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Forge CAD—Breaking the Mold

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Designing and tailoring a CAD solution to meet their unique needs gave Lancaster County Wide Communications control over the end product and significant improvement in the overall safety of Lancaster County residents and emergency personnel.

Located in Pennsylvania, Lancaster County Wide Communications (LCWC) is responsible for answering all 9-1-1 emergency calls across 60 municipalities and dispatching units for more than 140 Fire, Police and EMS agencies. In 2007, the LCWC radio room handled approximately 414,494 calls.

LCWC's past two CAD (computer aided-dispatch) implementations introduced issues pertaining to multi-user access to incident details, time intensive data entry, slow system response time, system security and CAD vendor support. After taking a closer look at their commercial off the shelf (COTS) CAD product, LCWC decided that they needed a more flexible system that met their unique needs.

With a long-term history of providing LCWC with solid IT solutions, the Lancaster, PA-based IT consulting firm, Cimbrian, was selected to perform the vision phase of the CAD initiative in December of 2006. As their CAD consultant, Cimbrian helped LCWC understand what they needed their next CAD system to do by listening to the expectations and needs of their dispatchers and call takers as well as fire, police and EMS personnel.

"Many of today's CAD vendors provide COTS CAD solutions before taking adequate time to explore and analyze the answers to a myriad of critical questions," said David Flemming, program manager of Cimbrian's ForgeCAD. "Having been down this road before, LCWC realized the importance of defining and documenting a clear vision before selecting a CAD solution."

Defining the Vision and Making a Choice

In keeping with agile software development methodologies, LCWC identified key stakeholders in the CAD initiative and selected representatives from the end-user community to participate in weekly focus group sessions. Cimbrian business analysts led each session and provided visual representation of LCWC's stated needs to assist in validating that what they were asking for was indeed what they wanted in the end. Cimbrian technical advisors were present each step of the way to ensure that all LCWC requests were technically feasible. These initial steps were integral in delivering an end CAD product that was guaranteed to meet the needs of all internal and external users of the system.

Once the high level vision of the project was defined and agreed upon, LCWC prioritized their business needs and began exploring their options for CAD solutions. With the guidance of Cimbrian technical advisors, LCWC selected three existing CAD vendors to perform demonstrations of their products. Having their needs documented prior to the demonstrations enabled LCWC to get a much more accurate assessment of the featured products and provided the vendors with an accurate description of needed functionality. One vendor declined the opportunity to present a demonstration based upon their inability to meet stated requirements—saving LCWC and the vendor valuable time. In the end, LCWC came to the conclusion that all three products would require a sacrifice in features or a change in their current business process. "We didn't want to change our operations to suit the technology. We wanted the technology to suit us," said Mike Weaver, director LCWC. It was clear that a custom CAD application was the best option.

Designing the Custom CAD Solution

In order to build a CAD system that was customized, scalable and fit the particular needs of LCWC, Cimbrian needed to understand, define and then give the emergency response personnel the critical information they needed to save lives. With a solid vision in place, the Cimbrian and LCWC team began defining lower level, detailed requirements. Defining requirements can be challenging for an organization that is not familiar with the software development process. Cimbrian guided LCWC through this process by providing visual representations of their requests. These visual representations took the form of wireframes (sample screen shots) and process flow charts. As requirements were defined and validated using these tools, the Cimbrian technical team was assembling the lower level architecture for the product. With the architecture in place upon validation of the requirements, the Cimbrian technical team was able to immediately start incorporating LCWC requested features into the product.

Monthly releases were deployed to LCWC's quality assurance (QA) environment. These releases included all new features developed dur-

Images courtesy of Cimbrian with permission from LCWC.



A four-position Forge CAD "Pod" in the Fire Board Communications Area.



LCWC dispatcher using Forge CAD which she has configured to suit her working preferences.



Overview of the LCWC Communications Center.

ing the prior month. LCWC staff members were then able to test the newly added features to determine if they would satisfy their stated business need. If a feature was not implemented to their satisfaction, day-to-day business operations were not interrupted. The feature was enhanced and included in a future release to the QA environment. With LCWC staff members involved in both the design and testing of the Forge CAD features throughout the life of the project, LCWC was confident that Forge CAD would be a success. "The Cimbian process was a huge contributor to the overall success of the project. Everyday users should always play a part in designing the solution—because they are the ones using it," said Weaver.



LCWC supervisor position where shift supervisors use Forge CAD to easily observe and oversee any active or completed incident details.

LCWC went live with Cimbian's Forge CAD in April of 2008. With a career history of five CAD deployments under his belt, Weaver claims that the Forge CAD deployment was the "smoothest of all."

Forge CAD is fully scalable, both in product fit and product price. Since developing Forge CAD for LCWC, Cimbian has sold their customized CAD solution to another

PSAP and several other government agencies have expressed interest. According to Flemming, interest has grown due to Cimbian's approach to software development and their success with LCWC. "Forge CAD ensures a product that is able to meet a wide variety of needs and budgets. Forge CAD is built to be extended, adapted, enhanced and customized to work exactly how you want it to."

Technical Considerations

The Forge CAD technical design takes into account LCWC's need for information to flow as quickly and seamlessly as possible through a secure system, while still allowing authorized internal and external multi-user access to incidents. The product is built on a Microsoft platform that includes Microsoft Server 2003, Microsoft SQL Server 2005 and Microsoft .NET Framework 3.0. (Cimbian is a Microsoft Certified Gold Partner.) The Forge CAD foundation is a messaging architecture based on Windows Communication Foundation to distribute data in near real-time. As call takers and dispatchers are updating critical incident details, information is broadcast to all other positions via the Forge Application Server. The Forge CAD Application Server is a .NET-based Windows service that coordinates system activity and handles authentication, authorization, information distribution and database persistence of system activity. The service may run in a clustered environment (meaning, simultaneously on more than one server) to promote high availability and scalability.

Forge WebCAD addresses the needs of all external users—including police officers on patrol using Forge WebCAD on their vehicle laptops, by providing secure access to external authorized users via a Web interface. Authorized users have the ability to login to

Forge WebCAD to view their agency, unit and incident details.

The End Result

All LCWC call taking and dispatching processes have been successfully operating on Forge CAD since April of 2008. LCWC and Cimbian tailored a CAD solution that fit within their organization. The solution was designed by the end users and therefore left little room for surprises during the product implementation phase. Users easily and readily adopted the new product because they were involved in the process from the beginning. The solution is effectively integrated with external applications to ensure that critical information is shared quickly and securely with all emergency services personnel. Administrative staff can now configure and manipulate data in real time—ensuring that dispatchers and emergency responders are seeing the most up-to-date information for their incidents, agency, units and responding personnel.

Designing and tailoring a CAD solution to meet their unique needs gave LCWC control over the end product and, as a result, has significantly improved the overall safety of Lancaster County residents and emergency personnel. **ENPM**

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