HP Task Broker Version 1.1 Sales Guide
For Internal Use Only

[Figure: cover, photo (screen shot)]

(Authorized for Channel Partners)

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## Introduction

The HP Task Broker Sales Guide is a self-paced learning tool that will help you sell Task Broker to appropriate accounts.

## Organization of this Guide

The HP Task Broker Sales Guide contains an introduction and seven separate units:

Unit 1: One Minute Summary - Describes Task Broker features and benefits.

Unit 2: New Features in Version 1.1 - Includes plans for the Domain version and interoperability issues with the prior version.

Unit 3: Markets and Opportunities for Task Broker - Discusses two areas of opportunity for Task Broker: Computational Clusters and DCE Interoperability.

Unit 4: Ordering Information - Lists part numbers and option information.

Unit 5: The Competition - Describes Task Broker's competitive environment and the relative advantages of the Task Broker concept.

Unit 6: Future Directions - Describes future enhancements planned for the product.

Appendix: How Task Broker Works - Gives a quick overview of how Task Broker locates servers and distributes jobs.

## Unit 1: One Minute Summary

HP Task Broker is a tool for distributing computational tasks and enables users to transparently distribute compute jobs to other machines in the network.

[Figure: page 1, illustration (A job is distributed transparently across the network) Caption: Task Broker Computing]

With HP Task Broker, the user can:

- Distribute computational tasks among heterogeneous UNIX-based computer systems
- Benefit from greatly improved productivity, access to more compute power when needed, and reduced hardware costs
- Perform computational distribution without any changes to the application itself
- "Load Balance" a group of computer systems by transparently finding the most available server for a computational task
- Transparently target specific servers most appropriate for a specialized task
- Form a "computational cluster," which can replace a far more expensive mainframe or supercomputer, and provide increased availability, scalability, and reduced costs
- Create a "heterogeneous cluster," allowing networks of machines from multiple vendors to interoperate in a completely transparent fashion

HP Task Broker runs on HP 9000 Series 300, 400, 600, 700, 800 computers running the HP-UX operating system, and Apollo DN 2500, 3500, 4500, 5500, and DN10000 workstations running Domain/OS. In addition, Scientific Applications International Corp. (SAIC) has ported Task Broker to the Sun3, Sun4, and SPARCstation platforms.

## Unit 2: Features and Benefits

Task Broker Features

Task Broker offers a number of features that provide more efficient access to compute resources across a network:

o Application code does not have to be recompiled to be run by Task Broker.
o Task Broker automatically sends results back to the submitting machine. Mail messages can be sent to notify the user that the job is complete.
o Servers and clients are added to the network equipped with Task Broker simply by hooking the machine to a LAN, updating the central Task Broker configuration file to include the new client/server, and starting the Task Broker daemon on the new machine.
o Task Broker provides an accounting of services used on a given server.
o The number of applications running on a computer can be limited.
o Users can control the use of their computer as a server. For example, users can specify that their workstations be accessed only at night.

Task Broker Benefits

Task Broker has the following benefits:

o More efficient access to compute resources (i.e., load balancing) -- Task Broker assigns jobs to the server node, whether a specialized server platform or unused workstation - whichever is most appropriate at the time. For example, a high-end compute server is obviously better for solving compute-intensive simulations such as finite element analysis. However, if this server is overloaded and a workstation that could do an adequate job is left idle, the overall productivity of the computer environment suffers.
o Improved productivity and products -- By allowing multiple compute jobs to run in parallel or on faster systems, performance is dramatically improved. Users may use the time saved to run more jobs in a given time period to improve product design or shorten development time.
o Greater flexibility and ease of accessing multiple servers -- The fact that all users get access to each other's idle cycles makes for a winning proposition for the entire work group.
o Access to heterogeneous computers -- You can build a cooperative computing environment. For example, a task submitted from an HP 9000 Series 700 workstation may be serviced by a Series 300 or SUN4 workstation, or vice versa.

Unit 3: New Features in Version 1.1

Features

The new release of Task Broker is HP-UX only. It is an attempt to significantly improve the product's ease of use, especially in the areas of configuration, setup, and administration. Specifically, Task Broker now has the following additional features:

o A Graphical User Interface (GUI) has been added, greatly improving the product's usability. The GUI provides a visual interface to most of the Task Broker command set and configuration information. Task Broker administration is greatly simplified. In addition, task status, monitoring, and control information is provided for the end user.
o Centralized configuration management has been added to the new release. This feature allows the entire Task Broker installation to be initialized using a single group configuration file, and to be administered from any single machine site.

An integrated forms-based configuration editor provides for easier and more robust administration of Task Broker information. The configuration syntax is simpler and checking is done during the editing session.

o An online, context-sensitive help sub-system, utilizing HP's Cache Creek product, contributes to Task Broker's overall ease-of-use by providing usage information when it's needed.

HP-UX vs. Domain

HP Task Broker version 1.1 is an HP-UX only release. It is planned that the product will ported to the Sun platform by SAIC. The intention is to continue to enhance the HP-UX version and to discontinue further enhancements to the Domain version of the product. There are several factors motivating this decision:

o Increased focus on HP-UX product. The preference is to focus our R&D resources on continuing to enhance the HP-UX version. This will help to increase the customer responsiveness of the Task Broker development team.
o Configuration limitations with Domain. This version of Task Broker has several Motif-based ease-of-use enhancements. Although use of the GUI is optional, Domain configurations of 32MB of memory would be necessary to run the associated software. This would limit the number of Domain machines able to make use of the new functionality.
o Interoperability will continue. The Domain Task Broker client/servers will continue to interoperate with the clients and servers of the new release. Therefore, the Domain version can continue to assist in the Domain to HP-UX migration task with no loss of functionality for the typical Task Broker user on Domain.

## Interoperability with Task Broker Version 1.02

The new Task Broker release is being designed to work in existing Task Broker installations, thereby enhancing the functionality of those installations. Therefore, the new version will interoperate with the previous version of Task Broker, specifically Domain, HP-UX and Sun (available from SAIC) version 1.02.

Interoperability in this context is defined as follows:

- The new version of Task Broker will be able to use existing scripts, such as configuration files and submit scripts, without modification
- A Task Broker installation can have new and old daemons coexisting and interoperating -- i.e., the new Task Broker daemons will be able to communicate with existing daemons to perform server and client functions, and vice versa

Of course, existing scripts may need to be modified to take advantage of the features of the new release, but changes are not required for the new version to be used with today's functionality.

For example, in a mixed Task Broker installation consisting of new and old versions of Task Broker, the new HP-UX version of Task Broker can be installed on the machines running HP-UX, any of which could then be used as a Task Broker administration node. In this way, the new administrative features can be taken advantage of with minimal effort and without requiring the upgrade of all Task Broker nodes.

## Unit 4: Markets and Opportunities for Task Broker

### Computational Clusters

A market opportunity with great sales potential is that of Computational Clusters. A Computational Cluster is a group of workstations networked together and used as a virtual single computational resource. The motivation behind this concept comes from customers who are downsizing from a single compute server, such as a mainframe or supercomputer, or customers who have compute-intensive tasks that can execute more effectively on a cluster of workstations, because of the desire to achieve parallelism or use a centralized server.

Task Broker enables the cluster to act as a virtual mainframe, rather than as a group of discrete machines. Task Broker allows the cluster to be viewed by its users as a single resource, and can significantly increase the performance of the cluster by locating the most appropriate compute resource within the cluster.

The advantages of the computational cluster over the resource that it is intended to replace are several:

- The cluster can be considerably less expensive than a mainframe
- The cluster is modular and, therefore, more easily upgradable
- The cluster can consist of workstations that may already exist in the workgroup

HP has a partnership agreement with Convex to jointly market Computational Cluster hardware and software. Although NQS+ has been ported to run on HP Series 700 workstations, this product is only available through Convex. Task Broker has not yet been ported to run on Convex hardware. A recommendation of NQS+ versus Task Broker should be based on customer preference after clearly describing the advantages of each.

For more information on Computational Clusters, contact Diana Headrick at telnet 436-5212, or refer to the Computational Clusters Sales Guide part number 5091-7428E.

### DCE Interoperability

The Distributed Computing Environment (DCE) provides a common framework for distributed application development and execution in a network of heterogeneous computer systems. Today's Task Broker already benefits from, and can make use of, many DCE services. Since DCE was designed to provide benefits without necessarily requiring changes to existing applications, Task Broker may invoke applications that explicitly use DCE services without modification. Specifically:

- Remote Procedure Call -- An application written using RPC can be distributed to a workgroup by Task Broker without modification to either the application or to Task Broker.
- Time Service -- The host machines in a compute group can use DTS to keep their clocks synchronized. This can greatly simplify the management of the Task Broker installation since, for example, its daemon log files will have their time stamps synchronized.
- Directory Services -- Applications that make use of CDS and GDS can be managed by Task Broker without restriction.
- Threads -- As with RPC, a multithreaded application can be distributed by Task Broker without modification.
- Distributed File System -- This feature is not only compatible with Task Broker, but will greatly simplify distributed access in the Task Broker workgroup.
- Diskless Support -- Task Broker will operate on diskless machines without modification.

For Task Broker to take further advantage of DCE services, such as by use of the security service, it must become fully integrated with DCE. This will require internal changes to Task Broker, which are planned for the future.

As is clear from the above, Task Broker and DCE are complementary and have the potential of enhancing each other's services in their current form. For more information on this subject, contact Laura Boivin at telnet 436-4484 and request a copy of "Task Broker and DCE Interoperability."

Unit 5: Ordering Information
HP-UX Product Information (New Release)
B1740L Task Broker License to use up to 10 computers
B1741L Task Broker License to use up to 50 computers
B1742L Task Broker Site License
B1732B Media and Documentation for Task Broker HP-UX Software. Requires prior or concurrent purchase of B1740/1/2L. Must specify media option.
#AAHSoftware on 4mm DDS DAT tape
#AAUSoftware on CD-ROM

Domain Product Information (Unchanged)
B1740L Task Broker License to use up to 10 computers
B1741L Task Broker License to use up to 50 computers
B1742L Task Broker Site License
B1743A Media and Documentation for Task Broker Domain Software. Requires prior or concurrent purchase of B1740/1/2L. Must order Opt. AAQ
#AAQSoftware on 1/4-inch cartridge tape

Unit 6: The Competition
Task Broker is a software tool that provides the user with the ability to distribute "compute jobs." The assumption is that in most cases the user is interested in:
o a tool that will require no changes to the application to perform its function.
o having the job executed as efficiently as possible, and is not interested in controlling the placement of jobs.
o distributing tasks at the application level, for example, rather than at the procedure level.

This puts Task Broker in the class of software tools that assist in "batch processing," with the following competition:
NQS and NQS/Exec from Sterling Software
NQS+ from Convex Computer Corporation *
Load Balancer from Freedman Sharp and Associates Inc.
Load Leveler from IBM
DQS from Florida State University
NetMake from Aggregate Computing Inc.

The primary difference between Task Broker and the other products is that Task Broker is designed to operate in a truly distributed environment. The competition is based on the concept of a centralized compute server, such as a supercomputer, being accessed by multiple users.

The compute server in the NQS model either queues and executes the job locally, or dispatches the job to another server. The central dispatching machine determines server availability through the use of a locally resident data base file that tracks such parameters as CPU and memory utilization of the server machines. This architecture has the disadvantage of having the network information reside on a single server, which makes the entire system dependent on the availability of that machine.

Task Broker's advantage is that it is not dependent on any single machine for the successful operation of the compute group. Any single machine failure results in the failing machine being automatically avoided by Task Broker's bidding mechanism (for an explanation of how Task Broker works, see the Appendix).

For a more complete discussion and technical comparison of Task Broker to other competitive offerings, contact Laura Boivin at telnet 436-4484 and request a copy of "Task Broker Competitive Information."

Unit 7: Future Directions
Service Broker
Task Broker's ability to transparently distribute jobs to optimum server locations would make a useful addition to many third-party applications. Bundling Task Broker into their application would allow software vendors interested in distributing computational tasks from within their application to do so by using Task Broker's services directly.

The framework for this interface is in place in Version 1.1, and is intended for completion in the next release. This product will be called "Service Broker."

This will represent a new market for Task Broker, and will fill a pressing need for many application developers: direct access to the compute resources of the network. An application can use the Service Broker Application Programming Interface (API) to convert from a "standalone" to a "client-server" compute model without having to build the underlying infrastructure. This would result in greatly reduced development costs for the third-party application developer, and a more competitive product.

Ideal customers for this product are those whose applications involve compute-intensive operations, and who would like to distribute those operations into a computer workgroup transparently.

## Internationalized Versions

Version 1.1 has the framework for a future internationalized version of Task Broker. Using this framework, the next release of Task Broker should be localizable, i.e., GUI input and output text could be translated into the local language, including the online documentation.

## Additional Platform Support

Task Broker is currently ported to HP-UX, Domain and Sun. (The Sun port of Task Broker is available through SAIC.) Additional platforms are planned and will include the IBM RS6000 and SGI.

## Appendix: How Task Broker Works

A machine running Task Broker can act as a client, a server, or both. A Task Broker client is a submitter of jobs into the compute group; a Task Broker server is a machine that provides services for clients. A single instance of Task Broker, called the Task Broker "daemon," resides on each client and server.

[Figure: page 8, illustration (A job request goes out across the newtork
and is executed by the most suitable available system.)
Captions: Service Request, The Winning Bid]

Each server provides one or more "services" for the workgroup, each of which represents a specific compute job. Servers can provide any number of services, and services can be provided by one or more servers (which would be necessary to load balance a compute group).

The Task Broker clients and servers interact to distribute and execute jobs in the following manner:

- A user submits a request for a service to the local daemon (client)
- The daemon sends a message to the group of servers, requesting bids to service the submitted job
- The servers compute their bid, or "affinity value," for the requested service, based on their availability to accept the job
- The client waits a preset amount of time for the servers to return their bids, and selects the server with the highest bid
- The server executes the job according to the instructions in the local execution script
- At job completion, the server returns the output files to the client which are then placed in the users working directory.

A few important points to remember from the above description are:

- Since the bids are computed dynamically for each job request, the jobs are automatically serviced by the most appropriate machine
- A failing machine will automatically be avoided by this bidding mechanism
- Since the same machine can act as both a client and a server, the local daemon can service requests if it is the most appropriate machine

For more detailed information on the inner workings of Task Broker, refer to the product manuals.


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