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New Tools For The Mobile Hardware Repair Work Force

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Abstract

High customer expectations, services consolidation, and aggressive maintenance pricing are just some of the factors pressuring HP to deliver the best service at the best price. HP's goal is to be a leader in the high-availability customer services marketplace while also offering flexible support services to deliver the best service at the best price. This service needs to span the spectrum of large systems to desktop printers. HP is investing heavily in the hardware support infrastructure and tools for its Customer Engineers (CEs) to meet these demanding customer needs. A recent program has been initiated to update HP CEs world-wide with the CE Toolkit. This Toolkit consists of a powerful set of diagnostic, knowledge and communication tools on a lightweight HP Laptop Computer.

The Changing World of HP HW Repair Business

In the early days of HW computer hardware support (1970s), HP like other computer vendors had great opportunities for selling HW support at premium prices for proprietary systems. HW vendors pretty much had a captive market for their systems HW support. This changed in the eighties with the introduction of "open systems" based on UNIX. In this environment, more and more customers had non-proprietary environments with multivendor content. Customers wanted "one stop" shopping for all their HW support needs. Support pricing came under pressure as more companies entered into the systems support business and HW costs declined. In addition, support cost pricing was made more difficult with all the multivendor products. See "Figure 1: Service Evolution".

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Traditionally HP systems have been primarily in the "middle ground" or the "mission sensitive" market. In the last few years, however, HP has broadened its systems offerings and also its support offerings. In the nineties we have seen the explosive growth of the desktop market. At the other end of the market, HP has seen strong growth with HP systems in the high availability marketplace.

New Challenges for HP HW Support Business

The changes from a proprietary environment to an open systems environment have created many challenges for HP support organizations to adjust to the "new world" of HW support. It became clear our business not only had to adjust for these changes, but, if we wanted to profitably grow the HP HW business faster than the industry average of 4%, we needed to make significant changes in how we sell and deliver HW support.

One key challenge then became identifying and executing strategies for fueling growth while maintaining the high level of customer satisfaction HP support is traditionally known for.

A key obstacle was that in some support segments our costs were just too high. Our hardware support organizations needed to do a better job a segmenting our support services and tailoring the deliverables for specific customer needs. In many cases support was over delivered at the low end while under delivered at the high end.

To address the increased range of our customers HW support needs, differentiated support products with completely different support delivery models were developed. At the low end information was made easily available so customers could help themselves, repairs were out-sourced to lower cost workforces, and couriers used to deliver simple parts (e.g. keyboards). At the high-end investments were made in 24X7 support coverage (labor and parts), account assigned CEs, and more to enhance customer satisfaction.

The Role of Support Technology

In the midst of these changes, it was clear we needed to make some significant advances in Support Technology. In particular, the complete "repair life cycle" from problem call receipt to problem call closure needed re-engineering in light of the new differentiated repair models. Areas identified of particular interest for improved HW support included:

- Data and knowledge management
- Remote support
- Diagnostics
- Communications

It was determined that improvements in these areas would result in:

- Enhanced customer satisfaction
- Productivity and cost savings for both customer and HP

The Customer Engineer Toolkit Project

One area we identified for improvement was to make the Customer Engineer as capable as possible when on-site repair was necessary. Although continued improvements in remote problem resolution and repair are being made, many times a CE is still required to go on-site for additional diagnosis and HW replacement.

Consequently, an investigation was launched in 1994 at the Multivendor Services Division (MSD) focused on enhancing CE capabilities. From this investigation we determined that CEs needed better on site diagnosis and repair tools and the concept of a "CE Toolkit" was born. This Toolkit would be a collection of HW and SW targeted at the HP CE who would be focusing on the mission sensitive and mission critical market segments.

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As a result, a CE survey was conducted and several focus sessions were held to develop a working set of requirements. Key requirements were:

- A standard HW platform (i.e. Windows based)
- Portable (rugged, lightweight, long battery life)
- Includes business applications and diagnostics
- Cost effective, supportable, and integrated solution

A worldwide Toolkit pilot was funded to determine if a general purpose "toolkit", including an

industry standard laptop platform would improve the productivity of HP's field CEs and by how much. Upon analyzing the pilot results, the average time per day saved per engineer was considerably better

than the project team's expectations. The CEs' enthusiastic acceptance of the Toolkit and their ability and desire to enhance it to fit their own particular needs was an important additional benefit. The Toolkit had a built in survey which was filled out by the user and sent weekly to MSD for analysis. The survey asked how the toolkit was being used and how much time was it saving the CE.

Results of the Toolkit Pilot

Results of the Pilot indicated efficiency improvements occurred in any or all of the following areas:

- Repair Order or CSO processing
- problem diagnosis and solution verification
- information access
- skills enhancement
- accessing the HP network infrastructure
- general productivity
- mobility

As management reviewed the pilot results it became clear not only would the Toolkit result in productivity savings, but increased repair quality would occur enabling HP to deliver the best service at the best price. Therefore, a decision was made to rollout the Toolkit to all CEs worldwide.

Key Toolkit capabilities are shown in "Figure 2: CE Toolkit".

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Key Toolkit Benefits and Features

Increased mobility and responsiveness

The Toolkit includes an application (currently being piloted) that enables the HP HW repair dispatchers to send repair orders to CEs anytime/anywhere over multiple communications links including wireless, dial-up, and intranet. This is especially critical in the high availability business. The CE can complete the repair and quickly send the CSO back to HP. Not only does this minimize customer downtime, but by updating parts usage on a "real-time" basis money is saved on parts inventory.

Faster and more accurate problem resolution

The toolkit includes diagnostics for SCSI devices, networks and more. Networks are an area which are growing rapidly in our customers businesses, and yet problems can be particularly difficult to diagnose without good diagnostic tools. In addition accurate diagnosis means problems are fixed correctly the first time. The Toolkit has applications which enable remote access to HP systems for patches and downloads.

Skills enhancements

With self paced training courses on CD ROM, CEs can take training at their convenience. These CDROM courses can use audio and video to improve course effectiveness, although some courses will continue to require "live" interaction with instructors and equipment. In addition mini "just-in-time" refresher training allows the CE to service products on short notice.

General productivity

The toolkit includes office productivity applications for electronic mail, letter writing, expense reporting, time management, and more. In addition CEs have added their own software such as map applications to help them find customer locations faster.

CE Image

Finally, HP believes we have the best service force in the world and they deserve world class tools. Going into a customer's site with the

Toolkit , a CE is confident they have the capabilities to solve a customer's problem correctly the first time.

A Closer Look at The Service Delivery Communications Model

Increasingly Customer Engineers need to be highly mobile and independent, rarely going to a field support office or attending meetings in person. Instead they will spend almost all their time supporting customers. The communications capability of the Toolkit is a critical component for this environment delivering service information "when CEs need it and where they need it". Some of the key mobile information needs are shown in "Figure 3: Service Delivery Communications".

The Toolkit "client" or laptop computer, communicates to the various information sources through a "service information server". The purpose of the server is to access "backend" information sources and send the information to the CE's Toolkit. The transfer of information is both unidirectional (e.g., parts information access) and bi-directional (e.g., CSOs). Both a "push" and a "pull" model is required. For the push model the sender (e.g., dispatch service calls) "pushes" information through the server to the client. An example is a dispatcher sending a CSO to a CE. The pull model when the client asks for specific information. An example is a CE requesting parts information.

Note that this picture also shows a "volume subcontractor" sending and receiving information to the server using Electronic Data Interchange (EDI). This solution supports the lowend business repair segment where subcontractors may do the actual repairs but HP may take the initial customer call.

A Closer Look at Mobile Knowledge Strategies

The increasing number of HP and non-HP systems, products, processes and the associated repair knowledge create a "knowledge gap" between what a CE needs and what has traditionally been readily available.

Therefore it is necessary to examine information delivery strategies for the mobile CE. Some information changes rapidly and some almost never changes. On a different axis, some information sources represent the equivalent of many feet of bookshelves while some information can be contained in very small parcels. See "Figure 4: Information Access Methods".

Generally speaking, information which is relatively small and volatile is best accessed and moved via real time methodologies like wireless, modem, or intranet. Conversely, information that is voluminous and stable is best not moved but rather accessed through some fixed media which is locally available. These conclusions are based primarily upon cost and time constraints. Trying to move and/or search through the contents of the UNIX manual set over an expensive interface (phone lines, wireless....) would take a considerable amount of time because of (currently) available transmission speeds and would be costly as well. Attempting to move or access small amounts of information over an expensive interface does not require that much in time and cost. The CE Toolkit supports information access capabilities which span a great range of volume and volatility because of its ability to use CDROM, modem, intranet, and wireless technologies.

Information which has high volume content and is stable should be committed to CDROM media (and eventually to DVD). CDROM discs have unique characteristics which make them ideal for transporting and accessing large volumes of information which is relatively stable. These characteristics are:

- large capacity of approximately 650 MBytes per plate. The new DVD technology will hold about 7 to 8 times this volume per disc.

- light weight and stable media.

- can deliver information at fairly high streaming data rates (an 8x drive can stream at about 1.2MBytes per second)

- inexpensive to replicate - less than \$1 each in quantities of 500

A problem with CDROMs is keeping them current and the associated distribution problems to a mobile workforce. CEs don't have much time to manage CDROM updates. The Intranet is increasingly diminishing the need for CDROM based searchable data bases. The costs to update intranet data bases are much lower than producing and distributing CDROMs, and more importantly new information is instantly available. CDROM subscription services, however, will continue to be important for content rich in graphic and video. Intranet access speeds will make access to high volume data painful.

When the technology is available, a two level approach could be used which consists of periodic CDROM updates augmented by on-line, real time information accessed via the web or intranet.

Relatively compact information which changes rapidly should not be placed on CDROM. While CDROM discs are generally good media for transporting information, the process of mastering, cutting, packaging and distribution takes too long for information which changes rapidly. The CDROM disc would be obsolete before it reached the CE.

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Conclusion

As the HW support business and our customers' needs are constantly evolving, HP is investing in the support infrastructure to meet these needs. The CE Toolkit is designed to enable the HP on-site work force to diagnose and repair both HP and non-HP devices by equipping them with powerful tools, in depth knowledge, and versatile communication links. With a large number of Toolkits deployed, the Toolkit has become indispensable to the HP Customer Engineer.

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