Snapshot

Customer: NTE Electronics, Inc is a prominent supplier of electronic components and accessories.
www.nteinc.com and www.ntepartsdirect.com

Challenge: Running a B2C Web site that shares data in real-time with a wholesale focused ERP system, without any duplication of data.

Solution: Use a framework approach to extend the current ERP system with a B2C site that shares all data in real-time.

Key Benefits: B2C benefits – such as brand awareness, reaching a larger market and the ability to analyze consumer preferences – without the need for another server or ERP solution.

Product Used: LANSA Commerce Edition

Reliability and innovation for Baustoff Union

Many LANSA customers and partners have solutions in place that keep on working and evolving over the years to stay in tune with the company's business needs and opportunities. Below is one of those success stories, by LANSA's German business partner S.M. Hartmann (SMH), illustrating that it has been smooth sailing on the IT front for its customer, Baustoff Union, for over 15 years.

Baustoff Union (BU) started using the SMH ERP solution in 1997. Initially the solution was RPG-based, but over the years the original programs have been extended and progressively replaced using LANSA's development and integration tools. The ERP system now has a modern user interface, integration with TomTom WEBFLEET, dashboard overviews with MS Excel integration and a choice of EDI and other communication formats. Mobile apps, created with LANSA's LongRange, allow BU's management to access key metrics from their iPads and iPhones, while customer representatives in the field have mobile access to relevant customer information.

The SMH solution supports BU's exceptional growth and helps to achieve dramatic efficiencies, such as guaranteed delivery of stock orders within three hours of a customer placing an order and a stock turnover increase by a factor of six.

Exceptional Growth

Baustoff Union is a leading provider of building materials, construction services and equipment rental services in Bavaria, the largest state of Germany. BU supports both professional builders and private customers with quality products and consultancy.

Baustoff Union Holding AG & Co was recently honoured as one of "Bavaria's Best 50" mid-sized companies (ranking 4 out of 50), because of its exceptional growth.

Otto Förtsch, Managing Director of BU, acknowledges the award is a great success for a family owned construction company.

A LongRange mobile app allows BU's management to use their iPads and iPhones to view key metrics and relevant company figures.

He explains, "We have succeeded to establish ourselves as a recognizable brand, because we are strongly customer-oriented and committed to very high quality standards. We maintain high quality through continuous training of our staff and by consistently implementing ideas for improvement. In terms of technical equipment, we are always innovative and guided by the latest standards."

"The solution contributed to an efficiency increase of over 300% over six years."

As an example of innovation and customer focus, Förtsch mentions that BU equipped its trucks with specially developed cranes that can rotate 360 degrees and extend to a height of 28 meters. The full rotation and generous height make it possible for most construction sites to do the job with one crane instead of two, saving customers time and money.

In its own IT landscape, BU demands the same criteria it provides to its customers: quality, innovation, value and cost optimization. These criteria led BU, in 1997, to select IBM i (then called AS/400) as its computing platform, due to its exceptional reliability, security and performance. In the same year the SMH ERP was selected for its extensive functionality, ease of use and the availability of local support.

Faultless Functioning

Both the IBM i platform and SMH ERP solution have evolved over the years and today they still provide a modern IT environment that fully supports BU's growth and innovation. Förtsch says "The choice that we made over 15 years ago still proves to be the correct one today, even though market conditions and technologies have completely changed."

The SMH ERP solution originally consisted of RPG code, which has been extended and progressively replaced with LANSA-developed functionality, providing a smooth and low risk modernization path for SMH customers.

"The faultless functioning of the SMH ERP system is of fundamental importance to our business success and so is our partnership with SMH. SMH supports us in all phases

of development and maintenance and has always been able to very quickly implement our requirements," continues Förtsch. "The reliability of our ERP system is largely due to the knowledge and professionalism of SMH."

Siegfried Hartmann, Managing Director, SMH, explains how his team keeps customers happy and his company growing. "Since partnering with LANSA in 2006, we have all the tools we need to create and maintain contemporary software solutions and to modernize and enhance existing applications. Because LANSA's tools are cross-platform, we can use the same skills for IBM i, Windows, Web and Mobile development, keeping our team lean."

TomTom WEBFLEET

"We have used the LANSA tools very successfully for numerous projects," continues Hartmann, illustrating his point with a high ROI project example where LANSA Integrator developed Web services were used to let BU's ERP system communicate information about routes and delivery orders with TomTom WEBFLEET. The solution allows BU's fleet controller to retrieve the current position of its trucks and selectively send a delivery job to the best positioned vehicle. "Using LANSA Integrator it was straightforward to get TomTom's Web solution and our ERP system to communicate. SMH delivered the project on time and on budget," says Mr. Förtsch.

"The solution has contributed to an efficiency increase of over 300% over six years. Customer service has also improved as we can now guarantee delivery of stock orders within three hours of receiving an order, helping customers to avoid expensive delays in building projects."

XML and EDI Orders

BU is a shareholder of Hagebau, a home improvement and building materials chain with more than 1,400 locations, jointly owned by over 300 suppliers and retailers. Hagebau acts as a central purchasing association for its shareholders and offers warehousing facilities at several locations.

To facilitate the constant exchange of information between BU and Hagebau., SMH created special functions in the ERP system that automatically send outgoing orders to Hagebau in XML or EDI format. Hagebau then either fulfils the orders from its central warehouse or forwards the orders to the relevant suppliers.

BU also automated its sales invoices, giving customers a choice between EDIFACT, email PDF or customized formats.

Both solutions were realized with LANSA Composer, a platform for integrating business activities, involving transportation, transformation and custom business processing.

LANSA Composer is also used to process

Otto Förtsch, Managing Director of Baustoff Union (left) and Siegfried M. Hartmann, Managing Director of S.M. Hartmann GmbH.

"We use the same skills for IBM i, Windows, Web and Mobile solutions."

incoming transactions, such as the billing information of the individual suppliers, which it picks up directly from the Hagebau FTP server. It then compares the header and item data to the orders in the BU ERP system and automatically creates the corresponding links.

Over 80% of the purchase orders and incoming invoices are currently processed this way, reducing admin costs to a minimum. Further savings are expected when the invoices of other major suppliers can be imported.

BU's finance department evaluates all major divisions through a Windows-based dashboard, developed with Visual LANSA. It reads information from the IBM i ERP system, with the option to export data to MS Excel for further analysis. "It provides us with absolute transparency of all key metrics and has helped to increase the stock turnover ratio in the last ten years by a factor of six," says Förtsch.

Mobile

Another highly innovative project involves mobile technology. SMH has extended its ERP system with mobile access, using LongRange, a native mobile app development tool from LANSA. The mobile ERP extension allows BU's representatives in the field to access customer information, pricing, stock availability and orders, and using GPS, map the best route to a customer. A second app allows BU's management to use their iPads and iPhones to view key metrics and relevant company figures.

"I'm pleased that we don't have to outsource mobile development to Objective-C or Java developers. LANSA created LongRange specifically for developers with RPG skills, plus there is a version for LANSA developers. So, the same developers who maintain our ERP system are now involved in providing native mobile access to that ERP system," explains Hartmann.

"We are confident we have found the right partner in SMH," concludes Förtsch. "SMH is inherently innovative, always interested in improvement and further development and committed to the highest quality standards, just as we are. Our companies are a perfect match." ■

Snapshot

Customer: Baustoff Union is a leading provider of building materials, construction services and equipment rental services in Germany. http://baustoffunion.de/

Challenge: The need to improve customer service, and innovate, while avoiding the risk of disruption and errors an ERP overhaul may cause.

Solution: The ERP solution from LANSA partner SMH provided a low risk approach to progressively modernize, add and replace functionality, such as Mobile access, Integration with TomTom WEBFLEET, EDI/XML/PDF capabilities, and more.

Key Benefits: Better customer service, savings and exceptional growth.

Products Used: Visual LANSA, LANSA Composer, LANSA Integrator, LongRange.

Mind the Gap: addressing ambiguity in requirements

Patrick Fleming
LANSA North America

The lesson of the Tower of Babel, possibly the first post-project review in historical records, is that communication failure within the team will cause project failure. In today's projects, often staffed by cross-functional teams spread across the globe, the communication challenge persists.

Complexity in problem definition, solution and design tool architecture, organizational structures and market forces demand agility and constant risk assessment. According to the Project Management Institute (PMI), of the two in five projects that fail to meet business objectives, half traced the cause of failure to ineffective communications. In software development projects these typically include incomplete or changing requirement specifications, and lack of user input.

Don't assume that all project stakeholders have the same understanding of the term 'requirements'. A broad-ranging definition is: Requirements are a specification of what should be implemented. They are descriptions of how the system should behave, or of a system property or attribute. They may be a constraint on the development process of the system. A non-functional requirement should define how well the system must do what it does.

'Requirement' in software development projects is also a term overloaded with many different meanings and could be relating to any of the typical project artefacts in the probably incomplete list that follows:

Business Requirements, Technical Requirements, Stakeholder Requirements, Design Requirements, User Requirements, Functional Requirements, Customer Requirements, Non-functional Requirements, System Requirements, Scope, Process Requirements, High-level Requirements, Detailed-level Requirements, Regulatory Requirements, Product Requirements, Usability Requirements, Quality Requirements, Project Requirements, Data Requirements, Documentation Requirements, Business Rules, Assumptions, Constraints, and more.

As the classic tree swing cartoon illustrates (originating from the 1970s), all project stakeholders bring their own biases, assumptions, prejudices and expectations which influence the eventual outcome. The IT team or software vendor might be able to define what they can deliver, but only the customer can explain what they need from the system. Choosing which project documents are created and reviewed is based on categorization and criteria, such as:

- By target audience (e.g. stakeholder, user, regulatory and customer requirements)
- By level of detail (e.g. scope level, high level, detailed level and project requirements)
- By business domain (e.g. business rules and business requirements)
- By system/product (e.g. process requirements and product requirements)
- By project (e.g. assumptions, constraints, documentation requirements)
- Technical (e.g. data, design, functional, non-functional, usability, infrastructure requirements)

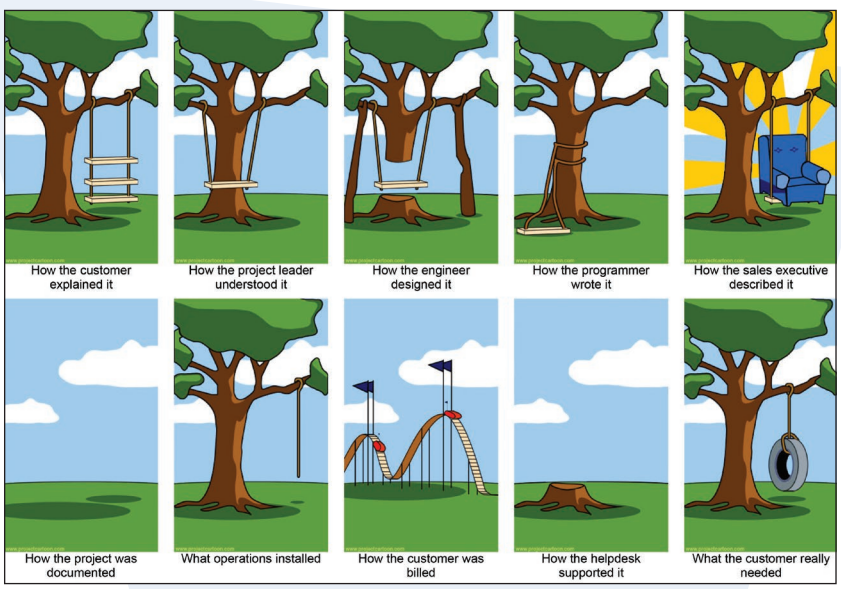
To ensure that the required project deliverables are produced, careful planning and monitoring is needed to manage both the process and the quality of the requirement specifications, in all documentation and review steps.

The planning and monitoring tasks might include:

1. Describe the attributes of a good requirement definition approach, adapted to the business, organization and project.
2. Understand the different kinds of requirements and classify customer input into the appropriate categories.
3. Take an iterative and incremental approach to requirements development.
4. Use standard templates for your vision and scope definition, such as Use Case and System Requirements Specification (SRS) documents.
5. Define the mechanism and process of formal and informal reviews, helping to ensure that stakeholders effectively review, prioritize and explicitly accept the requirements baseline.
6. Instill team and customer discipline to handle requirement changes consistently and effectively.

While Industry groups such as IIBA's BABOK 2.0 and Borland's RDM provide prescriptive standards and processes, we must cater for human frailties in expression and comprehension. Authors often lack formal training in specifying requirements and may use unconstrained natural language which:

- Introduces ambiguity, vagueness and subjectivity
- Is not always clear, concise and coherent
- Is often not testable
- Sometimes misses triggers, implied requirements and exceptions ➔



Tree Swing Project Management cartoon http://www.projectcartoon.com/cartoon/357611

Non-standardized business and technical language in English doesn't help. For example, the word 'set' has 194 distinct uses: 58 as a noun, 126 as a verb and 10 as an adjective. The acronym ATM has 129 possible values. Then there are 'doublespeak' examples (from Orwell's book 1984) which deliberately disguise the literal meaning, such as "negative patient care outcome" (death), "career alternative enhancement programs" (layoffs) and "fiscal underachievers" (the poor).

Two important goals of writing requirements are that anyone who reads the requirement should reach the same interpretation as another reader, and each reader's interpretation matches what the author intended to communicate. Language that is explicit, concise and jargon free can be understood by those who don't have the training or the desire to interpret jargon and acronym filled documents.

Take a moment to review the requirements statement column in the table below, and attempt to identify the ambiguity defect. Is there a better way of writing the requirements? Can each requirement be tested as written?

Functional requirements like those in the table can be better expressed from the perspective of something that the system should do, or something the user can do. In some functional requirements, the generic term 'the user' is referred to. The user's role or class or Actor in the application step (e.g. the production manager, the system operator) should be explicitly referenced instead. Also, the term *shall* is preferable to *should* (which may indicate desired), versus *may*, which could mean optional. Semantic nuances between verbs – such as shall, must, may, might, will, would, should, could, needs to, has to, should provide – can make it hard to interpret the requirements consistently.

A single requirement can be matched against objective criteria, measuring how well it is complete, correct, feasible, necessary, prioritized, unambiguous and verifiable. The requirements baseline set collectively should be verified so that the requirements are complete, consistent, modifiable and traceable.

The Easy Approach to Requirements Syntax (EARS) presents a general template for writing concise, testable requirements syntax. It comprises the format: [optional trigger] [optional precondition] Actor Action [Object]. An EARS example requirement specification is: "When an Order is shipped **[trigger]** and Order Terms are not 'Prepaid' **[precondition]**, the system **[Actor]** shall create **[Action]** an Invoice **[Object]**."

The timing, level and precision of the requirements, as specified for developers and testers, can be impacted by whether:

- Work is being done for an internal or external client.
- Developers have considerable domain experience.
- System testing will be based on requirements.
- Accurate estimates are required.
- Precedents are available, such as replacing an existing application.
- Customers are extensively involved.
- Project team members are geographically dispersed.

To discover and resolve ambiguity earlier in the development cycle, have team members who represent diverse perspectives who can formally inspect the requirement documents. Suitable reviewers include:

- the analyst who wrote the requirements
- the customer or representative who supplied them (particularly for use case reviews)
- the developer who must implement them
- the tester who must verify them

Another powerful review technique is to begin writing test cases early on in requirements development. Writing conceptual test cases against both the use cases and functional requirements, reinforces your understanding of how the software should behave under certain conditions. This practice helps reveal ambiguities and missing information, and also leads to a requirements document that can generate comprehensive test cases.

Also consider developing prototypes to help visualize a more tangible result than a text based SRS. Create a preliminary or possible implementation of a poorly understood portion of the requirements, to help identify and clarify gaps in your knowledge. Analysis models such as data flow diagrams, entity-relationship diagrams, class and collaboration diagrams, state-transition diagrams, and dialog maps provide alternative and complementary views of requirements that also reveal knowledge gaps.

The do-nothing alternative could lead to requirement ambiguity, which forces designers and developers to guess. If that happens, who do you want constructing your tree swing? ■

Functional Requirement Statement	Ambiguity Defect
The software shall support a water level sensor.	What does 'support' mean?
The thesaurus software shall display about five alternatives to the requested word.	Boundary values – how many is 'about five' 3, 4,6,10 more? Under what conditions are they displayed?
Accepted transactions are posted to the database later. Delinquent accounts are reviewed periodically.	When is later? When is periodically?
The software shall blink the LED on the adapter using a 50% on 50% off duty cycle.	Does the software blink the LED at all times? Is there a trigger that initiates the blinking.
If a boot disk is detected in the system, the software shall boot from it.	What if a boot disk is not present – is that a discrepancy scenario or an exception.
If you drive through a red light at an intersection, you will get a ticket.	Omission of implicit action, such as 'the user hits enter' or 'the event times out', or 'the record is not found' A better specification is "If you drive through a red light, and your car is photographed by a traffic camera or stopped by a police officer, you will get a ticket."
If the interest amount is greater than 100, send the customer the notice.	Aliasing of 'interest amount'. Is it interest owing, earned, paid or anticipated?
The system shall provide collection of PC configuration data for a mass release by the Delivery/Fulfilment team.	Subjective interpretation - The team is named Delivery/Fulfilment. - Some projects call the group a Delivery team, others call it a Fulfillment team. - There are two teams and either team can do a mass release, so the slash means 'or'. - Both groups jointly do the mass release, so the slash means 'and'.

Godiva improves efficiency with LANSA Data Sync Direct

Some companies adopt GS1 just for compliance sake, while others see GS1 as an opportunity to improve product information and procedures that go far beyond GS1. Godiva Chocolatier, Inc., the world famous chocolate maker, has implemented LANSA's Data Sync Direct as its Product Information Management (PIM) solution and as its solution to synchronize supply chain information with its wholesale customers over the GDSN (Global Data Synchronization Network).

GS1 compliance was not the most important driver for Godiva and less than half the product attributes the company is capturing are related to GS1. Data Sync Direct serves as the company's central repository for product information and consistently feeds accurate and up-to-date data to downstream systems and to third parties. Being able to maintain and manage product information in a central place, with proper workflow procedures and audit trails has helped Godiva to streamline its procedures from product development to marketing and sales.

Keeping Track of Attributes

Godiva Chocolatier is a manufacturer of premium chocolates and related products, such as truffles, coffee, cocoa, biscuits, dipped fruits and sweets, chocolate liqueurs and more. Godiva, founded in Belgium in 1926, was brought to America in 1966 and has been the leader in premium chocolate ever since. Godiva owns and operates over 600 retail boutiques worldwide, B2C Web sites and its products are also available via select department and specialty stores.

Godiva's regional offices run their ERP systems on a single IBM i server. These ERP systems include individually customized versions of BPCS in Brussels and Hong Kong and PRMS in Japan and North America. Godiva uses Island Pacific for its retail sales audit function, also on the same IBM i server, and has IT staff in all mentioned locations.

Godiva has over 2,000 wholesale customers in the US and Canada, mostly department stores and other retailers. These stores need to be kept up to date with product information. Prior to using Data Sync Direct, Godiva was depending on MS Excel to manually upload information into the 1WorldSync data pool. Godiva was also using manual procedures and Excel to capture product attributes that were not available in its PRMS system.

Christine Moore, Product Master Data Manager at Godiva, explains, "It was labor intensive to safeguard the accuracy of information. Product attributes were kept in a number of Excel and Access files by various departments and individuals. Consolidating the multiplicity of files required expert knowledge and manual effort."

"As business was growing, it became nearly impossible to keep track of product attributes and manage them for all our retail and wholesale channels without a PIM tool," continues Moore. "We needed a proper central database to house product information, an audit trail to capture product changes and a workflow facility to support related procedures. We needed all those things."

"The improved level of accountability helps to track compliance by department."

Not Just for GS1 Compliance

In searching for a robust PIM solution, Godiva looked at market analyst's reports and submitted RFPs (Request for Proposal) to several vendors. This resulted in the submission of four proposals that Godiva considered worthy of pursuing. One of these was from Weidenhammer Systems Corporation, an information technology firm that had provided consultancy services to Godiva for several years. Weidenhammer proposed LANSA's Data Sync Direct solution.

Susan Phillips, Project Manager EDI at Godiva, together with Moore, produced a list of criteria that the solution had to meet:

- Be rolled out globally – multilingual and easy integration with multiple ERP systems.
- Manage workflow, audit trail and security.
- Connect to the GDSN with all pertinent messaging capabilities.
- Capture Godiva-specific attributes and manage a four level deep product hierarchy.
- Allow for customized reporting, such as for price list and sell sheet creation.
- Disseminate data internally to all relevant departments.

"Of the four solutions that we extensively researched, LANSA Data Sync Direct suited our needs best," says Moore.

During the implementation project, Moore and Phillips spent much of their time interviewing users of the different departments that would be using the solution, to make sure that the right attributes were defined and collected.

"We weren't implementing the system for a specific division or just for GS1 compliance. We wanted to capture all attributes, both those that needed to be visible within the company and those that needed to be available to our supply chain," says Moore.

An added implementation challenge for Godiva was to capture the dimensions for some of its unusual shaped product items, such as the seasonal Valentine, Easter and Christmas items. They can be in the shape of a heart, egg, teddy-bear, and so on. GS1 on-boarding staff, whose New Jersey office isn't far from Godiva, came out to Godiva's company store to ensure data quality standards were met. They bought one of almost every product and spent nearly three days measuring and weighing the products. (There might have been some product tasting as well and it was probably one of their nicest ever on-boarding projects.)

Concurrent Workflow

The concurrent workflow feature, an integral part of LANSA Data Sync Direct, allows Godiva to kick off tasks to multiple attribute owners in several departments, asking them, for example, to provide specific information by a certain due date. When staff members sign-on to the system, they get to see the tasks assigned to them. Attribute owners can be product oriented, responsible for an individual product or class of products. Or they can be responsible for a group of attributes by function, such as product development, marketing, packaging, and so on.

"The concurrent workflow is one of my favorite features," explains Moore. "Staff can work on their particular attributes simultaneously. I don't have to wait for a staff member to do his or her part before I can kick off a task to another staff member, even when they are working on attributes for the same product."

Benefits

According to Moore, the Data Sync Direct solution has improved accountability. "It is much easier now to track whether or not attribute owners have done what they needed to do. In case of a hold-up, I can go directly to the responsible person and find out what the issue is. The improved level of accountability helps to track compliance by department and streamline the process," continues Moore.

Moore also feels that procedures are more efficient because of the solution's audit trail "All product changes show up in the audit trail and I can see who has made the change. This ensures that I am informed promptly and allows me to ask the right questions to the right person."

Godiva uses LANSA's end user reporting tool (LANSA Client) to generate price lists for its wholesale customers. The price lists, customized to Godiva's requirements contain GDSN information, such as dimensions, weight and pricing. The report shows the SKU (Stock Keeping Unit) as the identifier, while displaying all packaging levels on the same line. "It's a simple report that has changed the life of our marketing team dramatically. Not just because of the speed of getting price lists generated, but also because of the increased level of detail. Our customers benefit as well, as it helps them to plan their shelf space," says Moore.

Moore finds it an enormous advantage that all data is now stored and maintained in a central place. "All GDSN and Godiva attributes are kept centrally. Previously everyone would send me spreadsheets and I would need to consolidate their information in yet another spreadsheet. Having a central database where people can maintain their own attributes has been tremendously beneficial. We now have a single source of the truth for all product data."

Phillips says that Data Sync Direct works smoothly from an IT point of view. "Its embedded security allows us to limit user access to specific tasks and product categories. We could have deployed Data Sync Direct on Windows, but we preferred to have it on the same IBM i server as our PRMS system. Integration was straightforward and keeping it all on the same server was very cost effective. Data Sync Direct is very reasonably priced as well, allowing us to deliver the project on a modest budget."

Since 1926 Godiva has been the premier maker of the fine Belgian chocolate. Today the Godiva brand is known – and loved – in over 80 countries around the world.

"We needed a proper database, an audit trail to capture product changes and a workflow facility."

Multilingual Global Roll Out

Phillips concludes, "The LANSA team was awesome to work with. They didn't just assist us with the technical implementation, but also with business decisions as they have extensive knowledge on GS1 and GDSN subject matters.

"Our plan is to roll out the solution to our offices in Europe, Asia and Japan," concludes Moore. "That's why LANSA's multilingual capability and regional support are important."

"PIM and GDSN are business projects rather than IT projects. My advice is to consult your business users and do your homework upfront. When that's done, the actual implementation should be easy." ■

Snapshot

Customer: Godiva Chocolatier, founded in Belgium in 1926, is a manufacturer of premium chocolates and related products. www.godiva.com

Challenge: Product attributes were maintained in multiple files, requiring expert knowledge and manual effort to be consolidated.

Solution: A central database where staff can concurrently maintain the attributes they are responsible for, supported by proper workflow and audit procedures.

Key Benefits: Less manual effort to maintain and distribute product information, improved level of accountability, streamlined procedures and easier tracking of compliance.

Products Used: Data Sync Direct

Western Australian students benefit from on-screen marking

School Curriculum and Standards Authority

Most of us go at least once in our life through high-stake examinations, such as school leaving or university entrance exams, or for a professional certification. Reliable and accurate marking is critical, as future career options may well depend on the outcome. On-screen marking technology helps to ensure that marking is impartial, consistent and fair to all. This is because of features like real-time monitoring of markers, insertion of quality assurance scripts and easy implementation of best-practice methods such as blind double marking.

The Western Australia School Curriculum and Standards Authority uses MarkManager, an on-screen marking solution, to mark the exams held at the end of year 12. The solution, implemented on a Software as a Service (SaaS) basis, involves the scanning of completed examination response booklets that authorized markers can access over the Internet. Using the LANSA tool set, MarkManager was originally developed by the Board of Studies, Teaching and Educational Standards in NSW Australia for its own use as a certifying authority.

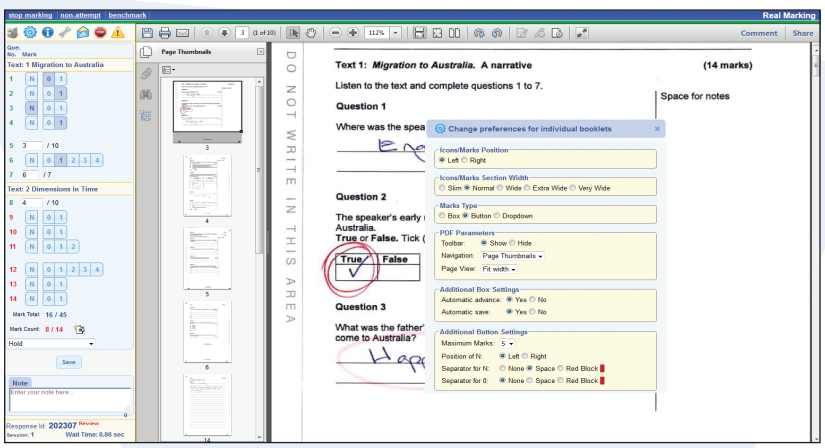
The Challenges

The Western Australia School Curriculum and Standards Authority (the Authority) is responsible for setting standards of student achievement, the assessment and certification of student achievement, curriculum development and assessment, developing and accrediting courses, and maintaining a database of related information.

The Western Australian Certificate of Education (WACE) examinations, which take place at the end of year 12, are a huge logistical exercise for the Authority. Tasks include hiring and training the markers, printing the examination papers, distributing them to the examination centres, collecting the scripts and getting them securely transported to the markers. Approximately 17,000 candidates sit for the WACE examinations, each doing on average an exam in four courses. Over 68,000 exam booklets are printed and nearly 1,000 markers are involved in marking of the scripts and another 350 markers are involved in scoring the non-written (practical) exams, such as music performances and drama.

One of the major challenges faced by the Authority is due to Western Australia's vast land area. This makes it hard for teachers from regional areas to take part in traditional marking, which by its nature requires access to hard-copy scripts and hence a more centralized marking approach. Not only does this impact the number of available markers, it also means that fewer teachers have the opportunity to improve their curriculum and assessment skills by participating in the marking process.

Another challenge is the overhead in catering for blind double marking, which the Authority had found effective in improving reliability and accuracy. In blind double marking, two markers assess a script, unaware of the scores awarded by the other marker and unable to view each other's annotations. When the two scores differ by more than a predefined variance tolerance, a reconciliation procedure follows. In a traditional marking environment, separate mark-sheets are required to conceal earlier marks, adding to the cost and causing delays.



The marker views each script on-line, and assigns marks on-screen to exam responses.

> **"Monitoring the standard of marking as it is occurring, is exceptionally important."**

A final challenge is the ability to monitor the performance of markers in a timely manner. In a traditional marking environment there may be a delay before a supervisor notices a drop in consistency. Not being able to take corrective action promptly may result in a backlog of incorrectly awarded marks building up.

To overcome these challenges, the Authority was already using on-screen marking technology for some of its WACE exams. Since the accuracy, security and timely progress of marking are essential, the Authority continuously strives for improvement and reviews its marking technologies every few years.

The Authority put out a request for proposal for a managed services solution for on-screen marking. After a comprehensive tender evaluation process, the Authority selected MarkManager, an online marking solution developed by the Board of Studies, Teaching and Educational Standards in NSW, Australia (BOSTES), commercialized with assistance from LANSA.

Jenny Morup, Manager, Examinations Logistics for the Authority, explains, "We selected MarkManager because it met our criteria and offered value for money. The fact that the solution had proven to work well for the high school examinations in another state and that BOSTES would provide implementation assistance were also important factors."

The Solution

"The team from BOSTES was very knowledgeable, helped us with the planning and gave very good support. Together we set up an operational plan that worked exceptionally well throughout the project," says Morup.

In its first year of implementation, 2012, the Authority used MarkManager for nine exams.

The Authority's marking process started

with color-scanning of scripts (examination response booklets completed by the students), which were uploaded in PDF format into MarkManager. During that process student and exam centre identification details were masked. For some exams, the pages were re-sequenced, so that markers only got to see the exam section they were assigned to mark.

The Authority doesn't use marking centres and markers use their own equipment to access the scanned scripts remotely over the Internet, usually from their home. The solution ensures that no marks or scripts ever reside on the marker's desktop. Markers can set their individual screen preferences, such as to display mark boxes left or right, and they can view a list of the scripts they have been working on. They can add notes for themselves or for the attention of the chief marker.

Chief markers can upload practice scripts that markers have to complete satisfactorily before they are allowed to start marking real scripts. They can also set up a frequency for inserting control scripts in between real scripts, to check that markers remain on the ball.

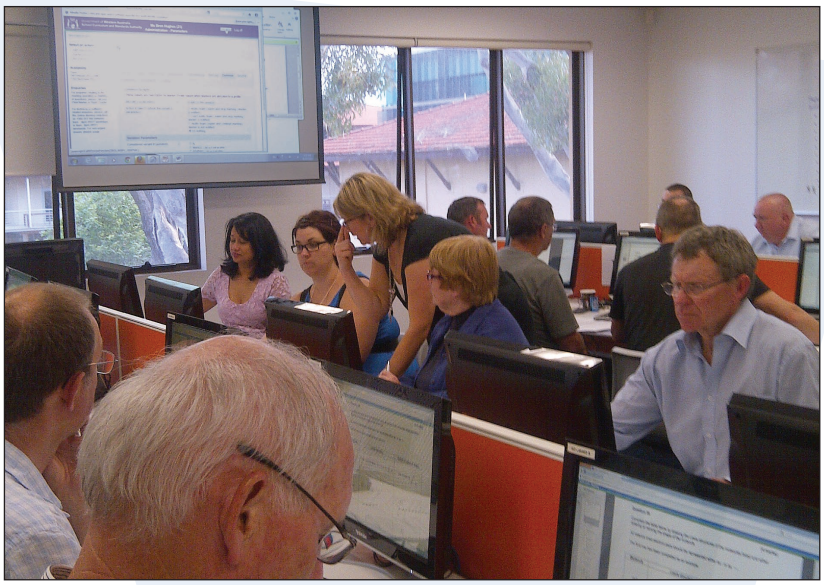
Chief markers have a real-time dashboard view of what markers are doing and can go to any script to look at the marker's notes and marks awarded. They can view the statistics, such as how the spread of markings for an exam section is evolving, how many scripts are marked and still need to be marked.

MarkManager's ability to let chief markers and markers exchange messages is considered extremely helpful, especially since the Authority's markers work remotely. Messaging is used, for example, when a marker wants the opinion of the chief marker about a certain script. Likewise, a chief marker may feel the need to comment on the marking of a certain script.

Melanie Jasper, Senior Consultant Written Examinations (Marking) at the Authority, says that the feedback from the markers was very positive "They found the application easy to use and liked the fact that they could adapt the screens to suit themselves. Access to the scripts was easy and the speed very quick. Markers were able to work on one script after another without experiencing any slow uploads. The system was quick, even in peak periods."

The Benefits

"The ability to monitor the standard of marking as it occurs is exceptionally important," explains Morup. "In addition to blind double marking, we also have good quality control because of the control scripts that can be placed throughout the marking process. If a marker starts scoring outside the expected range, the chief marker can take immediate action. The solution helps us to achieve accurate and unbiased marking."



Training session for markers. The Authority aims to select markers from the teaching community, as it is good professional development to experience the high discipline of exam marking.

"The implementation went well. It worked very successfully right from the beginning."

The Authority aims to select markers from the teaching community. Morup explains why, "It is good professional development to experience the high standard of WACE examination marking. They learn to mark using the proper marking keys, which are the explicit statements about what the examiner expects of a candidate. They can take that knowledge back into their schools and classrooms and use it to prepare their students better. "

"Online marking enables us to take the marking process across remote regions, while we can still closely monitor the quality and the process. We have international schools that do our courses and we can now also include markers that are based overseas. So they can benefit as well," continues Jasper.

"Having the scripts online is safer and more convenient. Script confidentiality is enhanced and the risk of misplaced scripts reduced."

Jasper finds the ability to split an exam into sections very beneficial, "It gives you a lot more choices of how you are going to mark an exam and who is going to mark which section. We can configure the program ourselves to split an exam into sections, for example combine questions 2, 5 and 8 in a section because they all relate to a particular mathematics concept, or separate short answers from extended responses. We can give markers those particular sections that they are specialized in. The examination scripts are still available intact, so we can still look at the whole paper as well."

Conclusion

"The implementation of the new system went exceptionally well. It worked very successfully right from the beginning. The BOSTES team was very responsive. They understood our requirements and adapted the program where needed. The success of any project is the communication," concludes Morup.

"The training and the manuals for the chief markers were extensive and relevant. The chief markers particularly commented on the facility of real-time monitoring of markers and the completeness of the reports. The only issue they had was that they didn't have enough time to try out all of the reports. But as they gain more experience next year, they will be able to explore more of the reporting." ■

Snapshot

Customer: The Western Australia School Curriculum and Standards Authority is an independent statutory authority that is responsible to the Minister for Education. www.scsa.wa.edu.au

Challenge: To provide fair, accurate, secure and timely marking results for high school examinations.

Solution: Use MarkManager for on-screen marking of written examinations.

Key Benefits: Good quality control because of the ability to monitor the standard of marking as it is occurring and because of easy implementation of reference scripts.

Products Used: Visual LANSA, LANSA for the Web, LANSA Integrator.

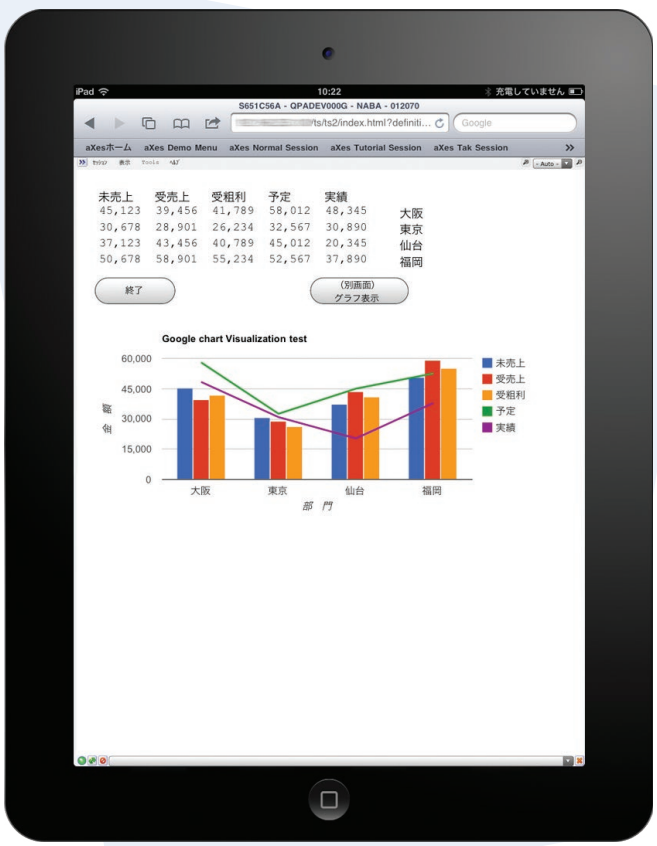
Yamachu visualizes data with aXes and Google Charts

This case study is based on an article that was published in iMagazine Japan www.imagazine.co.jp

'A picture is worth a thousand words' and many companies go through extensive projects and substantial costs to implement dashboards and business intelligence systems to show their data graphically. Yamachu, a paper wholesaler based in Niigata City, Japan, implemented a very practical solution to visualize its data in just one month. Yamachu used aXes and Google Charts to present data captured from 5250 screens in charts and graphs that management can explore interactively from their desks, or from outside the office using their Smartphones.

Too much Detail not Meaningful

Yamachu is an expert on all matters related to paper, based on knowledge accumulated since the company's establishment in 1871. Yamachu's art media division provides recommendations such as the adequacy of printing, processing and designing paper – it also advises and supplies to various print-related industries. Its package media division supplies packaging materials across industries, with the processed food industry being a major customer. Its paper retail division sells a variety of stylish paper products in small quantities to design and print professionals and hobbyists through its showroom in Niigata and also via its on-line store, www.kamizukan.jp.



Yamachu used aXes and Google Charts to present data captured from 5250-screens in charts and graphs on mobile devices.

Yamachu started using the IBM S/34 in 1979 and has remained with IBM ever since. The company's purchase, inventory, sales and distribution systems are running on IBM i. All systems have been developed by Yamachu's in-house RPG team and have been continuously updated in response to Yamachu's business requirements.

"aXes was easy to operate and provided the desired features at a low cost."

Mr. Yoneta, responsible for systems management and e-business promotion, noticed for several years how division managers struggled to present data in a meaningful way to Yamachu's president during meetings. Their reports tended to explain numbers and data in too much detail, while the president was more interested in seeing the bigger picture. Occasionally the managers used Excel charts, but it was very time consuming to prepare and the outcome wasn't always satisfactory.

Mr. Yoneta wanted the system to be able to visualize management data, as a means to reduce the time needed to understand a situation and to allow management to respond quicker. He started to look for a tool that could display DB2 data in a browser and could illustrate that data in graphs and charts.

Visualizing the Numbers

"When I was reading iMagazine Japan, a product called aXes grabbed my attention since it contained all the features I wanted. I immediately contacted KISS, the Japanese distributor. We downloaded the trial version and tested it," explained Mr. Yoneta. "Shortly after the trial period, I decided to proceed with full implementation, since aXes was easy to

operate and provided the desired features at a low cost."

aXes is a tool to transform 5250 applications into GUI browser-based applications automatically, simply by installing it. Mr. Yoneta took specific notice of one of aXes standard features, which is to synchronize data with an internet application, like Google Charts. Just as its famous sister product, Google Maps, can visualize address information in maps, Google Charts can visualize quantitative information in charts and graphs. The Google Charts API is supplied by Google. All you need to do is to provide parameters to the specified URL using a simple script.

Mr. Yoneta commented, "I liked the fact that aXes came with plenty of examples and FAQ information that I could easy follow. By using the tutorials I managed in about one month to develop and implement a solution that presented our key business data in graphs. We purchased aXes towards the end of February and management could view their data on Google Charts by April."

Seeing the Bigger Picture

Mr. Yoneta now prepares a variety of real-time interactive reports, using purpose written RPG programs, aXes and Google Charts. The reports, such as sales statistics and inventory status reports, are available with various bar graphs and pie charts and the reporting period can be set to daily, monthly and yearly. The charts can be drilled down for further investigation of the data.

As just one example of an immediate practical benefit of being able to visualize data, Yamachu now has a better way of dealing with slow moving items. Yamachu has a rule stating that all products must be sold within 18 months of purchase. However, this rule could not always be adhered to in the past. Now with the new aXes and Google Charts solution, it is much easier to identify which products are nearing their expiration date, allowing for the appropriate action can be taken.

Yamachu, established in 1871, is a paper wholesaler based in Niigata City, Japan.

"Staff members are using their mobile device to connect to the IBM i system via aXes Mobile."

The information that the division managers present in their meetings with the president is now also visualized in Google Charts. Communication between the president and the division managers has improved. When the president notices something unusual in a chart, he can quickly check the actual data. Since both the high level charts and detailed data are available online, it is now easier for the president to understand the comments from the managers and he can feel more confident that he has the correct information available for making decisions.

Access from Mobile Devices

aXes web-enabled screens can be accessed from Smartphones and other mobile devices. Mr. Yoneta is already using his Android device to connect to the IBM i system from outside the office. Yamachu's president will also make use of aXes mobile data access and be able to view his company's data anytime from anywhere using his Smartphone.

Since aXes only requires a server license and does not charge by user, the licensing costs will not increase when the number of internal Web users is expanded. Yamachu is planning to increase its use of aXes and visualize more data with Google Charts, web-enable additional 5250 screens and provide more users with Smartphone Web access to its IBM i systems. ■

Snapshot

Customer: Yamachu is a paper wholesaler, based in Niigata City, Japan.
www.yamachu.com

Challenge: Visualizing business data in charts and graphs and providing Web access to users.

Solution: Web-enable 5250 screens and for key business data visualize the data with Google Charts.

Key Benefits: Communication within the company has improved because users can interactively explore charts and graphs containing real-time data. Authorized users can access operational data and management reports over the internet using their Smartphones.

Product Used: .aXes

IT Challenges organizations face and how LANSA can help

Marjanna Frank
LANSA Review Editor

Every year Gartner and other IT research and advisory companies produce their Top-10 list of IT challenges. Let's have a look specifically at the challenges related to application architecture and application development and also at how LANSA addresses them.

Technology Change

Staying up-to-date with constant change and new technologies is one of the biggest IT challenges that businesses face. Organizations 'bet their business' on technology and getting it wrong can be disastrous. Falling behind is not an option either. But should businesses, other than high tech companies, really need to delve deep into technology in order to benefit from it?

At LANSA, we don't believe so. A 26-year old core principle of LANSA is to simplify information technology. We do this by taking care of the low level technical details, such as operating system, database, integration protocol and other specifics. This has several advantages.

Firstly, as successive waves of new technology have been introduced over the years, our customers have been relatively **protected from having to rework their solutions**. They have moved their applications between IBM i and Windows servers, they have adapted when an interface changed from SOAP to JSON or from CSV to XML, and they didn't have to worry about Apple iOS or Android specifics.

Secondly, by not having to do the low level 'plumbing work', developers can more productively **focus on the business issues** they need to solve. For some developers, removing the technical complexity means removing the fun. Those developers are unlikely to become LANSA fans.

Thirdly, LANSA customers can **take their skills with them** to their next technology platform. This is especially useful for solution providers who need to support customers on multiple platforms. But it is also beneficial for end-user companies. LANSA customers don't get stuck in indecisive maintenance mode when they plan to leave their current technology platform, because they can take their applications and skills with them. No one can afford to put innovation on hold!

In short, the closer developers align their coding to a specific technology, the harder it will be for their company to move. To keep gambling on technology trends is to be certain of 'losing big' at least once. When developers can rely on a high-level tool to take care of the low-level coding and can rely on that tool to stay up-to-date with changing technologies, their companies benefit.

Our customers describe LANSA as their insurance against technology change, because it protects them from dependency on a particular combination of hardware, operating system, database or user interface technology. By choosing LANSA, organizations avoid the associated risk and can stay focused on achieving their business outcomes.

Organizations 'bet their business' on technology and getting it wrong can be disastrous. Falling behind is not an option either.

Providing Mobile Access

Mobile has passed the top of the curve in the hype cycle. By now everyone accepts that mobile has become an integral part of corporate IT. Mobile apps bring with them a number of challenges, such as development skills, management of devices and apps, online/offline access and security. Let's explore how these challenges are addressed by LANSA:

If you are running your IT department with a small team, and you plan to keep it that way, you will want the same developers who look after your business systems to also deliver mobile access. LANSA offers three practical options for that, depending on whether you prefer native, hybrid or Web apps.

If you need to guarantee that your mobile business apps will always function, **both online and offline, regardless of a network connection**, then native mobile is your best choice. **LongRange** is a native mobile App development environment that allows users to store data locally, synchronize data between their device and the server when convenient, and access server data in real-time when connected.

LongRange consists of a server-based component and a native mobile app. Developers can use their existing **RPG or COBOL skills** if the server runs the IBM i operating system, or they can use LANSA's 4GL (which is a **realistic skill** to learn compared with alternative options) if the server is Windows, Linux or IBM i. The server program handles the business

If you want to keep your IT team small, you will want the same developers who look after your business systems to also deliver mobile access.

logic and exchanges data, together with specific instructions defined in LongRange studio, with the mobile app. The app has direct access to device features, allowing for signature capture, barcode reading, video/photo/audio capture, GPS and more.

Since the business logic is **centrally managed** on the server, users are automatically accessing the most recent functionality, without having to update the app on their mobile. Both Apple iOS and Android apps are driven from the same server source code. This central definition of logic and single source concept take the headache out of mobile app management.

If your staff needs **mobile access to existing line-of-business 5250 applications**, then **aXes** is the fastest way to achieve that. aXes lets you Web enable or Mobile enable (re-face) RPG and COBOL applications out-of-the-box and then, optionally, graphically enhance them. This allows you to provide mobile Web access to existing business systems very rapidly (within hours) with your staff being able to access them from tablets. It will not provide the same user experience as a purpose built native app, but it will work extremely well and the solution can be up and running in a day or two. aXes also offers a hybrid App (aXes Mobile) providing RPG and COBOL programs with similar access to device features as LongRange apps have.

If you want a more sophisticated purpose built mobile Web solution, rather than Web enabling an existing legacy application, **Visual LANSA** is a better way. More about that in the section the *Pervasiveness of the Web Browser*.

Security is such an important topic that it is covered in a separate article in the Architects Corner.

Case studies about Mobile can be found at ***www.lansa.com/builtwithlansa/mobile.htm.*** Read about how a leading UK building company uses LongRange to provide its health and safety inspectors with online and offline access, guaranteeing that the mobile solution works even at remote building sites. Read how J-Oil Mills used aXes to provide its sales staff with mobile Web access in a matter of hours. Read how Trecenti used Visual LANSA to provide customers with an in-store iPad solution to find the perfect diamond for their wedding rings.

Exposing Server Functionality and Data via a Standard Interface

Many organizations are struggling to integrate applications, especially when different technologies, vendors and skills are involved. Integration with cloud platforms and partner applications can also be challenging. There are a multitude of methods for integration, of which Web services, XML and EDI-INT have emerged as industry standards. Still, some of your partners may send you spreadsheets and text files.

At LANSA, we understand that organizations want to standardize on a single framework to solve all common integration challenges. The framework needs to deal with the details of all the different formats, transport mechanisms and platforms, so that the developer doesn't have to.

LANSA Integrator includes services for data transformation, communications, email, messaging and Web services, complemented by interface tools and utilities. It's the ideal Integration Toolkit. Developers can use these services in their integration projects. It supports multiple data formats, including XML, EDI, text, MS Excel, PDF, relational databases and more. It also supports multiple data transport methods including HTTP, FTP, SFTP, Email and message queue software. Plus it offers wizard-based Web service development (SOAP and REST) to **consume Web services and to expose existing functionality as a Web service**.

Any application can call LANSA Integrator services programs, including .NET, C#, RPG, COBOL and LANSA programs. This allows companies to **re-use their existing programs in a Service Oriented Architecture**.

LANSA Composer is built on the same technology as LANSA Integrator, but also comes with a visual and code-free development environment (for business analysts), a library of activities to orchestrate process flows (sequential and conditional execution) and with administrative capabilities (auditing, error recovery, etcetera).

Integration case studies can be found at ***www.lansa.com/builtwithlansa/integration.htm*** and ***www.lansa.com/builtwithlansa/process-integration.htm***. Read how LANSA customers benefit from efficient integration with new applications and technologies, such as electronic banking, CRM, document management, warehouse management, routing services and so on. It also allows organizations to provide additional delivery channels and more flexibility to business partners. Common integration requirements include:

- **Integration with SAP**, for example by the Government of Andorra, CBH Group, REHAU, Promese and Apria.
- **Integration with Ariba and Broadvision WebMethods**, for example by Rawlings Sporting Goods and Becton Dickinson.
- **Integration with CRM systems**, for example with Salesforce by Frontline Consultancy and Honda Australia, and with Sugar CRM by TP Orthodontics. ➔

Cloud and SaaS

More and more companies are turning to SaaS (Software as a Service) and other cloud solutions to respond to business needs faster and more economically.

For organizations that want to **move a legacy 5250 application to the cloud** or a hosted environment, aXes Cloud provides a solution. The **aXes Cloud** software is installed on a single IBM i server, called the Cloud Gateway. Then, using any device that runs a browser (e.g. desktops, laptops, mobile devices), authorized users can access applications and other facilities on any IBM i server that is connected to the Cloud Gateway.

aXes Cloud automatically connects incoming users to their assigned applications that can be spread across multiple IBM i servers. Hosting service providers use aXes Cloud to route users from multiple companies to the correct IBM i server. Software vendors use aXes Cloud to offer their solution in a SaaS model.

For organizations that need to **exchange data between their on-premise and cloud solutions**, **LANSA Integrator** offers wizard-based Web service development to consume Web services and to expose existing code as a Web service.

Preparing applications for SaaS readiness is not as simple as Web enabling a solution. A true SaaS application has a multi-tenant architecture. The ability to have multiple organizations (called tenants in the Cloud nomenclature) co-existing on the same application instance, without compromising the security of data for those organizations, defines the application as multi-tenanted. ISVs (Independent Software Vendors) who want to **offer a truly modern multi-tenacy SaaS solution**, can do so by redeveloping customer facing programs with **Visual LANSA**. On the server side, LANSA automatically handles multi-user access and makes it straightforward to create secure multi-tenancy solutions. On the client side, Visual LANSA enables a rich, Windows-like user interface to be run inside a standard browser.

Thousands of companies, and many more individuals, use LANSA-developed SaaS solutions, usually unaware that their solution is based on LANSA technology. For example, thousands of employers and employees access their LANSA-based HR and payroll solution in the cloud, some of the world's largest banks manage their syndicated loans in a LANSA-developed hosted environment, and thousands of students have their exams marked with a LANSA-based SaaS on-screen marking solution. Read the SaaS showcase at ***www.lansa.com/casestudies/saas.htm***.

Pervasiveness of the Web Browser

The Web browser is now the most common user interface for commercial applications. Its zero install nature on the client makes it easy to support users with a variety of desktops, tablets and smartphones. Web applications are available to existing and potential customers, remote staff and mobile sales staff. The browser interface also suits the growing SaaS and Cloud trends.

Web applications use an architecture that breaks applications into discrete parts, using multiple programming languages and several layers of technology. For example, HTML and JavaScript in the browser, C# on the Web server, C# or Java on the application server and SQL for the database. This makes Web application development complex, especially for developers with little experience.

LANSA provides a **productive Web development environment** that insulates developers from these complexities. It does so by automating common application development tasks, such as automated user interface design and build, high level and central definition of business rules and logic, built-in database interfaces and connections and automatic deployment of the centrally defined business rules and logic.

This helps developers with little or no experience to become proficient in building Web applications more quickly. The flexibility built into our development tools also caters for experienced developers who want greater control over development artefacts. Developers can choose from:

Visual LANSA, to build new **Web applications with complete control** over page content and layout. Suitable for the more experienced web developers, while still simplifying database and business functionality on the server.

Visual LANSA Framework, to assemble **Web applications rapidly and with minimal coding**. The application and user interface design are prototyped and use the same design for both desktop and Web applications. Our customers refer to the Framework as 'having a mentor on site'.

LANSA Integrator, to **simplify the integration between your line-of-business application and any Web platform,** by consuming or exposing Web services. For example, between your IBM i ERP system and eCommerce systems like Ariba or Magento, or CRM systems like Salesforce and Sugar CRM.

LANSA Open for .NET, **to make it easy for .NET developers to invoke IBM i services from their Web application**. It offers a class library that plugs into Microsoft Visual Studio.

Visit the Web site development section at ***www.lansa.com/builtwithlansa/*** to read the B2C case studies (business to consumer) and the many varieties of B2B case studies (business to business), such as B2E (employees), B2D (distributors, wholesalers, brokers), B2I (installers, technicians), B2S (suppliers), B2T (transporters, drivers) and more. ➔

According to Gartner, Application Development and Maintenance (ADM) accounts for 34% of IT budgets and optimizing ADM can cut costs by more than half.

Ongoing Development and Maintenance Costs

A Google search on **ongoing cost of application development and maintenance** comes back with millions of results. Obviously it's a much discussed topic. According to Gartner, Application Development and Maintenance (ADM) accounts for 34% of IT budgets and optimizing ADM can cut costs by more than half. (April 2014, *www.gartner.com/newsroom/id/2711017*)

LANSA's products remove a lot of the technical complexity for the developer, making **both application development and maintenance more efficient and productive**.

LANSA's Business Rules Repository is more than field definitions, validation rules and reusable components – it promotes an entirely different approach to application development and maintenance.

The LANSA Repository is both the custodian of data and business rule definitions, and the enforcer of the rules. When rule definition and enforcement are the responsibility of a single entity, application maintenance is vastly reduced and data integrity is ensured.

As LANSA's case study writer who regularly talks with customers, let me add some personal observations that I'm not always allowed to publish in case studies:

- Many of our customers work with such small and productive teams, that they do not want the actual size of their IT team published, as it may create worries for customers or shareholders. I am often asked to remove the actual number and just say "lean team".
- LANSA's learning curve is not only short, it is also a realistic skill to learn, both for RPG and COBOL developers as well as for college graduates. Learning Java or .NET, especially for older developers, is sometimes described as 'training to become a brain surgeon'.
- Where some case studies say customers have "trialed Java", there have often been years of effort down the drain with little or no result. These projects are then realized with LANSA in a fraction of the budgeted time.

If you go to *http://bit.ly/lansa-productive* you will find many case studies that illustrate LANSA's productivity.

Conclusion

LANSA reduces the complexity of developing, maintaining, modernizing and integrating business-oriented, database-centric systems. These are the systems that run the daily operations of small, medium and large organizations in critical areas like enterprise resource planning, financial accounting, sales force automation, supply chain management and e-business.

LANSA is used by organizations that recognize the many advantages of tailored and well integrated systems, but who no longer have the time, money or inclination to hand-crank solutions the old way. Packaged solutions are fine to automate standard commodity processes. But it's in the gaps created by these generic solutions where the real opportunities to innovate and gain competitive advantage exist – and this is where LANSA fits. ■

Requirement	Product	Skills Required	Studio/Design Environment	Deployment Client(s)	Deployment Server
Application Development and Maintenance	Visual LANSA	Visual LANSA	Windows	Browser Windows desktop	Any combination of IBM i, Windows and Linux
Develop native Mobile business apps for IBM i server deployment	LongRange	RPG or COBOL	Windows	Apple and Android Smartphones and tablets (Windows planned)	IBM i
Develop native Mobile business apps for corss-platform server deployment	LongRange for LANSA	Visual LANSA	Windows	Apple and Android Smartphones and tablets (Windows planned)	IBM i, Windows, Linux
Mobile enable existing 5250 applications	aXes Mobile	JavaScript	Windows	Apple and Android tablets	IBM i
Application Integration	LANSA Integrator	IBM i: Any supported programming language Windows/Linux: Visual LANSA	Windows		IBM i , Windows, Linux
Application and Process Integration	LANSA Composer	Business analysis skills	Windows		IBM i, Windows, Linux
Invoke IBM i services from Windows applications	LANSA Open for .NET	Any .NET supported language	Windows		IBM i , Windows
Deploy existing 5250 applications in the Cloud	aXes Cloud	IBM i administrator		Browser	Hosted IBM i environment
Develop applications for SaaS deployment	Visual LANSA	Visual LANSA	Windows	Browser	Hosted IBM i, Windows or Linux environment
User interface modernization of 5250 RPG/ COBOL applications	aXes eXtensions	JavaScript	Windows	Browser	IBM i
Staged modernization of 5250 RPG/COBOL applications - navigation, user interface, and functionality	LANSA RAMP	JavaScript Visual LANSA	Windows	Browser Windows desktop	Start on IBM i and end on any combination of IBM i, Windows, Linux

Mobile applications and data security

Sean Szarkowicz
LANSA North America

The rate and speed at which mobile apps are being pushed into the marketplace is phenomenal and is not expected to slow down in the near future. Businesses are quick to capitalize on mobile technology in innovative and creative ways, both to please their customers and stay competitive in the marketplace, as well as to improve efficiency by providing employees with effective and productive access to data. As organizations rush to deliver mobile apps, they are at risk of overlooking critical security considerations.

To put mobile applications and data security in perspective, here are some statistics* that highlight the need to be mindful of security:

1. 85% of companies surveyed by AT&T have experienced one or more data breaches.
2. Malware increased by 97% from 2012 to 2013.
3. 36% of people do not have a password for their mobile device. 30% of those who do, save their password in notes on the device.
4. 3.1 million people were victims of smart phone theft in America in 2013, an increase of 194% on the reported thefts in 2012.
5. The number of mobile devices used for business purposes is expected to exceed 1 billion by 2018, of which almost 35% will be consumer owned (BYOD).

Luckily most of these security risks can be avoided, or at least their effect minimized, with some simple proactive steps.

Mobile application security can be broken down into three main categories.

- Securing data at rest on the mobile device
- Securing communication between the mobile device and the server
- Securing application access to the data

This article explores the challenges and solutions to developing and deploying secure mobile applications that ensure adequate protection of business information, while still allowing for user privacy and rapid rollout.

Securing Data at Rest

The first and most simple step is to secure access to the device itself by configuring password, PIN and gesture recognition that limit unauthorized access.

As native mobile apps have the ability to read from and write data to the device, it is extremely important to secure locally stored information. Only the authorized applications should be able to access the data.

Most mobile devices offer the ability to install business applications in a secure sandbox environment. Each sandbox provides a tightly controlled set of resources for its guest program(s), such as isolated disk space and memory. This allows for separation of corporate and personal data and applications. The corporate sandbox, controlled by the IT department, should be without any access to or from the personal sandbox. This approach protects the security of corporate business data, as well as the privacy of personal data.

When data is stored on the mobile device, the following are important considerations:

- Is the data properly encrypted, using an industry standard encryption algorithm?
- How sensitive is the information? If it is very sensitive, should it be stored at all?
- Has application access to the data been secured, for example with user ID/password?
- If the device is lost or stolen, can application access be immediately revoked and its data wiped remotely?
- What is the lifespan of the data? Will it be erased by an app and, if so, when?

Securing Communication

Most mobile apps access the corporate server using HTTP (HyperText Transfer Protocol), which is the most common Internet protocol. Unfortunately hackers can intercept data that is transferred over the Internet, including data transmitted to and from mobile apps, with sniffing tools and man-in-the-middle attacks.

The easiest ways to make communications more secure is to use HTTPS (S=Secure) instead of HTTP. Technically HTTPS is not a protocol in itself, rather it is the result of layering HTTP on top of the SSL/TLS protocol. Transport Layer Security (TLS), and its predecessor Secure Sockets Layer (SSL), are cryptographic protocols designed to provide communication security over the Internet. By using a HTTPS connection, data is automatically encrypted with a digital certificate that is configured on the server. Digital certificates and encryption keys, ranging from 128 to 4096 bits,

ensure that the data being transmitted is secure and is not available to hackers.

With the latest advancements in cryptography and digital certificates built into the IBM i OS and the Apache Web server, the IBM i stays on top of the list of the most reliably secure platforms.

Securing Application Access to Data

To ensure that mobile device users are only given access to information that they are authorized to view, some common best practices should be implemented:

- Setup role-based security on the server. This allows you to quickly revoke access to data and applications for an entire group of users.
- Perform security checks on the server.
- Never store passwords/PINs on the device.
- Log all application activity from all devices, on the server. Restrict access based on the unique device identifier and revoke access when a device is lost or stolen.
- Prompt for an additional PIN when access to critical data is requested.
- Revalidate login credentials after a period of user inactivity.
- Implement a firewall and a DeMilitarized Zone (DMZ) on the servers that are exposed to the outside world.
- Provide VPN access that can be easily enabled or disabled on the server side.
- Use remote monitoring capabilities and remotely wipe a device if it is lost or stolen.
- Encrypt sensitive information on the server and only send information that's strictly required to the mobile app.
- Update employees regularly about your security policies.

Conclusion

Application and data security will continue to be a cat and mouse game, as new vulnerabilities are found and exploited by the bad guys, while the good guys try to fix them. The good news (for the good guys) is that device manufacturers and operating system vendors are constantly improving their security features, for example, to detect malicious activity or viruses.

Organizations that aim to deliver secure mobile applications on a realistic budget should consider a cost effective and productive mobile application framework, using the following evaluation criteria:

- Does the vendor have a proven track record?
- Does the framework include ready to use building blocks?
- Does the framework support your choice of mobile devices (e.g. Apple and Android) and corporate servers (e.g. IBM i and Windows)?
- Does the framework leverage existing developer skill sets?

LANSA's LongRange mobile app development framework comes with building blocks for application navigation, user interface, security and also with example code for a variety of applications. IT departments can use their existing skill set (RPG, COBOL or LANSA) coupled with their business knowledge, to build and support secure mobile applications that deliver real business value.

LongRange's ability to run while connected and store data securely offline, provides a ready-made secure mobile infrastructure.

LongRange lets you combine authentication and login mechanisms that integrate mobile apps with existing business assets. It supports GUID (Globally Unique IDentifier), a method for identifying and authorizing mobile devices. LongRange can create a GUID at installation, or you can assign a GUID to each device. Another option is to issue a onetime access code to the device user.

Data transmissions between the LongRange app and server are compressed and encrypted with cryptographic nonce (a number or bit string used only once) to ensure that the data cannot be tampered with. Communications using HTTPS and VPN are supported.

LongRange supports multiple levels of authentication using the built-in user profiles and security tools that are part of the operating system on the server (e.g. level 50 on IBM i servers). Application level security further restricts access to applications and data. LongRange's authentication mechanism can be customized using the built-in exit points that are part of the LongRange mobile platform.

Data stored on the device by LongRange resides in a sandbox and is not accessible by other mobile apps. Last but not least, data can be encrypted and access restricted.

Often referred to as 'the most secure computing platform on the planet', the IBM i platform has a proven built-in object-based and user-profile management system. Even so, it is not a question of 'if' but 'when' attacks will occur. Therefore you should also consider security in a wider context. The checklist below will help you to ensure that multiple layers of security exist to keep the bad guys out.

***Sources for statistics:**

http://bit.ly/mob_sec_stats ■

12-Point Mobile Application and Data Security Checklist

1	Update your mobile device whenever application patches or operating system upgrades are released.
2	Always use a passcode to lock/unlock your device.
3	Do not jail-break, root or modify the operating system files.
4	Regularly backup or synchronize data to avoid loss of information due to theft. For additional security, install device-tracking apps to locate your device if it gets lost.
5	Only install apps from reputable vendors and check the app's review and ratings before downloading.
6	Never click on unknown URLs or respond to requests for personal information.
7	Make protecting your mobile device a priority, install a firewall and regularly scan for viruses and spyware.
8	Be careful when using public WiFi hot spots. Do not make purchases or other financial transactions and do not provide personal Information.
9	Access to business applications and data should always use a secure HTTPS connection or a VPN. Do not store sensitive data locally on the device unless it is encrypted and secured.
10	Work with your IT department to implement a security policy regarding what information is allowed to be accessed from mobile devices and how the organization will handle lost or stolen devices.
11	Make sure your development team incorporates security into the entire application development lifecycle by identifying and prioritizing critical applications and testing for security vulnerabilities. Retest when an application or infrastructure has changed.
12	Be prepared to adapt to the changing mobile landscape and regularly review your security policies and risk assessments.

TRYING TO PIECE TOGETHER A MOBILE STRATEGY?

THERE ARE MANY PIECES TO THE PUZZLE

- Which business apps provide the best payback?
- Do I build mobile web, hybrid, or native apps?
- Will users be connected or off-line?
- What development skills do I need?
- Which device types do I support?
- Where do my IBM i and Windows systems fit in?

LANSA's complete mobile technology stack and experienced consultants can help you choose the optimal approach for all your mobile projects.

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www.lansa.com/mobile-puzzle

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