

# **CODE - A case study on productivity**

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Arnold Industries has a long history with the CODE/400 tool. They started using the CODE/400 when it was an OS/2 product. It has helped maintain a high level of productivity as their IT staff grew from 5 in 1991 to 20 developers today. Although the primary rationale for using CODE was always programmer productivity, the programmable editor in CODE became a key tool in Arnold Industries' Y2K conversion efforts.

## **About the Company**

Arnold Industries Inc. is a transportation and services company ([WWW.AIND.COM](http://WWW.AIND.COM)). They have three major divisions. Two divisions are focused on transportation, trucking and freight, primarily in the eastern United States. New Penn Motor Express ([WWW.NEWPENN.COM](http://WWW.NEWPENN.COM)) provides next-day LTL service in the Northeast region of the United States. Arnold Transportation Services focuses on irregular route and dedicated truckload services throughout the Northeast, Southeast, Midwest and Southwest regions of the United States. Arnold Logistics is a division of Arnold Transportation Services and specializes in integrated distribution services, order fulfillment and contract packaging services. The IT group is headquartered in Arnold Industries and provides support for all 3 divisions. Arnold Industries has 12 AS/400e and iSeries servers to support the three divisions.

Like many other companies, Arnold Industries started using the Web as a method of publishing static information using an NT server. As they matured to a dynamic Web environment, they added Notes, stored procedures with remote SQL and NET.DATA programming on the AS/400 to power their Web site.

## **Nature of the Problem**

When Arnold Industries first considered purchasing CODE/400, the problem that they were trying to address was programmer productivity. The company was expanding and the application requirements to support the expansion were expanding as well. Improving developer productivity would help address the new application requirements without adding substantially to the development staffing.

## **Search for a Solution**

Arnold Industries already had a substantial investment in AS/400 applications and were very satisfied with the performance, stability and reliability of the AS/400 platform. They tried and found they couldn't afford the restrictions, disruptions and instability involved in moving to a CASE or a 4GL development solution. They wanted to continue with their current AS/400 development strategy but improve their productivity.

## **Selecting A Solution**

CODE/400 was chosen as the tool to improve development productivity for several reasons:

- Arnold Industries wanted an IBM solution because of the reliability, stability and service of IBM solutions
- The CODE editor, in combination with the program verifier and the error list window substantially improved the edit/compile productivity of their programmers. After updating source code in the CODE editor, programmers could check their updates on the workstation using the program verifier. Any errors discovered by the program verifier would be displayed in the error list window in the workstation development environment. When programmers double-clicked on an error in the error list window, the error would be brought up in the CODE editor with the error highlighted. When the error was corrected, the highlighting would disappear and the error list window would be updated. By using the program verifier, every compile submitted to the AS/400 was guaranteed to be a clean compile. This not only improved the productivity of the programmers but it also substantially reduced the number of compiles on the AS/400.
- The CODE designer improved the productivity of designing DDS for screens, reports and database files. The "What You See Is What You Get" (WYSIWYG) design tool made the design process quick and easy. And CODE designer was always in sync with the latest DDS changes in the AS/400 system.
- The manuals were on-line and so they were always consistent with the level of the product in use. Programmers didn't have to experience the pain of dealing with printed manuals that were out of date. The context sensitive help made finding programming information productive and painless.
- The CODE editor was programmable and the samples and examples that were shipped with the CODE product indicated some of the potential of this capability

## **Product Evolution**

Although not part of the original buying decision, Arnold Industries frequently uses the filtering, the graphical compares, the high level flow diagrams and the indent, which are features of the CODE editor. There is one other feature of CODE that Arnold Industries used extensively during their Y2K conversion process - the programmable editor.

Arnold Industries converted their ambiguous dates to the date data type to address their Y2K conversion requirements. Using the date data type also made their date mathematics considerably easier to develop and maintain. Once the problematic date entries were located, Arnold Industries

changed the data base entries to date data types. Compiling the application source against changed data types yielded an error list, which identified all of the places in the source code where the date sequences were used. The CODE editor was programmed to replace the original source with the new code sequences, which used the date data types. This made the conversion process simpler and less error prone and substantially reduced the Y2K conversion and testing costs (about 2.5 million in savings).

This was a unique and intelligent use of the capabilities of the ILE RPG compiler and the CODE product.

### **Problems Encountered / Lessons Learned**

Although CODE proved to be a productive programming environment, there were some challenges.

#### **CODE Installs**

Installations of new versions of CODE proved to be problematic. Installing new versions of CODE on existing PCs tended to yield unpredictable results that were difficult to isolate, diagnose and repair. This didn't occur on every install but it made the install process time consuming. To address this concern, Arnold Industries revised their install process. They installed CODE over old versions and waited to see if they had problems. If they had problems, they removed the old version of Code and then they installed CODE again. Since they adopted this new process, the installation of new versions of CODE has been problem free.

#### **Training**

Some of the long-term development staff uses the CODE tooling almost exclusively. They discovered its productivity benefits in their Y2K conversion efforts. However, most of this staff became familiar with the CODE tooling through a "voyage of discovery". Some of the more recent experienced hires still are using the ADTS tooling. Arnold Industries recognizes the need to institute some formal in-house education to maximize the productivity benefit of the tool use.

#### **Technical Support**

Although Arnold Industries relies on IBM to provide the defect support for the product, they also make use of another vehicle to provide technical usage support. The CODE forum is a user self-help group to help new and experienced users with usage problems. This CODE forum was especially important to Arnold Industries during their Y2K conversion efforts. They used the forum to determine when it was best to install solution packs...when they were stable. This was very important because they couldn't afford to have CODE down during their conversion efforts. Now they monitor the forums to explore new uses for the CODE tooling.

## **Conclusions**

CODE has satisfied the needs of Arnold Industries for improved developer productivity. However, the capabilities of the programmable editor proved to be a crucial element in their Y2K conversion efforts. CODE continues to provide additional benefits to Arnold Industries. As they move to e-business development, the distributed debugger helps them effectively and efficiently debug the more complex applications associated with e-business.

## **Package Details - WebSphere Development Studio for iSeries**

CODE is a component of the strategic iSeries AD tools offering, WebSphere Development Studio for iSeries which became generally available on May 25, 2001.

### **Host Tools**

RPG, COBOL, C and C++ compilers

Application Development ToolSet (SEU, PDM, SDA, etc.)

**WebSphere Development Tools for iSeries** (with unlimited workstation licenses per server)

VisualAge for Java, Professional Edition, V3.5, plus Enterprise Toolkit for iSeries

WebSphere Studio, Professional Edition, V3.5, plus AS/400 Affinity enhancements

CODE/400

VisualAge RPG

WebFacing Tool

The new package is an iSeries product that is very attractively priced. It is a no additional charge upgrade for customers with software subscription.

### **For More Information:**

If you want more information on WebSphere Development Studio for iSeries, please visit the IBM Web site at:

“[www.ibm.com/software/ad/wdt400](http://www.ibm.com/software/ad/wdt400)”

If you want more information about CODE usage at Arnold Industries, you can contact Chris Nickchen at [CNickchen@aind.com](mailto:CNickchen@aind.com)

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