



Mainframe-to-Windows Server Move Speeds Key Process 33 Percent at Southern Company

Overview

Country or Region: United States

Industry: Utilities—Energy

Customer Profile

With 4.3 million customers, 26,000 employees, and a capacity of more than 41,000 megawatts, Atlanta, Georgia-based Southern Company is the premier energy company serving the southeastern United States.

Business Situation

The company's Southern Nuclear subsidiary ran its employee authorization system on an aging mainframe that couldn't accommodate changing business requirements or federal regulations.

Solution

The company replaced the mainframe solution with a Web solution running on Windows Server® 2003 and based on the Microsoft® .NET Framework.

Benefits

- Provides flexibility to meet new requirements
- Cuts average authorization time by 33 percent
- Helps to reduce outage time
- Cuts maintenance costs 74 percent

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One of the mission-critical processes at Southern Nuclear—the nuclear facilities subsidiary of energy giant Southern Company—is granting clearances for employees and contractors who enter its facilities. That process was managed by an aging mainframe that could no longer handle the increasing pace of new federal regulations and changing business needs. So, Southern Nuclear turned to Computer Technology Solutions, a Microsoft® Gold Certified Partner. Together, they created the Employee Plant Access Control Tracking system (EmPACT™), a Web-based solution running on Microsoft technologies. As a result, Southern Nuclear gains the flexibility to meet new regulations and requirements, has cut the length of the authorization process by 33 percent, and saves 74 percent of the cost of maintaining the former mainframe solution.

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Doyle Crews, IT Analyst Senior,
Southern Nuclear

Situation

September 11, 2001, changed a lot of things. One of the more obscure changes it spurred was Southern Nuclear’s migration away from a mainframe.

Southern Nuclear is a subsidiary of Southern Company, the largest energy company in the southeastern United States. The Southern Nuclear subsidiary operates three nuclear power plants, which provide 20 percent of all electricity consumed in Alabama and Georgia.

Security has always been a key concern for nuclear facilities, and Southern Nuclear is no exception. Employees, vendors, and contractors must be screened on a variety of factors—including criminal record and psychological fitness—before they can be granted unescorted access inside a nuclear power plant. Nuclear facilities must meet federal Nuclear Regulatory Commission (NRC) requirements for the entire authorization process, from the initial request to grant access to an individual, through the granting of a badge, the random-pool drug and alcohol testing of authorized individuals, follow-up testing, and the processing of terminations. And even more regulations govern the reports that a facility must make to the NRC regarding an individual’s fitness for duty.

Since the early 1990s, Southern Nuclear had managed its authorization process through a COBOL-based application called the Access Control System (ACS). The solution ran on a 1,240-MIPS (millions of instructions per second) Amdahl 2000 mainframe computer running IBM OS/390—but not very well, especially as time passed.

Southern Nuclear had run most of its applications on the mainframe in the 1980s and early 1990s and had mainframe expertise throughout the company. But as it implemented a corporate directive to move those applications to Windows®-based systems and

the Microsoft® .NET Framework, its internal mainframe resources dwindled. Meanwhile, fewer programmers were interested in COBOL, making it tougher for the company to find new resources to service the remaining mainframe applications, such as ACS. By 2005, less than a handful of knowledgeable COBOL programmers remained on the Southern Company IT staff, and most of them had primary responsibilities elsewhere in the company.

The ACS application itself became tougher to service as it became weighted with more than a decade’s worth of customizations and workarounds—code that contributed to performance and reliability issues. Although there were few programmers available to work on the software, more work was needed. Four disparate databases—for fitness-for-duty testing, random drug testing, follow-up testing, and Owner Controlled Area (OCA) access—meant redundant and sometimes inaccurate data entry; Southern Nuclear knew the databases needed to be integrated to address the problem. And every time the NRC issued new regulations for the access authorization process, those changes also needed to be reflected in the company’s processes and software code.

“The mainframe system had reached its limit in terms of the upgrades we could implement,” says John H. Brown, IT Manager, Southern Nuclear. “It was difficult to make further changes in what had become very convoluted code. Addressing one area could well break something else.”

Then came September 11. In the wake of that event, the NRC made wholesale changes and additions to the authorization process, and it increased the rate at which new requirements were issued. ACS couldn’t keep up. Southern Nuclear needed another solution.

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Brown and his colleagues researched available off-the-shelf solutions and considered a product developed using Oracle forms with an Oracle database. “The business units involved in a demonstration of the product found it difficult to navigate,” says Brown. “It had an excess of screens and fields, which made it cumbersome to use. And it was a nonstandard platform for us. That meant we’d have a full range of support costs that wouldn’t be present with a standards-based product.”

For Southern Nuclear, “standards-based” meant the Windows Server® operating system, but there was no such solution available.

Solution

Southern Nuclear decided to create its own solution for Windows Server. It turned to Computer Technology Solutions, a Microsoft Gold Certified Partner based in Birmingham, Alabama. Together, they created the Employee Plant Access Control Tracking system (EmPACT™), a solution running on the Windows Server 2003 R2 Enterprise Edition operating system and Microsoft SQL Server™ 2000 database software. (An upgrade to SQL Server 2005 is planned.)

The solution was written using the Microsoft .NET Framework and the Visual C#® development tool in the Microsoft Visual Studio® 2005, Professional Edition, development system. It replaces the four disparate databases of the former solution with a single instance of a SQL Server 2000-based database, which eliminates the redundancy and potential inaccuracies arising from rekeying data. It also creates a “single version of the truth” that is accessed by users including the security coordinators and security specialists who initiate and manage the process of approving individuals for access to the facilities.

In contrast to the mainframe solution, which required security personnel to print reports in order to review the status of applicants, the EmPACT solution allows users to view, coordinate, and modify an applicant’s status on a single, highly graphical screen. Because the solution integrates data from all four databases, a user gets a comprehensive picture of an applicant’s status, including criminal background check, psychological profile, drug and alcohol testing, fingerprints, tamper training, and credit history.

As part of the authorization process, EmPACT integrates with the federal government’s Personnel Authorization Database System (PADS), a national database containing background information on candidates for nuclear facility access. Workflow logic built into EmPACT automatically downloads PADS data for applicants at Southern Company, and EmPACT in turn uploads data on its candidates to PADS in a nightly batch process so that the data can be shared with other facilities, as appropriate. Another interface, to Southern Nuclear’s training system, allows EmPACT to retrieve qualification information in order to verify training status before clearance is granted.

A security coordinator reviews the applicant’s complete profile in EmPACT. If the coordinator approves the request, EmPACT forwards the approval to the security office for the relevant facility. There the authorization badge is issued and information about the badge is captured in EmPACT. Should the status of the person or the badge change—for example, if the person fails a random drug test or leaves the job, or if the badge is lost—that information is also maintained in EmPACT. As additional data is collected on an applicant or a new test or milestone is completed, the Southern Nuclear personnel who need to know about that update are notified automatically in e-mail through SQL

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Server Notification Services, working with the custom business logic of the solution.

Southern Nuclear is subject to federally mandated reporting on the authorizations that it grants to its facilities. In the EmPACT solution, these reports are created automatically through SQL Server Reporting Services, which provides 45 reports pre-defined to meet the federal requirements and customized to meet the additional needs of Southern Company personnel. Users also have the ability to create their own pre-defined reports and to generate reports on the fly to meet new needs.

Because EmPACT is Web based—it uses Microsoft ASP.NET Web-serving technology in its presentation layer—it can be accessed by authorized users anywhere over the company's intranet, without requiring client software to be downloaded to a specific personal computer.

The solution allows vendors and other outside contractors to submit the names of employees for whom they are requesting access authorization, and to update and check on the status of those applications.

The solution is hosted on Dell PowerEdge model 1850 server computers, with separate servers for the user interface and business logic, data access, the database, and reports. Failover redundancy is provided through active/passive clusters for each computer, which ensures continued operation in the event of a problem on any primary computer.

Benefits

By adopting the .NET Framework-based EmPACT solution for Windows Server, Southern Nuclear gains the flexibility to meet new regulations and business requirements, and cuts the length of the authorization process by 33 percent. In addition, it saves

74 percent of the cost of maintaining the former, mainframe solution.

Provides Flexibility to Meet New Requirements

Whereas the mainframe solution failed to give Southern Nuclear the flexibility to change business logic and processes to meet new NRC requirements, EmPACT does provide that capability, according to Doyle Crews, IT Analyst Senior, Southern Nuclear.

“The programming skill set needed to modify or customize our business logic or our look and feel is available in any IT shop with a Web development staff,” says Crews. “Instead of the highly customized code we were using before, EmPACT is based on object-oriented design and standard tools that make maintenance and modifications so much easier than they were.”

In addition to easily updating the solution, Southern Company security personnel can easily update the reports they produce—whether in response to new NRC requirements or new business needs of the company.

“Our security personnel and business users were extremely limited in the reports they could generate and the data they could probe,” says Crews. “Now, users can customize reports or create new ones on their own. That means that they have fuller access to the data and can manage the authorization process more effectively.”

Further evidence of the flexibility of the solution is that Southern Nuclear and Computer Technology Solutions plan to strip out the Southern Nuclear-specific portions of business logic and market the solution to other utilities, which will then be free to customize the logic to meet their own requirements.

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Brent Thigpen, Security Supervisor of Nuclear Fleet Security and Emergency Planning, Southern Nuclear

Cuts Average Authorization Time by 33 Percent

The most significant metric in the field of access authorization is the number of days it takes to grant access and process a badge. Southern Nuclear has cut this time by 33 percent, thanks to EmPACT. Under the mainframe solution, authorization took an average of 1.5 days per worker. In 2007, under EmPACT, that time has been cut to 1 day.

“By streamlining the entire process of authorizing access and granting badges, EmPACT has enabled Southern Nuclear to lead the industry in the amount of time required to process a clearance,” says Brent Thigpen, Security Supervisor of Nuclear Fleet Security and Emergency Planning at Southern Nuclear.

Helps to Reduce Outage Time

The streamlined authorization processing is especially important to Southern Nuclear during the four times per year that a facility is offline—an “outage” in industry parlance—for refueling and performing major maintenance. During those periods, 1,000 or more temporary personnel from vendor companies enter a facility, all of whom have to be processed through the authorization system before they can begin work.

“In the past, I’d spend hours on the phone answering questions from vendors about whether their people have been granted clearance,” says Dorothy T. Price, Security Specialist Senior, Southern Nuclear. “We had a large volume of people coming through the system at once, and they needed to be in the plant right away. With EmPACT, the vendors can check the status of clearances themselves over the Web, freeing me to do the more important work of clearing requested personnel. And since EmPACT also streamlines that process, the solution gives me the information I need about an applicant,

instead of requiring me to chase down the information.”

As a result, employees from outside firms are cleared faster for access to a facility. “EmPACT helps us to achieve shorter outages,” says Brown. “And shorter outages enable us to operate more efficiently, more profitably.”

Cuts Maintenance Costs 74 Percent

The greater flexibility, faster performance, and increased effectiveness of EmPACT compared to the former mainframe solution also come with a lower price. For strategic reasons, Southern Nuclear didn’t consider investing in another mainframe solution. By deploying EmPACT on Windows Server-based computers that were already operating in its server farm, Southern Nuclear avoided having to buy new hardware. And the cost of the continuing maintenance contract for EmPACT is 74 percent less than the cost of maintaining the mainframe solution.

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