Leadership Awards

Emerging Technology Leader Winner:
University of Dayton / Mikesell’s Snack Food Company

Business Continuity: A Must Have for Business Survival
Leadership

Technology First Leadership Awards—Congratulations to the Winners!

By: Ann Gallaher, COO, Technology First

The Technology First Leadership award recognizes the contribution of information technology students and professionals ensuring a vibrant Dayton community. Recognizing Individuals and Teams exemplifying Technology First Values: creating a community to share knowledge, grow business, and explore the future.

The annual Technology First Leadership Awards are an opportunity for the IT community to come together and celebrate the good work that is moving Dayton forward. Congratulations to all of the nominees and the winners for a job well done!

Congratulations to This Year’s Winners!

Emerging Technology Leader
University of Dayton / Mikesell’s Intranet Project

Outstanding Technology Team
Speedway

Innovative Technology Team
Midmark

Best IT Services Company
AfidenceIT

IT Executive of the Year
John Huelsman

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MEMBER FEATURES

Training
Describe the type of IT services that your student or student team provided, eg., programming, database administration.

The four students on UD MIS Senior Project team for Mikesell’s were tasked with a challenging, broadly scoped project. The Mikesell’s project centered on establishing a Mikesell’s intranet for use by all Mikesell’s employees. In order to complete this project the students had to apply the following MIS/business related skills:

- **Business Analysis** (for requirements gathering)
- **Technical Aptitude** (for researching viable software solutions)
- **Decision Making** (for assessing the options for business functionality / software platforms and selecting the optimal choices)
- **Programming** (applying the proper syntax and logic to the software platform)
- **Design/User Interface** (designing the most appealing user interface “look and feel”)

Describe the project that was undertaken. What was done, for what purpose?

The Mikesell’s project for the UD MIS senior students was to establish the foundation of a Mikesell’s Intranet solution for all employees to utilize. The Mikesell’s employees needed a solution to enhance their productivity through the utilization of a web-based intranet portal to allow them to view their pay statements, view corporate policies online, disseminate company-wide information/newsletters, access a corporate employee directory with pictures, etc.

However, this project was unusually large in scope as the students were challenged to address the entire life cycle of a project. This included defining the potential functionality of the intranet, prioritizing that functionality, identifying and assessing viable software platforms for the intranet, installing and configuring a fully functional prototype and then documenting the software components / configuration for Mikesell’s to support the solution at the completion of the project.

As part of the requirements definition, the students decided to take a two pronged approach. First they assessed many business intranet examples to gather ideas around best-in-class intranet features. Then they interviewed approximately 15 Mikesell’s employees including the CEO and CFO to gather their feedback on what capabilities they would like to see in an intranet. Part of the students’ objective was to prioritize the business functionality based upon the impact to the organization. This included employee productivity, employee morale and tangible cost savings.

In parallel, the UD student team analyzed various potential software platforms for building the Mikesell’s intranet platform. They created an extensive spreadsheet comparison of not only the business feature capabilities and technical components, but also of the associated costs of the solutions. They then presented their recommendations for both the prioritized business features and the software platform to Mikesell’s CEO, CIO and CFO. They received robust approval and enthusiastic endorsement of moving ahead with the prototype.

At that point the UD student team shifted their focus to establishing a working prototype. They partnered with the Mikesell’s cloud hosting partner, DataYard, to stand up the intranet base software. They did a great job working with a third-party, just like IT teams have to do in real world situations where collaboration with other organizations is essential to the success of an initiative.

And finally, the UD student team also began engaging another Mikesell’s partner, Smart Data Systems, for assistance with the actual configuration and integration of the functional software bolt-on products. This was another great example of a real-world situation where the core team did not have the expertise to address some key problem areas and therefore had to utilize external talent.

The bottom line is that this student team took the “bull by the horns” and tackled a large project with fantastic business results and an equally impactful and relevant real-world business experience.

Describe aspects of the undertaking such as challenges overcome or team collaboration.

The UD student team had several significant challenges that they successfully addressed as a team. The first tough area that they had to address was in defining the wide open definition of what functionality to include in the intranet. They conducted extensive research into best practices for company intranets and then utilized that information as the foundation to conduct a series of employee interviews to be able to nail down the scope.

Another open item that the students had to resolve was around finding a solution to the hardware required to install the software. After discussion within our team, we agreed to target the Mikesell’s hosting partner, DataYard, but the students had to do the direct interaction with DataYard to actually install the software on the proper platform. They successfully partnered with the hosting partner to stand up the intranet software.

The final area that the UD students had to overcome was in resolving software issues with the base intranet software and targeted business functionality bolt-on products. As a result of a partnership with Smart Data Systems, the students were able to opportunistically resolve the software configuration issues and implement the desired business functionality.

Describe the result of the project. As a collaborating company, what was the response to the work / project? How will this impact your company’s efficiency and/or productivity?

The Mikesell’s intranet is not yet completed as the UD student team has a plan in place to complete a defined set of core business capabilities by the end of their last semester. However, they already have a working prototype fully operational with
Describe the endeavor (product/service) that was undertaken—what was done and for what purpose?

In 2014, our Customer Loyalty group had a roadmap of eleven items that were prioritized to be completed in 2015. In October 2014, Speedway officially acquired Hess Retail and essentially doubled in size as far as store count, that roadmap changed as we had to shift all resources to focus on making sure our environments and systems could handle the increase in transactions and Loyalty members.

While we were focused on growing our store count, we could not neglect continuing to enhance our Speedy Rewards Customer program, which had at the time more than 4 million active members. The ITS management team needed to determine a way to accomplish both the acquisition tasks as well as enhancements for the future.

In January 2015, a dedicated Speedy Rewards Agile team was formed, known internally as Team Godzilla. Prior to activating this team, there were very few dedicated IT resources to this critical customer-facing system. By dedicating eight IT resources and one business owner to this team, there is constant focus on the platform that will enable Speedway to grow Speedy Rewards, which is a major strategic differentiator within the convenience store industry.

This team moved from a waterfall approach to an iterative development approach, where requirements and solutions evolve through collaboration between this team and the Customer Loyalty group. They have shown how to improve the partnership between IT and business organizations, streamline the software delivery lifecycle, deliver consistent incremental value while reducing risk, and create a culture of collaboration, focus, quality, and innovation.

Describe the results and how efficiency, productivity or performance was improved.

In 2015, Team Godzilla was able to complete all of the items on the new roadmap and an additional seven high priority, high value added items. A major accomplishment for the team included the scaling of the system for the additional 1250+ stores gained from the Hess acquisition, which virtually doubled the size of the underlying infrastructure. The scaling allowed for a reduction in transaction timeouts, improved processing times, and a more reliable data backup process.

The team was able to enhance the deployment process by introducing an automated deployment tool resulting in a reduction of manual errors during deployments. They have also championed new server-side and client-side tools, not only for the team’s developers, but for other IT developers. Additional work completed by the team in 2015 included changes made to the program related to supporting new states in the Speedy Rewards program. Work was completed on several new customer-facing initiatives. A few of these initiatives included fuel price rollbacks at the pump, a new customer survey tool, a new enhanced Speedy Rewards web-based kiosk, enhanced location-based messaging to alert Speedy Rewards customers of their club balances and how many more points are needed to earn a free item in each club, a new My Speedy Rewards feature to allow registered members to enroll in specific clubs, a new option from Speedway.com to Staples Marketplace that will allow customers to use their Speedy Rewards points to purchase merchandise through Staples website, and one new grocery partnership where fuel discounts can be earned by shopping at a qualifying grocery partner. These were all implemented successfully in 2015.

During 2015, Speedy Rewards memberships grew to over 5 million active members and transaction processing time also improved due to the new enhanced environment. The business unit feels much more connected with the planning and development phases. Because of the iterative approach, the business is more directly involved in the process, therefore there is less scope creep, faster speed to market, and better quality releases of new features.

Explain why this undertaking is worthy of recognition such as team collaboration or challenges overcome?

Team Godzilla is worthy of this recognition due to the positive impact they have had on the Speedy Rewards program and the internal clients who focus on keeping Speedy Rewards innovative and profitable. This team is a collection of self-motivated, outstanding performers and great communicators who are able to collaborate on a daily basis to make sure the most important items are being completed and delivered. They have also taken the opportunity to collaborate with outside vendors to create the best possible programs for our customers. The team is very engaged with the business, they understand the impact they have on Speedway’s loyal customers while also keeping an eye on how to engage non-customers. The team was faced with multiple challenges in 2015 and succeeded each time.

This Agile team is critical to the future success of Speedy Rewards. Speedway will always have major initiatives such as acquisitions or other large projects but with this

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Outstanding Team

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team in place, Speedway will make sure that they remain focused on not only maintaining the Speedy Rewards program, but enhancing it with new customer features to stay relevant and be a leader in customer loyalty marketing. The Godzilla Team is truly an extension of the business, working closely not only on the development but actually guiding the business requirements and feature enhancements. The team is full of passionate Speedy Rewards members who are constantly looking at ways to make the customer experience better. They are completely committed to the success of the program and take ownership of all the issues and opportunities they must overcome.

Explain why this company is worthy of recognition for ensuring a vibrant Dayton community?

As Speedway’s growth carries forward, it is bringing new jobs to their Enon-Springfield corporate offices. They have committed to adding 350 jobs across a 3-year time frame and are well on their way to meeting this commitment already. In addition, they are targeting a 15% growth in IT staff in 2016. Speedway’s presence in Dayton and the surrounding area remains strong as it continues to be a leader in the convenience store industry. Great teams like Team Godzilla contribute to the growth of the customer base by delivering production ready products in very short time increments giving Speedway a competitive advantage.

“Some succeed because they are destined to, but most succeed because they are determined to.” – Henry Van Dyke

Thank You to Our Judges!

Phil Bergstedt
Chief Architect – Cloud Transformation
GE Aviation IT

Judy Brinegar
President/CEO
B63 Line

Lt. Colonel
Brian Snyder
Commander
88th Communications Squadron

7 practices, 1 partner: Sogeti

With experts in Advisory Services, Application Development, BIM, Infrastructure, Mobile, Product Engineering and Testing, our Local Touch—Global Reach approach to consulting means you have access to local experts and a global team.

Putting technology into practice, it’s what our consultants do...
Emerging Technology Leader

(continued from page 3)

sample data loaded in for Mikesell's including an employee directory and ability to view the CEO newsletter on the opening page. The Mikesell's employees are very excited and pumped up about not only the productivity improvements resulting from this new intranet portal solution, but also about the positive experience that they have had in partnering with the UD students.

However, the most positive results from this project are probably two-fold: The benefit to the students from such a relevant, real-world representative project that exposed them to so many different aspects of working on an important business initiative.

The positive impact to the Mikesell's employees as a result of the enthusiasm, energy and excitement portrayed by the UD student team throughout the life of the project. It has been truly enjoyable for all of us on the Mikesell's team that have been fortunate enough to be involved with the project and had the opportunity to get to know these top-notch students.

IT Executive of the Year

John Huelsman
Director of Information Technology
Hobart Service

Best IT Services Company

AfidenceIT

Innovative Technology Team

Midmark Customer Tracking System Project

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BUSINESS

Business Continuity: A Must Have for Business Survival

By: Joe Weinle, AfidenceIT

As a consultant, I’ve had the good fortune of working with many great companies. All have high reliance on their technology being available to conduct business. I have felt personal responsibility to ensure that IT outages do not have any adverse effects on their ability to run the business. Sometimes this outage avoidance involves preventative investment in their technology environment. At times, it is challenging to balance expenditure on an IT project that mitigates a perceived risk against the cost of that project. The benefits of investment in a technology solution may not always be obvious or seem pressing. Data Breach Security Forecast report by Experian confirms, “For businesses, the risk of experiencing a data breach is higher than ever with almost half of organizations suffering at least one security incident in the last 12 months” (2015).

It is my job to ensure leaders understand costs versus risks so they can make an informed decision. Businesses can offset perceived risk with cloud-based software packages. But, that approach doesn’t remove all or even most of the risks that can cause disruptions. The goal of this document is to provide steps businesses can take to continue operations when an unexpected event occurs.

Understand the Business

Before assessing the risks, the first step is to understand the core mission of the business. This step is critical in pinpointing the areas with the most risk. Here are some items to consider:

- **What makes us who we are?** This is the mission of the business and the goals that drive the everyday actions.
- **What do we do to reach our goals?** These are the specific processes and tools we use every day.
- **Who are the people that use the processes and tools?** These are employees, vendors and contractors who contribute to the success of the business.

Identify the Risks

The risks and likelihood may vary by business and by units within the business. For example, the loss of the phone system would have a higher impact on a sales unit than an accounting unit.

When identifying specific risks, first estimate the likelihood a risk will occur. Second, assign a value to the risk. These two steps provide a measure that can be used as a guide to assigning the resources. Then, the business can begin mitigating and preparing for the risk. Each company may be in a different phase of maturity in this process. I worked for a client in the financial services industry who expressed loss in dollar amounts. Each hour a specific application was not available was equated to dollars lost. The risk assessment enabled us to direct resources to the most critical (expensive) outage. Another reasonable starting point may be ranking the likelihood of risk on a scale one to three.

Data Security

Time and effort need to be dedicated to protecting critical business data. The news about a major data breach at large organizations comes out often. Even federal employee data was compromised, and customer information at Target was stolen.

The impact of this risk can be dramatic. In one example, a business had multiple failures on fault tolerant server disk systems, one of which was the backup system. One disk system contained critical customer work product. The business paid a large sum of money to recover what turned out to be about 70 percent of this data. The rest of the data was recovered from employees searching their systems. Besides the loss of the money, this failure created a loss of productivity. Employees allocated their resources to searching for the missing customer deliverables. A simple offsite backup plan would have minimized the loss of resources and time. This customer did not perceive the risk great enough to spend the extra money on offsite backups.

Keep in mind that employee personal information needs to be considered. One of my past employers had the HR lock box stolen. The box contained all employee records. While no major adverse issues resulted, in this case, my perception of my employer changed.

Physical Security

Physical security is the protection from physical circumstances that could result in significant losses. An example of physical security is ensuring employees are safe during snow storms or bomb threats. Another example includes workplace violence. Developing safety tips and conducting safety assessments that mitigate workplace violence are components of physical security.

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Resources
Employees are key resources. Companies must assess the risks of losing key individuals. Success planning can address the future of a business when top leaders are lost to retirement or other events.

Contractors can play key roles in business success. Understanding contractors and their companies is important in assessing the risks associated with them. As a contractor, I have seen how a business relies on my services and the impact my departure may have if the right person is not located for my role.

Create a Plan
A business continuity plan does not need to be complicated. It can grow as the business grows and becomes more mature. Below are four parts to a business continuity plan.

Risk Mitigation
Risk mitigation involves planning to avoid the risk or to lessen the impact of the risk. Three potential risks include email outage, bomb threat, and data breach.

<table>
<thead>
<tr>
<th>RISK</th>
<th>EFFECT</th>
<th>MITIGATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMAIL OUTAGE</td>
<td>Slow communications with customers</td>
<td>Migrate to SaaS (Software as a Service) email like Office365</td>
</tr>
<tr>
<td>BOMB THREAT</td>
<td>Loss of productivity and limited access to facility</td>
<td>Documented plan for dealing with bomb threat</td>
</tr>
<tr>
<td>DATA BREACH</td>
<td>Loss of critical data to hackers and damage to data</td>
<td>Update firewall and use outside security firm to review and test</td>
</tr>
</tbody>
</table>

Often as an IT consultant, the focus is on backup and recovery of business critical systems. To mitigate these risks, a company may use SaaS (Software as a Service) for email, SalesForce for customer relationship management, and QuickBooks Online for accounting. Software such as these are great and can lessen the impact of hardware (server) failure. But, they don’t address other risks that put customer data at risk. An underlying assumption may exist that the provider of a SaaS application will do a better job of protecting the data than a typical business. But this risk should still appear on the risk assessment checklist.

Event Preparedness
A checklist should be created for event preparedness. For example, if the HVAC system goes out, what needs to happen? The event preparedness plan should include items that may be related to risk. Make sure to consider the loss of critical skill. The checklist would be used to confirm steps needed. Following is a brief example.

<table>
<thead>
<tr>
<th>SYSTEM/SKILL LOST</th>
<th>WHAT TO DO</th>
<th>COMPLETED/ENGAGED</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELECTRICITY</td>
<td>Backup power generator</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Work at alternative location</td>
<td></td>
</tr>
<tr>
<td>BUILDING</td>
<td>Work from home or alternative location</td>
<td></td>
</tr>
<tr>
<td>SKILL: TAX ACCOUNTING</td>
<td>Train additional staff</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use outside consultant</td>
<td></td>
</tr>
</tbody>
</table>

Incident Response
The incident response contains instructions on how to respond to a security breach or event. Below are the key components of incident response management.

- **Create a Response Team.** The response team works to get operations back to normal if the incident causes a shutdown in operations. These are subject matter experts in each area of the business. They understand the efforts needed to return the operations to normal.

- **Create a Communication Plan.** The communication plan outlines how the team will communicate internally and externally.

Recovery Steps
Recovery steps document recovery procedures necessary to restore business operations. The steps document the action that should be taken as part of the recovery. Items in this section of the business recovery plan include:

- Emergency contact list
- List and location of emergency items—flashlights, clipboards, pens, gloves, etc.

Recovery checklist
- Call team members
- Check on employees and families
- Damage assessment
- Identify damage and loss of systems, equipment, and skills
- Implement needed recovery steps
- Communicate status to management and response team
- Communicate resumption of normal operations to staff, vendors and all others affected by the incident

Review and Test the Plan
This part of any business continuity plan is paramount to success. The critical items of the review and test phase include training, testing and plan maintenance.

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**Training**

Training can be simple or complex. In a simple form, a lunch session with employees can be held to discuss plan awareness. Training sessions reassure employees that there are plans to deal with incidents. Training, whether simple or complex, should address items such as:

a) Roles and Responsibilities
b) Information About Potential Threats and Risks
c) How Communication will be Handled
d) Plan Testing

**Testing**

Take the testing phase seriously. It could make the difference in life and death of people and the business. Some examples of tests include simulation drills or full-scale exercises. At a bank, we used a simulation drills to respond to a scenario where access to our main facility was lost. We used our alternative location and verified that necessary roles and functions worked as expected. The results were documented and reported back to management.

The Department of Homeland Security has held full-scale exercises where they simulate disasters and evaluate the response. These are often reported on the news. For most businesses, these multi-agency exercises are not needed. But, they do provide valuable lessons on how to prepare teams for an effective response to an emergency.

**Plan Maintenance**

Every plan needs to be reviewed and updated. Plan maintenance should include items like:

a) Necessary adjustments that result from testing, changes in business operations, and changes in personnel
b) Regularly scheduled formal review of all components
c) Review and update after an incident

**Final Thoughts...**

A business continuity plan does not need to perfect, but it needs to be prepared, reviewed, and updated. The business exists to execute a mission and employees count on it for their livelihood. It is irresponsible not to plan for incidents that will impact the business operations.

Ask, “Is our business prepared for the possibility of an incident that will impact operations?” If not, then get prepared!

**References**

The shift toward mobility in several business applications cannot be ignored, and studies show organizations that adopt mobility initiatives typically outperform those that don’t. Many are implementing a mobile customer relationship management (CRM) strategy, to provide immediate access to important information in an effort to increase efficiency and enhance relationships. As competition increases, mobile CRM can provide timely, accurate data to support sales and other key areas of the business.

Smartphone Internet usage is outpacing PC usage, with comScore reporting that mobile access accounted for 55 percent of all Internet traffic in January 2014. Office-based CRM systems are powerful tools, but often, users are disconnected from the system’s wealth of information when away from their PCs. More employees work away from a traditional office, and information demands and expectations have changed. Customers cannot wait until the next day for an email with details on a product, and relationships can be accelerated if interactions are logged in real time.

From a sales perspective, mobile CRM provides employees with on-demand account history such as recently purchased products, and the most up-to-date pricing information and case notes. Personnel have the capability to collect information from the source, inputting information directly about service calls, client meetings, products and vendors. Anything that needs to be logged and seen at a later time can be captured with mobile CRM.

Mobile CRM enables sales reps to be more effective, placing required information at their fingertips and encouraging more meaningful conversations. Research by Innoppl Technologies shows that 65 percent of sales reps at companies that have adopted mobile CRM have achieved sales quotas, opposed to just 22 percent from companies that have not implemented the strategy.

A key advantage of implementing a mobile CRM strategy is the shortening of the sales cycle. Closing sales with fewer interactions allows employees to dedicate more time to prospecting or working on new opportunities, therefore increasing earning and revenue potential.

Mobile CRM is also a valuable tool for enhancing production and planning capabilities. Employees working remotely can keep data organized as well as submit confirmed orders instead of holding them until they return to the office. When orders are placed quicker, the final product or service is delivered quicker, translating into shorter turnaround and high consumer satisfaction.

Other key benefits of mobile CRM include:

- Easier access to shared information about your contacts and commitments made in meetings, phone calls, e-mails and quick notes
- No more call reports or periodic reporting, as users can easily view their follow-up schedule, related notes and past completed activities
- Manage relationships regardless of location, with access to related notes, service and support call status and open and past closed issues with resolutions

To get the full value from CRM data, employees need access to the meaningful information that directly applies to their role in the company. With mobile CRM, senior managers can access real-time reports from the workforce, set alerts for when new deals are closed, provide valuable coaching remotely and identify and address problems before they arise. Remote access to CRM can assist several levels of the organization, from customer service agents and support teams to senior management.

The benefits of mobile CRM are not limited to sales functions. The versatility of CRM means it is not only a sales tool, but a service-delivery platform. For example, public sector employees can access case notes of employees and constituents, ultimately serving the people quicker with more knowledge. In a government setting, mobile CRM can help provide more efficient, higher-level service to constituents and control costs. Similar capabilities and functionality can be extended throughout organizations in any industry.

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Users have freedom of choice to utilize mobile CRM on all devices or platforms, as several modules allow access to the CRM system from any mobile device. For instance, MobileAccess is the leading mobile CRM solution for Microsoft Dynamics CRM. It is optimized for the latest enterprise-class devices and customizable to work seamlessly with unique CRM needs, with access online and on multiple devices.

As businesses search for ways to integrate mobility initiatives, mobile CRM platforms present an opportunity to instantly view and share information and strengthen relationships. It is a proven strategy to increase sales and productivity, arming employees with the tools to close a deal or address an issue at any time. If you are not taking advantage of the power of mobile CRM, now is the time to discover how it can increase your capabilities and customer satisfaction.
How Many Versions of iOS Should My App Support?

By: Geoff Bender, Segue Technologies

As developers, we’re always looking to take advantage of the latest technologies. Each new version of Apple’s mobile operating system (iOS) introduces new APIs that give us the ability to do wonderfully new things within our apps, but the balance lies in leveraging this new technology while still supporting an established user base. We often try to guess how many versions of iOS our apps need to target because the overall goal is to introduce new functionality while supporting the maximum number of users. Adding bells and whistles won’t do us much good if that means cutting out a significant portion of our audience. Personally, when trying to decide which iOS version my apps will target, the three primary things I take into account are high adoption rates, app complexity, and selective feature offerings.

High Adoption Rate

Apple’s devices aren’t “fragmented” in the way that many competitors’ devices are because Apple controls both the operating system and the hardware it runs on. As a result, there are only really two things that keep iOS users from upgrading: either the hardware is sufficiently old to prevent the upgrade, or users themselves choose not to. This clear upgrade path results in a new operating system adoption rate that is staggeringly high. Several sources (such as CNET and ZDNet) claim that this year’s release of iOS 9 reached over 60% adoption within a month’s time, significantly faster than that of iOS 8. This works in our favor because we can rest assured that by the time we’ve developed and tested features introduced by the latest software release, a good portion of our target audience will be able to take advantage of the latest features.

App Complexity

Will my app even need to take advantage of the latest technologies? What if I just plan to present a web view and a few buttons and labels? What if my app consists primarily of table views and doesn’t even rely on network connectivity? If I’m following the KISS principle (Keep it simple, stupid!) and I don’t plan on doing anything cutting edge, then I could honestly support several prior versions of iOS since most of the basic features have been around since the beginning.

Selective Feature Offerings

If I need to add some newer capabilities, I can always choose to code them in for newer devices and filter them out for older ones. Xcode, the iOS development tool, automates so many of the little tasks that we would have to perform when trying to support multiple devices or versions of an operating system. Want to use the latest software development kit (SDK), but support earlier operating systems? Just set the deployment target to an earlier version with one setting and test for compatibility in the various simulators. It really is quite easy to offer new features to those devices that can support them and selectively filter out features for devices running older versions of the operating system. Many times, the compiler will alert us if we try to compile a feature that isn’t compatible with the specified target. Want to take advantage of modern alert views with inline callbacks but you’re worried that older devices won’t support them? Just test if NSClassFromString("UIAlertController") == nil to determine what the device can and can’t support. This way we can still use the latest features and simultaneously support earlier operating systems. (For more information on the importance of mobile application testing check out the blog “Why is Mobile Application Testing Important?”)

Potential Pitfalls

• Abrupt Transitions

It won’t happen often, but sometimes there will be a bit of an abrupt transition between two versions of iOS that’ll cause headaches. Sometimes the compiler doesn’t tell you that what you wrote only works on the latest version of iOS. Suddenly your app crashes during the testing period and you’ve discovered that everything you wrote won’t work on older versions. I’ll use the example of a UIAlertController which was introduced in iOS 8. I wanted to support iOS 7 and 8 simultaneously and had to make a choice whether to use UIAlertView only (risking future deprecation) or use NSClassFromString("UIAlertController") to check for nil and write both. At some point I knew that UIAlertView would become fully deprecated and stop being supported, so in the interest of future proofing my app I chose to support both. This involved writing a small amount of code to support iOS 8 and a lot of code (including delegate methods) to support iOS 7. Now that iOS 9 is out and I’m supporting iOS 8 and 9 exclusively, I was able to go back into the project and remove all the offensive iOS 7 code, eliminating a bit of bloat in the process. Again, this doesn’t always happen, but the differences between the iOS 7 and 8 SDKs seemed much more stark than the comparatively easy transition between 8 and 9.

• Selecting a Development Language

Another consideration is determining which language to develop with. Traditionally iOS apps were written in Objective-C, which is still widely used. As of iOS 7, many developers have chosen to adopt Swift, Apple’s newer development language. While I personally enjoy Swift a good bit more than Objective-C and find myself writing much fewer (and cleaner) lines of code as a result, it is not without its growing pains and the changes between each language update can be quite drastic. This can lead to hours of code changes and problem solving just to get the project to compile. Additionally, when Swift was first introduced, if you chose to use it as your development language, you limited yourself to supporting only the latest version of iOS.

Potential pitfalls aside, I’ve chosen to use some of the latest technologies in my latest projects and have come to the conclusion, based on high iOS adoption rates, that I’d be reaching the vast majority of iOS users if I support the two most recent major operating system versions, iOS 8 and 9. From what I’ve seen, the prevailing wisdom seems to be that you really can’t go wrong if you support iOS for the prior year. Apple’s faithful supporters tend to be an eager bunch and will upgrade if they can, unless there’s a really good reason not to, which rarely seems to be the case. You can be confident that you’ll still be reaching the vast majority of your audience.
In the world of technology, guessing (or blaming) games as to the source of a problem seem to be a time-honored pastime. While I’m not against the occasional bout, life’s too short to constantly repeat a loop of “guess-and-be-wrong” before stumbling upon the right solution, or giving up to find another game to play.

Seeing is believing, and in the computer world, a “Sniffer” trace, a capture of every bit of data flowing on a network is a great source of seeing. A real “Sniffer” is an expensive device, deployed by a network guru, and is overkill for most diagnostic data capture. Enter Wireshark, a free (I love free) software package that runs on Windows, Mac and Linux that captures every bit of data that enters or exits the machine it’s running on. In most cases you crank it up, recreate your problem, stop the capture and scroll through a few thousand packets, looking for something out of place. There’s also the capability to filter those packets to just those you’re interested in, for example DNS look-ups, reducing your search for something out of place.

But what to do when you need to capture millions of packets over an hour or more when you’re looking for a needle in a haystack? One solution I’ve found very effective is to employ a small AWK formatting program. AWK is a sleek programming language, named after its creators, Aho, Weinberger and Kernighan. I’ll demonstrate one example of how I used this combination to help find one of those needles, including the AWK source code.

The problem involved trying to eliminate the printing of an unused label from an application with limited source code and even less documentation. On the positive side, the application keeps just about everything in an SQLServer database. I was hoping that capturing and analysing the database traffic between the app server and database server would reveal clues on how the label printing application worked.

To start, I ran a Wireshark trace on the app server, capturing all packets without any filters. I stopped the trace after a label was printed and exported all packets using the “File...Export Packet Dissections...” as a text file. There are a number of options on what to export, but only the Packet Header and Packet Bytes are needed, so I made sure only those two selection boxes were checked. The resulting text file has many lines per packet, and it’s too tedious to scan down to find clues and near impossible to make Find commands useful. Having one, long line for each packet is much more useful. Enter the AWK code.

I use the Gnu version of AWK which can be downloaded from: http://gnuwin32.sourceforge.net/packages/gawk.htm

Besides AWK being a simple programming language that is very good at handling strings, I also find that having a single, stand-alone executable (gawk.exe) much easier to deploy, with no Windows installation, DLL’s or configuration files. I keep the executable in same directory as all the input files I use and output files I create, C:\GAWK, which avoids the tedium of having to repeatedly spell out directory paths. To run the formatting program (code included below), open a Command Prompt, navigate to the C:\GAWK directory and enter the following command, replacing the italicized file names with the appropriate names.

```
< input file gawk.exe -f printpdml.awk > output file
```

The “< input file” throws the file into the input stream. “-f printpdml.awk” tells “gawk.exe” which file contains the program code and “> output file” sends all the program’s print output to the named file.

The resulting file contains the desired one line per packet, and while I’m not claiming it’s perfect, it’s 90% of the way there. In the case of the unwanted label, I was able to quickly find where the label printed, then backed up to find a Stored Procedure that looked appropriate. Searching that procedure led to another procedure that inserted one database record for each label. Commenting out the unwanted insert resolved the issue.

Not bad for less than an hour’s time and using two free programs.

Source Code for “printpdml.awk”

```
# This awk program formats that text file into a smaller, more readable format.
#
# BEGIN {
#  line = «a;
#}
# # Print the single, consolidated line collected by the code below.
# {  
#  if (NF < 2) {
#   if (length(line) > 0) {
#     print packet « « time « « source « « destination « « line;
#     line = «a;
#   }
#  }
#  }
# # # Get the information from the Packet Header line.
# # There are a number of options on what to export, but only the Packet Header and Packet Bytes are needed, so I made sure only those two selection boxes were checked. The resulting text file has many lines per packet, and it’s too tedious to scan down to find clues and near impossible to make Find commands useful. Having one, long line for each packet is much more useful. Enter the AWK code.

< input file gawk.exe -f printpdml.awk > output file
```

(continued on page 14)
(continued from page 13)

# Get the information from the Packet Bytes lines.
# Ignoring binary zeroes ("00") reduces the line size and makes
# seeing and finding things much easier.
# while (i < 18) {
    if (substr($0,7+((i-2)*3),2) != "00") {
        line = line substr($0,i+55,1);
    }
    i++;
}

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