HP Help in Customizing Software

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Summary.

Hewlett Packards Office Productivity Division, located in Pinewood, England, is one of a number of HP Divisions to provide a *Special Projects* capability. Special Projects are custom software modifications to standard products to tailor them specifically to an individual companies needs.

This paper looks at the approaches and processes that are required to provide an effective Software Customization capability. It shows the many common threads between customized software development and standard product development and also the areas of significant difference.

This paper will illustrate the factors that make projects good candidates for specials and what makes a bad candidate. It will also show that attention to Quality and Support and the adherence to an effective and understood process for software development is as critical, if not more so, for customized software as it is for standard product development.

The Formation of a Specials Capability

Before describing the mechanism of special projects, it is worth looking back at the major forces which make the availability of such a service necessary.

Over the last 5 to 10 years the Office Automation industry, vendors and customers alike, has undergone a major shift of emphasis. Initially, efforts where concentrated on standalone problem solving capabilities such as word processing and spreadsheets. Recently, the requirement to provide these facilities in an integrated networked environment has become the driving force.

As customers and vendors have become more and more sophisticated in the systems that they build, these systems are becoming mirrors of their organizations. While some companies control their Office Systems from one central location, others have decentralized administration and purchasing policies. While some companies, like HP, use electronic mail as an extension of an 'open door' communications policy, others, such as the military, use it's capabilities to ensure that proper communications channels and security procedures are adhered to. In addition for many companies, their Office Systems, or more correctly their implementation of Office Systems, are their competitive edge.

Increasingly these factors are leading companies to recognize the need to tailor Office Systems for their own individual organizational needs. HPs Office Systems, and those of other major vendors, incorporate a comprehensive suite of 'customization' tools as part of the standard product. And indeed, organizations exist, both internal and external to the vendors, that perform customization work using these facilities.

However, there will always be a more specific and specialized need. There will always be features, performance and behavior necessary to a companies operation of Office Systems, the provision of which requires detailed knowledge of and access to the internal workings of the products themselves.

There are four ways in which this need manifests itself among the major corporations.

1) Leading Edge Projects.
   Often larger companies, in their continuing effort to maintain and improve their competitive edge, embark on projects which have requirements not yet addressed by the product offerings of the major vendors. These companies require help from their vendors in adding the needed capabilities to the products well in advance of when the vendor would be able to release a generic capability.

2) Trailing Edge Projects.
   In contrast, other companies due either to the logistics associated with implementing large Office Systems in their organizations or from a conservative culture, choose to implement those products which are, for the most part, 'functionally stable'. While it would be impractical for a vendor to provide a permanent enhancement process on older versions of all products, for some companies it is an essential and cost-effective requirement.

3) Utility / Tool provision.
   In the larger office systems products, a wealth of 'unsupported utilities' and administration tools grow up around the product. These originate from a wide range of sources; from the development labs, from the vendors support organization, from the vendors own internal implementation of the products, from third parties and from customers themselves. Some of these utilities are of sufficient general use to be marketed as part of the product line by the vendor. Others are specialized and would not justify the costs of 'productization'. Nonetheless, Customers require access to and, more importantly, support of, such utilities as will improve the efficiency of their implementation.

4) Data Structure Access.
   Often, companies require, in order to develop their own applications, access to unpublished data structures and file formats used by the vendors products. Software vendors are reluctant to publish internal data structures for a number of reasons; It establishes a dependence that prohibits future changes and

enhancements and support of direct access to data structures presents a complex challenge. In order to be successful in their own implementation, however, customers require a mechanism to get access to the data they need, in a supported manner.

These factors, catalyzed by a number of specific projects, resulted in Hewlett Packards Office Productivity Division setting up a Special Projects capability similar to that provided by a number of HPs hardware divisions.

Objectives, Charter and Non-Objectives.

It is important in any service to early on, establish the ground rules. With clear objectives and charter it is easier for customers and HP to determine when a Special project is warranted, feasible and cost-effective.

The Special Projects Charter can be expressed as:

"To provide a Service to HP's customers to enhance and extend OPD products to meet their specific business needs."

"To provide a service ...."
Through Special Projects, Customers can commission enhancements to OPD products. They can obtain those enhancements that only they require and can obtain them in a time frame that is appropriate for their business needs.

"... to enhance and extend OPD products ...."
This is an extremely important aspect of Special Projects. Specials are almost always compatible with the general product direction of OPD. Special Projects are, in the main, incorporated into the standard products at the earliest possible opportunity, providing the customer with the same long term support that they would expect from any HP product.

".. to meet their specific ..."
Special projects are undertaken in partnership with a *single* customer and reflect their specific requirements.

" ... business needs"
Special Projects must *always* provide the customer with a significant return on investment.

It is worth noting here that the objective of ensuring customer satisfaction in HP's products is not an objective of specials. Customer Satisfaction is central to HP's product development philosophy. The responsibility for ensuring that satisfaction remains firmly vested in the product development teams.

What Sort of Projects are Good Specials?

Given the creating forces and objectives, it is possible to identify the sort of projects which are *good* specials. This is best done by a few examples.

Case 1 - HPDesk Addressing Mechanisms

The philosophy of HPDeskManager is one of addressing electronic mail users by name rather than by numeric identifiers. Some organizations address business communications to the job function rather than the individual. This ensures that personnel changes do not need to be reflected in the mail directory. A project to enhance HPDeskManager to accept numeric job code identifiers as user names is a good special.

- o It addresses an individual customer need rather than a generic one.
- o It does not conflict with the general product direction
- o Being a small project, it has sufficient return on investment to warrant a special.

Case 2 - Multi-Vendor Electronic Mail Directory.

A large electronic mail network that encompasses office systems from a number of vendors poses a problem in directory maintenance. Each vendor employs different directory mechanisms. While the issue of standardized electronic mail communications is now addressed by the CCITT X.400 standards, the directory services standard (X.500) is some way off a practical multi-vendor implementation. Customers who currently operate multi-vendor networks need to provide a directory linkage on current technology. This makes a good special because:

- o It requires specialist knowledge of the product to open the directory architecture.
- o It is specific to an individual customer in that the mix of mail systems and architecture of the distributed directory would be unique.
- o Provision of automated Directory services is in keeping with the general product direction.
- o While being quite a large project, the impact on a large network more than justifies the cost.

Case 3 - Product Specification Extension.

Occasionally, customers find themselves using a product in an environment outside the product's specifications. Whereas in hardware terms this might mean using a product which has been certified to -20°C, in an environment where temperatures drop to -70°C. In software terms this might be requiring a throughput that is an order of magnitude in excess of the product's specification or extending a products specification to include support for a specific printer or terminal not

previously supported in the standard product. These are appropriate specials because :

- o They require performance or specification in a product beyond that required by other customers.
- o It doesn't conflict with the product or have an adverse affect on other customers implementations.
- o It generates significant return on investment for the customer in terms of either increased throughput or reduced hardware resource.

Projects that are not good specials.

Conversely, there are some projects that are not best handled as specials even though they might initially appear to be.

Case 1 - Low investment return.

A project was investigated to provide a support in HPWord for a previously unsupported printer. In this particular instance, the customer concerned possessed only a very few of these printers. This project turned out not to be a good special. It was a better business decision for the customer to replace the small number of printers with newer models (which they intended to do in the future anyway) than to finance a special.

Case 2 - Not in Line with Product Strategy.

A request to provide, within HPAdvanceMail, a conversion between two third party document converters is a common request. While this is an important requirement for the customer, it does not make a good special project. Support for these third party word processors could never become part of the standard product. A better special project in this case is for OPD Specials to develop a generic converter plug-in mechanism. Then the converter itself could be developed by either customer or word processor vendor or third party or HP Project Center.

Case 3 - Product Dissatisfaction.

A limitation in HPDeskManager's distribution list handling made it difficult to correctly address a user whose name clashed with more than 500 other names. While this limitation is only of issue in very large networks, it does not constitute a special project. Essentially, since this restriction is not a publicized limitation of the product it constitutes a product defect and therefore a solution to this request is the responsibility of the product development teams.

Case 4 - Published Mechanisms

The development of gateway connections between HPDeskManager and other customers own private mail systems is often the subject of specials

requests. In most cases these do not require special project developments since the mechanisms to develop gateways are provided through standard HPDeskManager product features such as Foreign Service and the HPDesk intrinsics. This sort of development is normally better tackled by customers own development staff, a local software house or HP's own Project Center Operations.

A Process for Specials.

In order to have a successful project, a thorough process is required.

In all Special Projects, as indeed in all software development projects, the development of a comprehensive Functional Specification, of the problem and proposed solution, is the most important phase. Such a document can help to guarantee success and lower costs of the implementation by:

* Providing a firm project description and plan.

* Ensuring user acceptance and support

* Minimizing changes and delays

* Enabling productive scheduling of people and other resources.

The Functional Specification is most important for it defines and bounds the problems. This specification determines the total system design from a level above the detail level. Additionally determinations are made of the capability to accomplish the desired end. It is also typically utilized to determine the cost of producing the complete system.

In addition a Functional Specification enables accurate projection of project cost, eliminating the need to add a "risk factor".

Special Projects, like any software development activity, have a Life Cycle. It is important to the success of a Special Project for this life cycle to be clearly understood and agreed to by all parties before the project begins. It ensures that the project is managed efficiently, keeps costs down and ensures that the resultant project accurately reflects the customers needs.

There are five phases to a Special Project, each has its own unique characteristics, and each constitutes a major milestone in the Project life. The five phases are:

Phase 1 - Preliminary Investigation.
The purpose of a Preliminary Investigation is essentially to determine whether there is scope for a project. This is not only from a technical viewpoint but also in terms of the potential costs relative to the business needs of the customer. The deliverables of

Phase 1 are a Functional Specification Proposal. Which includes a *ball-park* estimate of project scope and cost.

Phase 2 - Functional Specification.

This is the most important phase of a special project. It is in this that we conduct a detailed analysis of the project in partnership with the customer.

Typically this would involve one or more working sessions with the customer to determine needs and requirements and gain an in-depth understanding of the problem. This is combined with a period of technical investigation and specification at OPD.

If the results of the investigation reveal that there is a need for a special development, the deliverables of this phase are:

- Scope
  A detailed Functional Specification outlining the architecture, functionality and constraints of the solution and its operation within the proposed environments.

- Cost
  A fixed cost for the development of the project.

- Schedule
  An estimated development and delivery schedule.

These deliverables are encapsulated in a Software Development Project Agreement which sets out, for both parties, the terms and conditions of project development and documents the mutual understandings. In addition, the Specification phase produces:

- Support Plan

  It is an objective of all specials that, at the earliest opportunity, as much of the service as is appropriate will be incorporated into the standard products. This provides the customer with the same long term commitment to support for a special that they would expect for any standard Hewlett-Packard product. There may be components for which this is not appropriate or feasible. These components will be identified in the Functional Specification and may be either handed over, in source code, to the customer or supported long term by a Custom Support Plan (CSP). A CSP is normally put in place for the period after completion of the special up to the time it becomes part of the standard product so that immediately delivery takes place, the Customer has access to the full support resources of HP.

- Acceptance Plan

Since the customer is a major participant in the specification of the project, they must also be a major participant in the verification that the delivered product meets the specification. The last act in the development phase is acceptance testing and it is important that it is planned and understood as early as possible.

Towards the end of the preparation of a Functional Specification, HP and the customer review the project together. This review is an important process for not only does it give both parties the opportunity to discuss and evaluate the proposal but it also gives the customer (or HP) the opportunity to vary any of Scope, Cost and Schedule recognizing that each has an impact on the other.

Phase 3 - Development.

During the development phase HP works with the customer to develop and install the special. It includes all activity from Functional Specification approval to completed acceptance testing. It includes all those aspects of a software development life cycle that are included in standard product development. Test planning, internal design, development, testing, quality analysis progress tracking and reporting etc. are all as much a part of the specials development cycle as for any project. Although Specials tend in general to be smaller than a normal HP development project, they have no less need of a thorough and complete development process and attention to quality. Phase 3 concludes with acceptance tests and delivery.

Phase 4 - Warranty and Special Support.

Upon completion of the development and demonstration to the customer that the product substantially conforms to the Functional Specification, a warranty and Special Support phase commences. During the warranty period (which is typically 90 days), HP and the customer work together to rectify defects and to bring the product further into compliance with the Functional Specification. Special Support, for a period after warranty is optional and is typically covered by a Custom Support Plan (CSP).

Phase 5 - 'Roll-In'.

At the earliest practical opportunity, the Special Product is included in the HP Product Line. This provides the customer with the benefits of long term support and the use of the standard product enhancement process. There are often some components of the special (occasionally all of it) which cannot be included in a standard product. These components will have been isolated at specification phase and a plan for long-term support put in place. Normally the majority of the special will become part of a standard product so that the CSP can be terminated and the ongoing support costs to the customer reduced.

A Special Project Team

As with all projects, a special project is a team effort. However, Special project teams are of significantly different composition than a product development team. There are in fact two project teams, one from HP and one from the customers organization.

The HP project team that is brought to the customers facility is staffed by a Project Manager (PM), Office Automation specialist(s) from OPD and a local Office Automation software support engineer. This team is supported by the product development teams, the division and response center support organizations and the local sales and support team. The HP Project Manager assigned to the project is responsible for the activities leading to the production and delivery of the project deliverables. The HP Project Manager is the focal point of contact between Hewlett-Packard and the Customers organization for the project.

For the Specials process to work successfully, the appropriate people in the customers organization must also participate. As a minimum, a review body consisting of representatives who know the day-to-day operations, procedures and methods both in the MIS staff and the local and remote user community is required. These resources know what is necessary to make their individual responsibilities / functional areas more efficient and effective. It is very important to the project that the customers management identify, make available and communicate their support to the key participants in the review process.

As is the case with all projects, there are many activities which require constant attention. Hewlett-Packard provides a Project Manager (PM) to the Project. The HP Project Manager will drive and direct most of the activities relating to the project, but will need a single point of contact within the Customers organization. Therefore, prior to the start of any project activities, it is be requisite that Customers management select and empower a project manager (PM) to work peer-to-peer with the HP Project Manager. While the customers PM might not be a full time job, he or she must be available when needed to help schedule, coordinate, meet, report, communicate etc. the customers resources and activities.

Summary

The availability of a Specials capability within the Office Productivity Division has opened a number of opportunities for HPs customers. With such a capability the ability for a customer to address a business need with HPs Office Products is not restricted by the closeness of fit between the standard product and the customers needs. It is restricted, as it should be, by the ability of the customer to analyze and justify the return on investment. If a facility is required by a specific customer it only needs be justified in terms of their own organizational costs and benefits not those of entire installed base for the vendors products.

The Specials Life Cycle and process described above reflects the commitment we have to doing the job right the first time. It is our experience that to do it right both the customer and HP will need a basis for agreement as to the user's requirements and business goals for the project. HP believes that a detailed, agreed functional specification document is essential to the success of the project. The finished document provides the customers management with a level of detail necessary to ensure that project expectations are identified and possible to be achieved. It also serves as a project guide book and helps both parties readily identify issues in a timely and appropriate manner.