

## 2003 Excellence in Practice Citation

Technical Training



**Cisco Systems, Inc.**

San Jose, California

### *E-Service Training Program*

#### **SUMMARY**

Our group created an innovative training program called E-Service Training (EST) which capitalizes on the potential of existing Internet capabilities and technologies. This approach to technical product training encompasses most aspects of classroom training using a web-enabled, modular design. The following are the separate, but complementary training delivery methods that are incorporated into the E-Service Training program:

- **E-Learning** – Presentations which provide conceptual and product overview information.
- **E-Lab** – Lab exercises which provide access to real, physical equipment for skills training and refresh.
- **Visual Hands-on (VHO)** – VHO provides product illustrations and step-by-step procedures for maintenance tasks.
- **Qualification Exam** – Assess students on their skill set and capacity to provide quality services.
- **Virtual Talk Sessions (VTS)** – Real-time, interactive sessions, over the Internet, with video, audio and chat.

The EST program provides technical training to a global audience anytime and anywhere while increasing productivity and lowering costs. By incorporating processes, templates and web-based tools, content developers create a training program and deliver it to a worldwide audience in a short amount of time. The learning audience benefits by a modular step-by-step approach because the EST program achieves what classroom training offers: learning, practicing, testing, and assessing. In addition, the EST program allows students to participate in training when they need it and where they need it.

## BACKGROUND

The purpose of the practice, E-Service Training (EST), is to deliver training to field engineers (FEs) who work at customer sites all over the world. The training provides information and specific skills used by FEs to perform on-site equipment maintenance services. The goal of the practice is to make sure that FEs are ready to repair and maintain new products as soon as the new products are released to customers. Due to the rapid nature of new product deployment, the increasing number of products, and the global location of customers, training all of the FEs in the time required becomes very difficult.

In an instructor-led training (ILT) model, FEs spend three to five days in a classroom. The FEs learn technology and product concepts, and practice hands-on tasks such as replacing and configuring hardware components. This model does not work for our audience for the following reasons:

- It takes too long to train FEs, therefore, they are not ready when new products are installed at customer sites.
- It is very expensive.
- It causes loss of productivity because FEs are away from their service duties while attending a class.
- It cannot be updated with new material as the new material becomes available.
- It is not available when the FE needs it most – just before going to a customer site.

The EST program was invented in early 2001 and implementation began soon after. The program started with a group of 14 developers in a company of about 40,000 employees. The EST program was designed to replace ILT and provide an improved training model to a worldwide audience of more than 7000 field engineers. Now, the EST program is a mature model and is overwhelmingly accepted by our global FE partner organizations. The EST program is not static though. The team constantly reviews the needs of the training audience to devise changes and additions to the program. Most recently, online dynamic assessment modules for the E-lab were added. Also, tracking and metrics tools have been created so that we can monitor the success of the EST program, and gain insight into areas which need improvement.

Currently, there are 13 employees involved in designing and maintaining this program. Of the 13, three are web programmers who maintain our E-Lab hardware and network, external and internal web sites, and our tracking and metrics tools. Two of the team members are technical writers and process engineers who perform technical edits of the content and help organize and maintain the templates, tools, and processes used to create content. The remaining eight engineers are Subject Matter Experts (SMEs) who create the actual content of the training offerings. In addition to creating content, several of these engineers seek out and evaluate new tools. Each one is also an expert in

one or more of the tools that are used and they act as mentors to other members of the team.

The EST program reduces time to market for services, improves developer productivity, reduces costs to both developers and learners, and improves field engineer confidence. The result is increased value and satisfaction for customers. The implementation of the EST program reduced training expenditures (excluding personnel) by over 80% while the number of people needed to create it shrank by 35%. In addition, the number of training courses which were delivered increased by 60%. The initial expenditure for the EST program infrastructure (hardware, software, etc.) was less than \$10,000.

Two of the key components of our organization's strategic focus are to accelerate customer success and to focus on the customer in everything we do. Inherent to this focus is the commitment to providing world-class on-site service to support our products. The EST program supports the company's strategic focus by providing better-qualified field engineers who provide better service to customers.

By exploiting the Internet, and by providing modular, targeted training, the EST program has been proven to support product deployments faster and better than traditional training methods. The program is a showcase for the ability of an effective tool (the EST program) to reduce time to market for services and minimize the cycles customers expend in supporting our products at their sites. The net impact of the EST program for customers is an increase in their productivity, profits, and cash—three pillars of customer loyalty.

## **DOCUMENTATION**

### **Needs Identification**

- 1. Describe the problem or need for which this practice is designed and implemented. How was this problem identified, and how was it determined that this practice is an appropriate response?*

For many of the products our company brings to market, our company sells contracts for performing on-site maintenance services. To support the customers who purchase contracts for on-site maintenance services, our organization employs thousands of field engineers (FEs) to perform the services on a global scale.

Therefore, our organization must make sure that FEs are ready to repair and maintain new products as soon as the new products are released to customers. Because there are many new technologies and products to support, it is very difficult to make sure that the correct FEs are trained for the right products and/or technologies.

We had a training group whose purpose was to make sure that FEs were trained on new products and technologies. Subject-matter experts trained the internal and external engineers globally in time for the deployment of a product to

customer sites. Training covered the technology underlying a product, how the product works in its environment, and procedures for performing necessary maintenance tasks.

We delivered the traditional technical product training via live classroom instruction. Using this way of training, we encountered the following problems:

- **Takes too long** – There are many steps necessary to create classroom training. The course developer has to:
  - Learn the material.
  - Create the course content in PowerPoint.
  - Publish the course content to paper for use in the classroom by students.
  - Prepare the trainer to train FEs in different locations worldwide.
  - Order equipment for multiple locations.
  - Set up and maintain equipment in the multiple locations.
  - Each trainer trains FEs (6-8 FEs per class).

Then the training can begin. This whole process can take from 2 to 6 months. Most of the time, course developers could not complete FE training in time to coincide with new product introductions.

- **Costs too much** – We typically had to buy a set of equipment for each regional theater – up to four sets sometimes. We found that because we had so many students worldwide, that the cost of purchasing and installing multiple sets of equipment became prohibitive. For example, one of the products we support costs up to one million dollars per set. When multiplied by four (one set per theater), the cost skyrockets to almost four million dollars. In addition to equipment costs, we had to consider the costs incurred by students to travel to the training location (travel, lodging, food), not to mention our costs for sending trainers all over the world. Additional costs are incurred when FEs call our internal support experts because they forgot what they learned in the class.
- **Too complicated** – The logistics involved in training thousands of FEs across the globe become staggering. Getting equipment to the right locations and set up, and scheduling classes for the engineers became a logistical nightmare.
- **Too much productivity loss** – To become trained, FEs leave their revenue generating positions for substantial amounts of time. Not only is this a large investment of time and expense but it means lost productivity. The time that instructors use to teach a class, over and over again, means that they have less time to create content.
- **Not flexible** – The knowledge retained after 3 to 6 months of training is minimal due to the lack of opportunity to refresh skills or keep up with product changes/additions. In addition, field engineers hired after the scheduled training do not receive the training. Another angle on flexibility is that the

content in the training is not very easy to reuse in another product or to use in a different format for a different purpose.

We determined that the costs of ILT were too high, the time to deliver ILT was too long, and the results from ILT training were not scaled. A clear vision existed for engineers around the world to be able to learn what they needed in a matter of days or weeks—not months—to keep pace with worldwide product deployment. Customers also need well-trained field engineers to quickly resolve customer issues and prevent or minimize the downtime that costs customers money and impacts their success. We felt that a web-based training program would solve our worst problems: we would deliver training much more quickly, we only would need one set of equipment, we could reduce expenses significantly from reduced travel (by both trainers and students), we could publish updates/changes and provide a real-time and just-in-time learning environment, and field engineers could do the training at their own pace at their own place.

## Design Values

2. *Please describe how this practice takes into account the best interests of both the organization and the employees targeted.*

E-Service Training represents the best practices within an organization for delivering training to field engineers by:

- Providing training and a qualification standard for field engineers.
- Improving training developer productivity.
- Reducing training costs and adding value by providing well-trained and qualified engineers who have proven their readiness to service products.

E-Service Training provides instruction via five program components: E-Learning, E-Lab, Visual Hands-On (VHO), Qualification Exam, and Virtual Talk Session (VTS). The E-Learning portion provides the information and concepts about technologies and products. The VHO and E-Lab components help cement the information and concepts by giving hands-on experience. The VTS component provides interactive sessions for students with instructors. Finally, the qualification exam assesses the concepts and skills learned by the students in the other components. This approach trains students by learning, practicing, testing, and assessing.

In the development of E-Service Training, content developers or subject matter experts do not need to start with a blank slate. The team surveyed and interviewed trainers, content developers, support engineers, field engineers and technical writers to gather information. Using the insight gained from this information, the team defined a training development process consisting of four stages: engagement, planning, implementing, and delivery. In addition to the process, the team created templates to facilitate faster and easier content

development to the extent that it almost becomes “plug and play”. The processes and templates substantially reduced the time needed to develop and deliver training to a worldwide audience.

Using web-enabled training significantly reduced the costs associated with traditional ILT training: only need to buy one set of equipment, eliminated the investment in multiple sets of equipment as well as the maintenance of multiple locations, students and trainers do not have to spend the resources needed to travel to training locations, facilities in multiple locations do not need to be maintained, and students spend more time working and generating revenue.

The E-Service Training program benefits content developers because of the rise of productivity in doing more in less time; field engineers benefit by the flexibility of learning anytime, anywhere; customers benefit by receiving fast service support from a well-trained and qualified work force, and organizations benefit by providing goods and services more quickly.

### **Alignment**

3. *How is this practice in alignment with the performance identified, as described in your answer to question 1?*

The team created E-Service Training processes and templates to enable web-based development and delivery. Originally, content creators who developed training material for ILT courses had to prepare for multiple physical locations of the training, scheduling, purchase and logistical set up of equipment, and the class training. These elements significantly contribute to the amount of time needed to deliver training on a worldwide scale. Since E-Service Training is entirely focused on using web technologies and the Internet to bring technical training to the audience, many of the elements that hinder the quick development and delivery of training become minimal or non-existent.

In terms of the costs, the movement of traditional ILT to E-Service Training becomes readily apparent. Some of the following expenses are reduced:

- Equipment – there is no need to buy extra equipment for training at other locations for a global audience.
- Support – since no equipment is sent to other locations, related costs to house equipment (staff, space, power, adjunct equipment, etc) are eliminated.
- Travel – the airfare, hotel, food and miscellaneous expenses related with students traveling to a central site is eliminated.
- Documentation – since the material is web-based and available for download, there is no need to print and copy training material.

Because the EST program is available anytime and anywhere, the student is no longer restricted to taking training at a specific time and location. A student is still able to take some time to train, but the excess time spent on traveling is

eliminated. There is a significant productivity increase because the student is not taken out of a revenue generating position for substantial amounts of time.

The flexibility of E-Service Training benefits a student months after the initial training. Once an ILT class is over, a student's ability to review the material is limited to re-reading the printed course materials and notes. With the EST program, a student can go back to review the material and actually *work* on the equipment. Therefore it becomes a vehicle to refresh skills or keep up with product changes/additions. In addition, the components of EST program offerings are constantly monitored and updated by content developers with the latest product and technology information. A student can always learn the latest and greatest information "just-in-time" and in real-time.

*4. Please describe how this practice integrates other training, learning, and performance improvement practices, and aligns itself with organizational goals to achieve the desired outcomes.*

The EST program is perfectly aligned with the organization's goal of delivering education and training online. It was implemented to help scale training to a new level — to fill the needs of a global field-engineering workforce that needed to learn quickly. The EST program improves on the classroom setting by making it easier to develop and deploy training material to a wide audience in a short amount of time. The E-Learning, VHO and E-Lab components fit well into the online delivery of training.

An added benefit is the documented verification of learning through the comprehensive qualification exam and E-Lab assessments. The exam and E-Lab assessments measure the knowledge learned via the other components and the information that the student was able to retain. In addition it is used as an indication to others that the student has the skills to service a product.

Audience feedback is important to help gauge the effectiveness of training. Asking for feedback before and after the training is delivered is paramount to the success of the organization. The EST program exemplifies a customer-centric approach. Constant feedback from the targeted audience during the creation of the training and after delivery of the training helps the team to improve the program and make it more valuable.

*5. What evidence is there of partnerships within and outside the organization (e.g. with senior management, frontline supervisors, unions, external training suppliers, consortia)?*

The EST program team works with several groups to ensure that the training covers the right material in the most appropriate way. These groups include the following organizations:

- **Organization's Senior Management** – The EST program received strong support from the organization's senior management team. We have presented this program to many Senior VPs, VPs, and Directors from different organizations. They all admired our innovative approach and considered the EST program to be a great example of a program which was aligned with the organization's goals for reducing cost, increasing employee productivity, and improving customer satisfaction.
- **Field Engineers (FEs)** – These are the people who use the EST program training the most. They provide feedback on desired improvements to the program. Voluntary participation from the FE audience in defining the scope of E-Service Training components has also increased – this has helped produce more targeted course deliveries. Some field engineer organizations consistently ask to be a part of the creation, development, and deployment of the different parts of E-Service Training. Through close interaction with them, the quality of the training is improved and satisfaction is higher.
- **Third-Party Maintenance (TPM) Partner companies** – These are our partner companies who employ FEs. They supply feedback on FE training needs, suggestions on new components that could improve FE effectiveness, and they keep records on how well FEs perform their job. TPMs are ultimately responsible for high-quality service so they are very supportive of the EST program because it has increased the quality of training thereby increasing the quality of the service given to customers.
- **Internal Support Engineers** – These engineers are internal employees of our organization who work with the FEs. The internal support engineer manages the FE contact with the customer and the FE is the on-site hands of the internal engineer. These people give us invaluable feedback regarding the general technical requirements for an FE and the products we should create training for. They also inform us about the performance of FEs which relates back to how well the FEs have been trained, especially if it's related to a particular product or technology. Internal support engineers also use our training on a daily basis, to become an expert or as a reference to support the FEs.
- **Global Product Support (GPS) Theaters** – The people who work in the various theaters provide information on which products most urgently need training in their theater. They also supply feedback on improvements required to make the training easier to use by the FEs in their theater. For example, FEs who work for TPMs in Japan need the material in Japanese as very few of them speak English. Therefore, we have begun a limited program to translate the most useful training components to Japanese.
- **Service Marketing (SM)** – The people in SM design services for new products so they are the first to know when a new product or technology is going to be released. We work together, side-by-side, to make sure that training is created and delivered in time for new product introductions.

- **Business Units (BU)** – These are the engineering organizations which develop and deliver the products. They provide technical information through new product introduction sessions, technical assistance, and equipment allocation for testing purposes.

## Evaluation Strategy

6. *How is this practice evaluated? What factors are included in your calculations (e.g. time, costs, staff count, lost phone calls, customer satisfaction)? Are the financial costs of this practice calculated? If so, how? How often is this practice evaluated?*

Metrics are needed to evaluate satisfaction, penetration and usage, effectiveness, relevance, and cost of training, tools, processes, as well as the program's compliance with business objectives. We use several metrics to help us gauge the overall benefits of deploying EST in comparison to Instructor Led Training (ILT). In addition, we use these metrics to help us decide where to implement enhancements to the EST program.

The measurements are based on these areas of evaluation: satisfaction, competence, effectiveness, usage, and cost.

- **Satisfaction**
  - Learner satisfaction is surveyed using a feedback form. Learners complete this form when they finish an exam.
  - End-user customer satisfaction is tracked. That is, customers and internal support engineers also complete surveys after each case is done, measuring how well the case was handled.
- **Competence**
  - Internal support engineers grade FE competence and technical skill for each incident.
  - GPSQ exam scores show how well FEs understand the material presented in the training offerings.
- **Effectiveness**
  - We track the time it takes for a service to be ready for a product or technology.
  - We track how long it takes the TPM partner FEs to achieve global service support readiness (traditional training vs E-service training).
  - We measure how confident an FE is after taking training (survey).
- **Usage – the following statistics are tracked:**
  - Number and percentage of FEs using EST program per theater.
  - Number of logins per course, per FE (i.e., how often did learner visit a given E-Service offering), FEs overall usage of available course offerings (i.e., how many offerings did learner utilize).
  - Total hours logged per month for individual FEs.

- Percentage of the training roadmap completed by each FE (i.e., how much of the available training an FE has completed).
- Number of logins per individual EST component per product.
- **Cost**
  - Return on Investment (ROI) is calculated on a quarterly basis. We compare the ROI for the EST program versus ILT, based on equipment, traveling, lodging, logistics, support, etc.
  - Operation costs such as travel, printed courseware, conference room use, etc.
  - Equipment costs such as servers, cabling, power racks, etc.
  - Miscellaneous costs such as partner chargeback fees, contractual obligations, etc.

By using various evaluation techniques, we are better able to gauge the effectiveness of our EST program. For example, we initiated a mandatory survey which learners complete after they take the written test. This survey represents a Level 1 type of evaluation. We added an extra component to the survey where the responses map to a numerical rating. If a rating falls below a certain threshold, the survey automatically queries the learner for more detail on why they gave a low score. This process is not too intrusive on the learner's time and it enables us to acquire more detailed feedback. In one instance, the user comments gave us more insight into some discrepancies in our training and how it matched up to the corresponding assessment. The feedback provided an impetus to start good dialogue with our users and we can enhance the training curriculum and assessments accordingly.

## Results

*7. What specific participant behaviors are observed as a result of this practice, and how do these behaviors contribute to the goals of the practice? Are the impacts of these behaviors short-term or long-term? How do these behaviors differ from the results of previous practices?*

The acceptance of E-Service Training has changed the behavior of both the people who create training as well as those who receive it. Training developers were accustomed to using a very structured process to create training for a classroom setting. In the process of developing the E-Service Training content, trainers had to learn how to create content on a variety of file formats outside of PowerPoint. Tools such as HTML editors, image editors, multimedia applications or animation programs are now included in the toolbox for trainers.

Not only did the trainers learn and use new tools, but they also developed a new mind set. Trainers realized that content development was not just about slides, but it was about creating training that was engaging, educational, and even fun.

Training developers put themselves in the shoes of their audience. For example, they have learned to anticipate where students may need more clarification on a

topic and then add animation or more diagrams. They are no longer in a classroom to provide explanation. In addition, more collaboration occurs, during, and after training development, to find out if the content was valuable to the audience. The long-term result is that the training developers have learned to involve their audience in the creation and development of the content.

One excellent result of switching from ILT to E-Learning was a reduction in our costs associated with our Third-Party contracts. If we only had one company whose FEs we were training, that company had much more influence on the contracts – they could expect our company to pay more for their services. Now that we have converted to E-Learning from ILT, we can train many more FEs, from different Third-Party companies. Therefore, our service contract fees have gone down and we have much more influence on the contracts. We have managed to increase the “supply” of qualified FEs, thereby reducing our expenses. This would not have been possible using the ILT model of training.

The audience for the EST program has had to adjust to the concept of learning online. The benefits are many but there are some challenges including taking the initiative to actually do the training. Students have to be proactive about learning – those that have relied on superiors to arrange for training have had more trouble taking the initiative.

Another challenge is ignoring distractions. Students must set aside some time to take the training and they have to ignore many distractions. In ILT, in a classroom, students can focus only on the instruction. When taking a course over the web, students have all the distractions of their work environment to deal with. Users may have to spend time before or after their regular shift to complete the training and take the exam.

The benefits to the students of online training usually outweigh the initial challenges. The most important benefit to students is that they do not have to travel to a remote city to attend a three, four, or five day class. The EST program is available anytime and anywhere so, once the students are used to taking the initiative, they can do the training on breaks between onsite visits, from home offices, or in small chunks between meetings, etc.

Students also learn to value the assessment exam as a tool to measure how much they learn. Students become accustomed to seeking out information and learning at their own pace in their own comfortable environment. Creating this behavior of self-initiative not only benefits in the career growth of the field engineer, but the competency of the organizations that employ them.

*8. What was the impact of the practice on your organization? Are the impacts of these behaviors short-term or long-term? Wherever possible please include actual figures related to the practice.*

The EST program has impacted the organization tremendously. It has reduced time to market for products and services, improved developer productivity, reduced costs, and improved FE confidence, resulting in increased value and satisfaction for the customers.

By moving away from ILT and using E-Service Training, the organization has reduced training costs by more than 80% year over year. The organization also reduced the time to develop and deliver a training program from a minimum of 130 calendar days to only 65 calendar days. Field engineer partner organizations, which can now access training via the Internet and CD, have reduced the time to prepare field engineers from 65 calendar days to approximately 15 days.

In addition to reducing the time to develop and deliver a training program from 65 days to 50 days, in the second half of fiscal year 2002, 13 training courses were delivered with just nine developers, an improvement of 178 percent over the first half of fiscal year 2001, when eight ILT training courses were delivered by 14 developers.

Since March 2001, students passed more than 7000 qualification assessments thereby demonstrating their readiness to deliver services for the organization's products. Qualification is beneficial because it enables the company to quickly identify which field engineers are qualified to work with specific products. Qualifying field engineers is a gain for the company's customers too, because they will have more confidence in the field engineers that come to their site to perform on site services; thus adding value to the service contracts they purchased.

### **Shared Learning**

*9. What have been some of the specific lessons learned from designing and implementing this practice for the purposes of continuous internal improvement? Please discuss whether and how this practice might be transferred and replicated both internally and external to your organization.*

We have learned many valuable lessons from the development and delivery of E-Service Training. Some of the most pertinent were how to listen to the audience, how to create a repeatable processes, and the importance of evangelizing the program and its benefits.

In the development and the delivery of E-Service Training, audience comments were always collected and analyzed. The training developer had to learn to listen to the voice of the audience when creating content and to modify the material when it was not relevant. Also it was vital for the training developer to understand what was important to the field engineer audience. With E-Service Training, content is not developed in a vacuum because the audience is more involved. It has helped improved the relationship between the trainer and student, because the trainer has learned how to develop a closer relationship with the student. The

students have been engaged throughout the development cycle which is beneficial for the student and the training developers.

The processes for creating E-Service Training are highly repeatable due to the templates that were developed. Each component of E-Service Training has templates created for its individual design. Inherent in the templates is the process to deliver consistently formatted output. The templates were created from a tasks analysis survey of field engineer's roles and responsibilities. The concept to create the process was quite straightforward: ask the audience what they want and then design and deliver it. From the responses received, the templates were built entirely on the needs of a field engineers job tasks.

Communicating change to people is sometimes a difficult thing to do and it was no different with E-Service Training. People who were used to traditional training have to be persuaded to see the benefits of bringing technical training from the classroom to electronic media and the Internet. Dealing with resistance to the acceptance of the E-Service Training was a challenge both internal and external to the organization. Much of the effort went to communicating the benefits of E-Service Training. The critical element was to gather hard data (such as money or time saved) and present this to key internal/external decision makers (i.e. upper management). A series of "road shows" were conducted for the partners and met the objective of communicating the E-Service Training program. After the key decision makers understood the program and became aware of the benefits, the communication process within organizations carried more force and ensured the cooperative deployment of this program. However, it does not just stop at this point. Just like in advertising, keeping the audience aware by way of regular news, dialogs, or updated training embeds the concept of E-Service Training into their minds, and encourages continuing collaboration.

It takes vision to move away from the ILT model and courage to take on new challenges. One also needs humility to ask an audience for help and honest feedback, diligence to create a "plug and play" process, and resolve to influence those that are resistant to change.

## **Contact**

Chun Wu  
Cisco Systems  
[cwu@cisco.com](mailto:cwu@cisco.com)