COMPAQ

Software Product Description

PRODUCT NAME: LinkWorks V 3.2 & LinkWorks WebWorker V3.0 SPD 60.34.05

CONTENTS

DESCRIPTION

LinkWorks Products

LinkWorks is available as the following products:

- LinkWorks Server 3.2
- LinkWorks Server 3.2 bundled with database engine
- LinkWorks Client 3.2
- LinkWorks Client 3.2 bundled with database license
- LinkWorks WebWorker 3.0
- LinkWorks Developer's Source 3.2

Short Description

LinkWorks is a solution framework for mission-critical, document-based business processes.

LinkWorks integrates personal productivity tools on many desktop types with business specific functions.

The LinkWorks framework is pre-configured (out-of-the-box) with generic functions like role-based access control, compound document management and workflow. It can be tailored to specific customer needs using a powerful workbench. The object-oriented architecture of the framework allows for the inclusion of business-specific "software components" using a programming tool of choice.

LinkWorks-based solutions can be implemented standalone or on top of industry-standard communication infrastructures like Microsoft Exchange and the Internet.

Product Positioning

LinkWorks was introduced in 1994 and was designed at the outset to use distributed object technology, with components that execute simultaneously on both the client and the server. LinkWorks Business Objects are standard documents that are encapsulated by their business rules. This means that their content is protected against illegal use, their storage structure is protected against procedural mistakes, their attributes are dynamically integrated with external systems and resources, their progress is monitored and controlled by a transaction based workflow system, and their history is fully traceable using an audit log. LinkWorks provides both a Business Object repository, in which the characteristics of all objects are registered, and a business transaction engine that takes care of the secure execution of the related process steps. The framework concept of LinkWorks allows small "applets" to be added that can execute project specific functions. This makes LinkWorks the ideal platform for developers to build adaptable and maintainable solutions.

With these qualities LinkWorks is positioned as a framework to support solution providers. Solution providers can be value added resellers with specific applications built using LinkWorks, system integrators using LinkWorks' integration capabilities, and in-house IT departments.

LinkWorks' capabilities that are unique to the product include:

- LinkWorks allows the framework to be extended,
- it is possible to override or replace functions within the LinkWorks framework,
- field upgradability of solutions without rebuilding/recompiling/relinking the total solution,
- packaging developed solutions into LinkWorks Software Components that can be electronically shipped and installed through simple drag and drop action.
- integration with existing repositories such as an image document repository, an ALL-IN-1 file cabinet or a Lotus Notes database repository.

LinkWorks means a radical re-thinking of how information is managed, distributed, and shared within an enterprise. Both the corporate management of information and the user interaction with information are greatly simplified, providing major gains in productivity for organizations.

LinkWorks supports a broad choice of desktop clients (Windows, Macintosh and Motif workstations), databases (CA/Ingres, Informix, Oracle and SQL Server), and servers (Compaq, HP, IBM, and Intel-based). This protects investments in existing technology. In addition, LinkWorks may be used over the Internet using a WWW browser.

Solution integration

LinkWorks V3 offers a fully object-oriented environment to develop, distribute, and deploy group-enabled client/server solutions. Business Partners and ISVs can build solutions upon LinkWorks using the following facilities:

- LinkWorks Script Language: a platform-independent, BASIC-like language. This can also be used to automatically record, edit, and replay sequences of user actions.
- Applications Plus Objects: extensive and powerful APIs enable application developers to extend business applications with LinkWorks functionality. The APIs support interaction between these applications and LinkWorks objects such as documents, business plans, and invoices. The APIs use industry standard mechanisms such as DDE, OLE2, and DLL/shared libraries.
- Class Programming offers the possibility to extend or change the LinkWorks functionality. Class Programming extends LinkWorks itself, not the integrated application.
- A sophisticated distribution and installation mechanism. Solutions that are based on an extension of LinkWorks with additional functionality, or a specific customization, can be extracted into so-called Software Components. Software Components can be distributed and installed through a simple runtime drag-and-drop action.
- LinkWorks includes a comprehensive graphical workbench, including browser, debugger, and profiler, for the developer of LinkWorks value added.

Features

- Client/server software running in heterogeneous configurations
- Access to LinkWorks functions using a WWW browser
- Powerful object-oriented development and deployment environment.
- Comprehensive scripting language
- Integration of LinkWorks functionality with external applications
- Extension of LinkWorks functionality itself
- Software Components mechanism to support deployment of customized solutions
- Built-in integration for several mail clients, ALL-IN-1 access, and X.500 directory services
- Improved user interface to handle increasingly complex objects
- Multi-platform support.

Benefits

The generic groupware functionality of LinkWorks, combined with its advanced programmability, gives the following distinct benefits:

- LinkWorks protects existing investments, as it is possible to integrate almost any personal, group, or production application as part of the LinkWorks solution, often with very limited effort.
- Customer solutions can be realized using a fraction of the effort required to implement solutions using more-traditional products and development environments.
- Customer solutions can be precisely tailored to specific customer needs, increasing the productivity of office workers.
- The effort required to deploy and install customer solutions is minimized.

LINKWORKS END-USER FUNCTIONALITY

The LinkWorks services

LinkWorks provides basic facilities to support:

- access control, version control, archiving, and retrieval of information
- sharing of information with other LinkWorks users (sharing, mail)
- controlled flow of information (workflow)
- communication with users of other systems
- easy to use graphical working environment (desktop)
- centralized system management

Users can create, copy, edit, rename, and delete objects. Objects can be basic objects such as a document or form or compound objects such as a folder, a drawer, or a cabinet. New documents are based on customizable templates, and users can have their own templates for special types of documents, such as forms, plans, and reports.

Attributes are defined for each type of document or filing container. For example, a trip report can have the attributes destination and expenditure, which contain the name of the city visited and the cost of the trip. Users can assign one or more keywords (from a catalog of keywords) to a document or filing container. These can be used as search criteria when the document or filing container must be retrieved.

Users and Roles

A business process includes many users that may be part of different organizational units. In fact, most users have a specific role within that organizational unit that requires them to participate in a process. LinkWorks allows the definition of individual users, roles and organizational units. Each user can be a member of multiple organizational units and have multiple roles. This many-to-many relationship between roles, users and organizational units makes it possible to reflect many types of organizations and their business processes within LinkWorks.

Business processes change over time and individuals who have a particular role in a process could change position or leave the company. These changes are managed as part of the day-to-day tasks of the LinkWorks Administrator using the LinkWorks administration tool. With the introduction of LinkWorks into an organization it remains important to setup the initial layout of the organization. In particular the use of roles (rather than specific user names) allows processes to be defined that are less likely to change and that can be applied in more situations.

Filing / Archiving

Documents can be filed in a hierarchical structure of filing containers, such as cabinets, drawers, folders and sections. Users can create filing containers on their desktops. Each filing container can contain filing containers of the same type or lower. Therefore, a cabinet can contain other cabinets, drawers, folders and sections. A drawer can contain other drawers, folders and sections. A folder can contain other folders and sections. And a section can contain other sections. The system can also be customized to provide as many filing levels as required.

Documents and filing containers can also be put into the LinkWorks archive. Objects stored in the LinkWorks archive can be retrieved using the Search facility.

Searching

The search facility can be used to find objects that are located on the user's own desk, on other users' desks in the same LinkWorks domain, or in the LinkWorks archive. Users will find only those documents or filing containers for which they have the appropriate access rights. A variety of search criteria can be specified, including object class and name, owner, creation date, keywords, a string of text, and deadlines in a workflow. A set of search criteria can be saved as a search form for regular use.

Sharing

Working in a group implies the need to share information. LinkWorks enables the sharing of objects with other LinkWorks users. A shared object is an object that can be accessed by more than one user. It is represented by more than one icon, either within one user's environment, or on different users' desks.

Users can turn objects on their desks into shared objects by using the mail menu or by placing the objects into a shared filing container. All objects that are contained in a shared filing container are also shared.

All users who share an object have the object on their desk, and they can access it simultaneously. A shared document that is opened for edit by a user is locked by that user, but is available to the other users in read-only mode. Changes to the document are immediately available to all the users who share it.

Users can also register interest in an object, so that they are notified when other users make changes to the shared object.

Version Control

Users can keep track of progress, and keep versions of the documents they work on, without the need to copy or rename each version. A version of a document can be saved, read, edited, copied, or deleted.

LinkWorks provides automatic version control for shared documents. When a shared document is closed after editing, a new version is created automatically. All previous versions are still available to other users.

Security

LinkWorks controls all access to LinkWorks objects. An access right is assigned to an object when the object is created. A user’s permission to access an object depends on:

- the owner of the object
- the organizational relation between the user and the owner
- the role of the user
- the “access rights” of the object.

Types of permission granted to individual users or organizational units include the right to read, to share, to find, to send, to edit, to sign-off, to archive and to remove.

Security of objects accessed over the Internet using a browser is not optimal. Although the Connector uses authentication, documents may be held in the browser and proxy caches, which are outside the control of LinkWorks.

Access Control Lists

Access Control Lists allow for the easy definition of cross-organizational access profiles. The use of the organizational structure as a starting point simplifies the process of defining the security structure. Individuals can be identified by their role in the organization. As a result, Access Control Lists are also easy

to maintain. If, for example, a user who was previously assigned to a specific role leaves the organization, a simple reassignment of the role to a new user allows this new user to access all relevant information without further changes.

In version 3.2 a user can be a member of more than one organization. This makes LinkWorks security mechanism fit in complex structures, such as matrix organizations.

LinkWorks Mail

LinkWorks mail enables the customer to send LinkWorks objects to other LinkWorks users. It also provides a Quick mail facility that enables users to send short messages (not including LinkWorks objects) to other users. LinkWorks mail includes the capability to address users external to the LinkWorks domain, connected via X.400 or SMTP and to look up address information through X.500 directory services.

LinkWorks objects can be attached to a mail message. These objects can be forwarded, copied, or shared (objects sent via external mail will always be copied):

- Forwarding an object means that only the recipient will have the original object. The sender does not keep a copy of the object.
- Copying an object means that the sender keeps the original object, and each recipient receives a copy of the object.
- Sharing an object means that the same object can be accessed simultaneously by the sender and the recipient(s).

Users can address mail to other users, roles, organizational units, or distribution lists. The user can ask for a confirmation of delivery, indicate that a reply is requested, and set a deadline for the reply. Distribution lists can include internal and external addresses and these lists can be stored in address books. Users can send a document or filing container to all distribution lists in the address book by dropping it on the address book icon.

A user may have multiple desks, but only a single mail inbox and outbox. Users can reroute their mail to another user, to cover periods when they are absent from work. To reroute mail, a user nominates another user as a substitute, and specifies which types of mail have to be rerouted and the dates when the user will be absent.

Integrated Mail

LinkWorks V.3 provides for integration with TeamLinks mail, cc:Mail, and MS Mail on Windows 3.1 clients; with Microsoft Exchange on Windows 32-bit clients; and with AltaVista mail on Windows NT. This means that if a customer has a set of requirements that cannot be met by LinkWorks mail, or already has one of these other mail packages in use, LinkWorks mail can be replaced completely. This solution offers all the advantages of the capabilities of the dedicated mail package, with the additional advantage that the mail messages can be handled as regular LinkWorks objects.

Integration with Microsoft Exchange also allows OLE drag & drop both to and from Exchange; and sending to LinkWorks users and non-LinkWorks users.

LinkWorks objects can be sent using the integrated mail system by simply dragging the object to the mailbox. A special mailbox, representing the integrated mail solution, is displayed on the desktop. Integrated mail supports copying (multiple copies of the object will exist) and sharing (a single object with multiple access facilities) of objects. Integrated mail enables the user to mail compound objects to users internal and external to the LinkWorks domain.

Incoming messages will show up in the inbox of the mail subsystem. One or more messages can be selected and transferred to the LinkWorks desktop, or to a pre-defined folder, using a simple button-initiated operation.

External mail has Mime support on UNIX and NT.

Workflow

LinkWorks supports workflow processes by enabling object routing, the setting of deadlines for different stages, and the signing of documents. Any document or filing container may be routed.

Users can define the flow of an object by attaching a pre-defined workflow blueprint to it. This defines a sequence of stages through which the object must pass. Each stage corresponds to either a user's desk or an organizational unit. The user can provide instructions and can set a deadline for each stage.

When a user has completed a workflow stage, he can drop the object in the mail outbox on his desk. LinkWorks then automatically routes the object to the next user or organizational unit within the same LinkWorks domain defined in the workflow.

A workflow can branch into parallel flows. This automatically makes the object a shared object. A condition can be set to indicate which branch of the workflow the object must take. Parallel flows can also be joined. This is implemented by introducing pre-conditions and post-conditions for each process step. Post-conditions are used to test whether the current stage is complete. Pre-conditions are used to test whether the next stage will accept the object.

The System Administrator can create several blueprints that users can select from. Users can attach a blueprint to an object or insert a blueprint into the existing workflow of an object.

Approval

Documents or filing containers can be signed at three approval levels: they can be initialed as "seen", they can be signed for approval, and they can be signed off. When a document is signed off, the status of the selected object is changed to ”Final Form”. With the default installation this means that the object can no longer be modified or deleted.

Directory Services

The LinkWorks V3.0 client includes an integrated Directory User Agent, providing access to any LDAP compliant directory server.

System Administration

LinkWorks system administration consists of the setup and the day-to-day maintenance of users’ LinkWorks environment. It is carried out by one or more users acting as the LinkWorks System Administrator. LinkWorks provides several system administration and system configuration tools to do this.

The System Administrator maintains the following elements of the LinkWorks environment:

- the users
- the organizational structure
- the set of objects the user is allowed to use, with their associated icon, application, and attributes
- the applications used to create and edit their documents

- the addresses of LinkWorks users
- the catalog containing the keywords that users can associate with objects
- the client workstations

The System Administrator defines the following elements of each user's profile:

- the organizational unit to which the user belongs
- the user's access rights
- the user's right to perform system administration tasks
- the session profile, for example the times at which the user is permitted to use LinkWorks
- the workstation(s) the user may use to log in to LinkWorks
- the user's initial desk and additional tools. Menus, buttons, icons, and integrated applications available as tools on the desktop are configurable. The System Administrator can create several types of desks and select a different type of desk for each user.

For users who access LinkWorks using a web browser, the System Adminstrator can define the user interface in terms of screen layout, button assignment and other properties related to the browser.

FUNCTIONS WHEN USING A WEB BROWSER

The LinkWorks WebWorker allows a user to access the LinkWorks desk over the Internet from a Web browser. Although the functionality is comparable to using a LinkWorks client, there are some restrictions. These restrictions are due to the difference in the access mechanism and can be attributed to:

- browser limitations
- performance constraints

The functions available in LinkWorks WebWorker V3.0 provide a means of viewing the business process, as follows:

- Document Viewing
- Document Check-in/Check-out
- Navigation through the desk
- File upload and import.
- New version upload and import
- Creation of compound objects and notes
- Search
- Keywords
- Attribute access
- Event Notifications

WebWorker V3.0 also provides the means to administer LinkWorks Users. This can be done both interactively and in a batch oriented way. The batch oriented way provides the means to synchronize the users with an NT or UNIX system group.

THE LINKWORKS SOLUTION INTEGRATION FRAMEWORK

LinkWorks is a highly customizable integration framework for the automation of document-based business processes. The framework contains all the elements required as a basis to build customer solutions, such as access control, event tracking and notification, version control for group authoring, electronic mail, electronic signature approvals, and automation of workflow processes. The extensive features for access control allow the establishment and maintenance of a secure environment in which work is coordinated.

LinkWorks provides a virtual desk for the LinkWorks user, which is a personalized graphical environment. This desk is modeled on a real world office and can be made available on any system across the entire LinkWorks configuration.

In general, a customer solution provides an implementation of the following aspects:

- the presentation of the user's desk (for example, menus, icons)
- the generic user functionality (for example, text editor, mail, archiving)
- the implementation of a process that describes the stages of work to be done
- the specific user/customer applications and functions
- infrastructure aspects such as access control and shared use

The out-of-the-box LinkWorks framework provides the generic functionality for most of the solution aspects mentioned above. This allows solution providers such as Value Added Resellers (VARs), Independent Software Vendors (ISVs), Business Consultants or IT departments to focus on the implementation of the branch or customer specific applications and functions, resulting in shorter implementation times and hence lower costs.

Developing a Solution

The LinkWorks concept of a framework means that the solution provider can distinguish between the following phases when he introduces a customer-specific solution on top of LinkWorks:

1. Reflect the organizational structure
   Load the organization into LinkWorks: define users, teams and departments and provide workflow blueprints to reflect business processes
2. Customize the built-in generic LinkWorks functionality
   Configure the LinkWorks environment without changing or adding functionality. An example is to configure the user desk by changing the definition of access rights or menus to reflect company policies.
3. Add and integrate specific customer functionality to the LinkWorks framework.
   Program new applications that access LinkWorks objects, integrate existing products, reuse other (horizontal) LinkWorks solutions and add or change the methods of LinkWorks objects to enhance their behavior.

Development techniques

LinkWorks provides four techniques for customizing and developing new functionality:

- Application Plus Object (APO) for integrating external applications with LinkWorks
- Class Programming for adding specific functionality by extending the LinkWorks built-in functionality
- LinkWorks Configuration for customizing the LinkWorks functionality to the specific customer requirements and encapsulating products from other suppliers
- LinkWorks Scripts for developing small applications (such as prototypes and test scripts) and automating repetitive tasks.

Each of these techniques is provided as a combination of tools and interfaces. Each one is optimized for one or more of the types of solutions that can be realized with the LinkWorks Framework. Tighter integration is often possible through a combination of techniques. These relationships are shown in the table below.

LinkWorks Solution Development Techniques

Type of customer solution	Application Plus Object	Class Programming	LinkWorks Scripts	LinkWorks Configuration
Integration of customer applications	•	•		•
Extending or changing LinkWorks functionality		•		•
Encapsulation of standard products				•
Automation of repetitive tasks			•	
Prototyping and testing			•	
Automation house-keeping tasks	•		•	

Applications Plus Objects

Through the LinkWorks APO concept, customized applications can create, access, and manipulate LinkWorks objects, providing a seamless integration. The APO concept is targeted at the professional Application Builder, who can use it to integrate business/customer applications within LinkWorks. Using the APO concept, these applications become LinkWorks aware.

The synthesis of business applications and LinkWorks objects is a powerful combination. The integration mechanism that allows the business application to access and control LinkWorks objects is called APO Plugs. It is an important mechanism to be used by the professional Application Builder.

APO Plugs provide applications with the ability to create and manipulate LinkWorks objects. Through APO Plugs applications that have been made LinkWorks-aware can access generic or extended LinkWorks functionality. Access is provided to the object's attributes and methods, as well as to the LinkWorks Management information.

The APO Plugs can be accessed through a variety of interfaces, which makes it possible to write the applications that require access to LinkWorks objects and Management information in almost any programming environment. The DDE and OLE Automation interface are provided for most of the APO plugs for applications that run on a Windows client. LinkWorks must be running on that client, before they can be used. All APO Plugs can be accessed through a DLL or shared library. This interface is platform independent, and can thus be used on any LinkWorks client or server.

APO Plugs can be grouped into four categories:

1. APO Plugs to find an object
   Objects are identified by a unique object reference. This object reference is needed to access and manipulate the object. The following APO Plugs will return one or more object references:
   - APO/QL Query Language
   - APO/D&D Drag & Drop
   - APO/NAV Navigation

2. APO Plugs that support manipulating objects
   Access to the object's attributes and public methods can be achieved using the following APO Plugs:
   - APO/AA Attribute Access
   - APO/OA Object Action

3. APO Plugs that provide access to the LinkWorks environment
   Two APO Plugs are provided to access information about the LinkWorks environment:
   - APO/MCC Management Component Cache
   - APO/ENV Environment

4. APO Plugs for LinkWorks Administration
   - APO/ADM Administration

APO/QL Query Language

APO/QL Plugs are used by applications to find objects in a LinkWorks Cell cluster, which includes all LinkWorks servers within a single LinkWorks configuration. APO/QL returns a list of object references for objects meeting the query conditions. Only those objects for which the application has search permission will be returned. There is also a function available to search in compound objects such as the desktop.

APO/D&D Drag & Drop

APO/D&D Plugs allow for drag & drop between LinkWorks and other applications. The result of the drag & drop action is the exchange of the LinkWorks object reference between LinkWorks and the APO client application. APO/D&D is supported for two programming environments:

- using DLL calls from C or C++, which is platform independent
- using Visual Basic through a Visual Basic custom control library (VBX). In this case, drag & drop is only supported from LinkWorks to the Visual Basic application.

Drag & drop onto standard applications (for example Word for Windows or the Windows Print Manager) is supported. For the drop onto LinkWorks, an object reference is always required.

For 32-bit clients APO/D&D has changed to be completely OLE compliant (OLE/D&D). C++ and Visual Basic applications should use "OCX".

APO/NAV Navigation

Using the object reference as the starting point, APO/NAV Plugs allow the use of qualifiers in order to navigate through the object hierarchies on the desk (root, parent, child).

APO/AA Attribute Access

LinkWorks objects have attributes, which are used to store data associated with the object. Access to this data is often required in a solution. The APO/AA Plugs provide applications with access to these attributes. In addition to the system attributes that are provided by LinkWorks out-of-the-box, user attributes can be defined per object class. By accessing system or user attributes from an application, the application can act on objects, depending on the status of the object as given by the attribute values. Conversely LinkWorks can act upon changed attribute values, for example, in workflow conditions.

APO/OA Object Action

APO/OA Plugs allow applications to call a LinkWorks public method, which results in the execution of a specific action. Providing access to the public methods makes it possible to implement solutions where specific application functionality is integrated in a seamless way with the generic LinkWorks functionality. Examples of public methods are: CreateNewObject, ActivateWorkflow, DeleteObject, EditAttributes. The complete list of public methods is given in the LinkWorks *Method Reference Help*.

APO/MCC Management Component Cache

LinkWorks Management maintains the working environment and the desk configuration of all LinkWorks users in a cell cluster. The APO/MCC Plugs enable an application to retrieve LinkWorks Management information.

APO/ENV Environment

APO/ENV Plugs ensure that external applications access LinkWorks information in a secure context.

APO/ADM Administration

The LinkWorks administrator can synchronize users, organizational units, roles and workstations with a corporate database using the APO/ADM Plugs to insert, update and delete entries in LinkWorks.

Class Programming

The Class Programming concept is targeted at the professional Application Builder. Class Programming can be used to extend or change the LinkWorks out-of-the-box functionality. It extends LinkWorks itself, not the integrated application, hence the technique is complimentary to the APO concept.

New solutions can be implemented by simply deriving new object classes from existing LinkWorks object classes. The new object classes inherit the behavior of the object class they are derived from. The behavior of an object class is determined by the LinkWorks methods. With Class Programming, the application developer can change these methods and thus change or extend the behavior of the derived object class. External methods allow extension even beyond the functionality provided by LinkWorks itself, as the code is now part of an external application.

The importance of this concept is that the developer can use existing functionality to derive new functionality. This results in a major productivity improvement with regard to solution implementation and integration.

Whereas APO Plugs provide an interface to external applications, Class Programming extends the LinkWorks functionality. These mechanisms, individually and in combination, enable developers to build highly integrated solutions.

The LinkWorks methods are written in the LinkWorks Class Programming Language. This is an object-oriented language which supports features such as the usage of variables, LinkWorks attribute access, numeric comparisons, code structuring using flow-control statements, default values for arguments that were not passed, and calls to other methods.

Methods that have been modified or added must be compiled with the LinkWorks Class Programming Compiler, which is part of the Workbench. Permission to use the Workbench is granted to a user by the LinkWorks administrator. After compilation, the modified methods are available for use within LinkWorks. In addition to the Workbench, a Debugger is provided for debugging methods.

With Class Programming it is possible to add or change public methods, protected internal methods, and protected external methods. Protected external methods call functionality outside LinkWorks. This foreign code can be programmed in almost any programming environment, since LinkWorks provides calling conventions for:

- DDE
- OLE Automation
- command line
- DLL (for 32-bit clients, only 32-bit DLLs) or shared library.

External code accessed through a command line, DLL or shared library calling convention can reside on the LinkWorks server. This enables the use of server resources.

LinkWorks Scripts

LinkWorks Scripts is a programming environment provided with the basic LinkWorks product. LinkWorks scripts are especially suited for developing small applications to automate repetitive housekeeping tasks and to perform ad-hoc tasks in the LinkWorks environment. Such tasks could include the monthly clean-up or archive of documents, or searching for workflow deadlines and executing appropriate actions. This technique is especially targeted at Power Users and LinkWorks Administrators.

Scripts are written in a BASIC-like language. Because LinkWorks scripts can access the APO plugs, it is easy to write programs that interact closely with LinkWorks and its objects. The scripts can be written in a platform independent manner.

A recorder function is supplied with LinkWorks scripts, which enables users to record the actions they perform on their desk. These actions are stored as a script that can be modified and replayed. This feature enables repetitive user tasks to be automated. Using the LinkWorks Alarm mechanism, these LinkWorks scripts can be automatically executed at a pre-defined time.

LinkWorks scripts can be executed on the LinkWorks client or on the LinkWorks server. The latter may be used for background execution of repetitive tasks.

The main characteristics of the LinkWorks Script Language are:

- platform independent
- APO Plugs can be used
- control structures and error handling
- many built-in functions are provided (I/O, Print, String handling, Type Conversion and so forth), at least partly dependent on the underlying platform
- support for procedures and functions, which can be defined in other scripts
- scripts can be stored in LinkWorks objects or as files.

LinkWorks Configuration

The user desk is made up of windows with icons representing objects. The user can use buttons and menus as well as mouse clicks to invoke actions on these objects. The edit and read actions start a tool or application that is determined by the class of the object.

LinkWorks Configuration is a set of tools in the graphical LinkWorks client environment that enables the LinkWorks Administrator to build a user desk that is optimized to meet the requirements of specific user tasks and environments. This improves productivity and increases security. LinkWorks Configuration allows the LinkWorks Administrator to change the appearance of LinkWorks. This includes not only the modification of visual elements such as icons, menus, and button bars, but also the support of new tools and applications.

Encapsulating an existing business application within LinkWorks can be done using LinkWorks Configuration alone. This requires the definition of the application as a Tool Type and the assignment of this Tool Type to a new object class.

LinkWorks Configuration is used by LinkWorks Administrators and solution developers. The LinkWorks Administrator can define a (limited) set of LinkWorks Configuration tasks and grant other LinkWorks users access to this set. The professional application builder will also make use of LinkWorks Configuration when developing solutions using Class Programming.

Distributing the Solutions (Software Components)

In addition to the various techniques for solution implementation and integration, LinkWorks provides a unique concept to deploy and distribute solutions. This is done by means of Software Components.

All solutions developed using LinkWorks Class Programming and LinkWorks Configuration are automatically packaged in a Software Component. External functionality can also be included in software components. After distribution of the Software Component (using media or network), it can be installed on the target machine with a simple drag and drop action.

The use of software components is a significant step forward in the development of reusable software. Because every Software Component is identified by a unique worldwide reference, the Software Component concept is also the technical basis used to build a software industry around the LinkWorks Framework.

LinkWorks tools

Solution development techniques as described above are supported by a set of specific toold. Note that these tools form an integral part of the LinkWorks client or the LinkWorks server product. A more detailed description of the tools and the specific relationship to the techniques is presented in the Introduction to LinkWorks Solution development manual.

Configuration Manager

A multi-user development tool on the LinkWorks Administrator's desk that comprises a variety of functions for LinkWorks Configuration. The elements that can be configured using the Configuration Manager include:

- Error Messages, strings
- Workflow Modes
- Icons, mini icons, button bars, buttons, menus
- Attributes
- Access Rights and access types
- Master Documents
- Tools, toolbars, calling syntax’s
- Software Components
- System Options

Workbench

The Workbench is the graphical, multi-user environment that is used for changing and extending the out-of-the-box LinkWorks functionality. It is installed by default in the compound object 'Configuration Manager' on the desk of the LinkWorks Administrator. The LinkWorks Administrator can share the Workbench with other users.

The Workbench is used for the following application activities:

- deriving new object classes
- encapsulating applications assigned to these new classes
- editing menus, icons, attributes, and so on inherited from a parent class
- changing or extending the built-in LinkWorks functionality using Class Programming.

Debugger

The LinkWorks Debugger is an important tool used to test and debug methods when adding or modifying methods using Class Programming. The Debugger is available to users specified by the LinkWorks Administrator.

Software Component Tool

LinkWorks Software Components are implemented as objects. These Software Components are managed by the Software Component tool, which is part of the Configuration Manager.

Script Language Interpreter

The Script Language Interpreter is the tool that is used to interpret LinkWorks Scripts.

Attribute Definition Compiler

The LinkWorks Attribute Definition Compiler generates source code stubs, which can be included in an application to access attributes.

Public Method Compiler

The LinkWorks Public Method Compiler generates source code stubs, which can be included in an application to call Public Methods.

Class Programming Compiler

The Class Programming Compiler on the LinkWorks server can be used instead of the LinkWorks Workbench for the development of methods. A text file is used as input, which can be created and edited with an editor of choice. The Class Programming Compiler compiles all the methods, strings, error messages, and public method definitions that are included in this text file.

YEAR 2000

LinkWorks

LinkWorks 3.2 software and LinkWorks WebWorker 3.0 have been verified to meet the following Year 2000 criteria:

- They support a date range from at least 1980 to 9999 and will transition from 31 December 1999 to 1 January 2000 without intervention.
- All date calculations and representations are correct for any date data within the supported date range. All date translations are correct for date data within the supported date range.

The easiest way to comply with Year 2000 requirements is to use dates where the year is specified as four digits. LinkWorks has complied with this requirement from its first release. All dates within LinkWorks are represented and stored in the database as four digits.

LinkWorks itself has no clocks and doesn't generate dates. Date information is generated by the underlying operating system, which has to be set up to use four-digit years, or obtained from users or user programs. The database (which stores date information) and programming tools have to be set up to use four-digit years.

Dates have to be specified as four digits in programming interfaces. This has been the case at least since LinkWorks V3.0 was released in February 1995. This applies except when a date/time type is offered by the programming language, such as Visual Basic. In this case, the use and interpretation of two-digit years is done by the program. Therefore, we recommend the use of four-digit years and that systems be set up accordingly.

In GUIs, LinkWorks uses the date specification of the underlying system where years may often be specified as two or four digits. If two digits are chosen, then a LinkWorks mechanism is used whereby numbers in the range 80 to 99 are interpreted as 19xx, and numbers in the range 00 to 79 are interpreted as 20xx.

LinkWorks bundled with Oracle and Ingres Software

Some of the LinkWorks products include Oracle or Ingres database software. The Year 2000 compliance of these LinkWorks products is based on:

- The Year 2000 compliance of LinkWorks itself, as explained above
- Statements made by Oracle that Oracle7 Server Enterprise Edition and Oracle Server Workgroup Edition are fully compliant. See the white paper at http://www.oracle.com/year2000/white_paper.html
- The statement made by Computer Associates that Ingres is Year 2000 ready now. See the list at: http://www.cai.com/products/ca2000/Y2Kready_list.htm

SUPPORTED PLATFORMS

LinkWorks Versions

LinkWorks V3.2 may not be used in a mixed configuration with LinkWorks V3.0 or earlier versions.

Growth Considerations

The minimum hardware and software requirements for any future version of LinkWorks products may be different from the requirements for the current version.

Database and Network Requirements

The LinkWorks V3 platform coverage is determined by four key elements:
Client operating system
Server operating system
Server database support
Client and server network support.

LinkWorks 3.2 Server Systems

Platform	Database Software	Network
Compaq® TRU64™ UNIX® V4.0	ORACLE 7.3.3 INFORMIX-OnLine Runtime 7.2 INGRES Base Product 6.4/06	Compaq® TRU64™ UNIX® TCP/IP
HP-UX 10.20	ORACLE7 7.3.3 INFORMIX-OnLine Runtime 7.2	HP-UX TCP/IP
IBM AIX 4.2	ORACLE7 7.3.3	IBM AIX TCP/IP
Windows NT 4.0 on Alpha	MicroSoft SQL Server 6.5 ORACLE7 7.3.3	TCP/IP
Windows NT 4.0 on Intel	MicroSoft SQL Server 6.5 ORACLE7 7.3.3	TCP/IP
OpenVMS 7.1 for Alpha	ORACLE7 7.3.2.3.2	TCP/IP

LinkWorks 3.2 Client Systems

Platform	Network
Windows 3.1 or 3.11 on Intel	Windows Socket V1.1 PATHWORKS 6.0 TCP/IP
Windows 95 on Intel	Microsoft Win 95 TCP/IP
Windows NT 4.0 on Alpha	Microsoft Win 95 TCP/IP
Windows NT 4.0 on Intel	Microsoft Win 95 TCP/IP
Motif Compaq® TRU64™ UNIX® 4.0	Compaq® Tru64™ UNIX® TCP/IP
Motif SunOS 2.5.1	Sun TCP/IP
Motif HP-UX 10.20	HP-UX TCP/IP
Motif IBM AIX 4.2	AIX TCP/IP
Mac 7.52 / 8.1 on Mac PowerPC	TCP/IP
Mac 7.52 on Mac 68K	TCP/IP

LinkWorks WebWorker

Compaq LinkWorks WebWorker 3.0 runs on LinkWorks Server software 3.2 on:

- Compaq® TRU64™ UNIX® V4.0
- Windows NT 4.0 Intel
- Windows NT 4.0 Alpha

It requires an HTTP server:

- on Compaq® TRU64™ UNIX® V4.0
    - Netscape Enterprise Server 2.01 (or later),
    - Netscape Communications Server 2.0 (or later)
- on Windows NT 4.0
    - Microsoft Internet Information Server 2.0

It requires a web browser that is enabled for Java script. It has been tested with the following browsers:

- Netscape Communicator 4.0
- Netscape Navigator V3.0
- Microsoft Internet Explorer 4.0

SOFTWARE LICENSING

LinkWorks software is furnished under the licensing of Compaq Corporation's Standard Terms and Conditions. For more information about Compaq's licensing terms and policies, contact your local Compaq office or see the licensing page http://www.digital.com/info/software-licensing/

Different types of product have different part numbers, as follows:

QB-xxxxx-SA	basic package
QB-xxxxx-MA	update package
QM-xxxxx-Ax	basic license
QM-xxxxx-Cx	update license

CLIENT Licensing

There are different client licenses depending on the server software used:
- LinkWorks.
- LinkWorks bundled with Oracle database.
- LinkWorks bundled with Ingres database.

The client license is independent of the type of client platform (e.g. Windows, Macintosh) and languages.

There are different client packages for use with the following servers:
- LinkWorks.
- LinkWorks bundled with Oracle database.
- LinkWorks bundled with Ingres database.

The client package contains the software on CD-ROM for all client platforms and languages. It also includes the documentation on CD-ROM, and one client license.

The client license grants the right to use the client software, and the right to make access to a LinkWorks Server. If there is more than one LinkWorks server in the configuration, the right is granted to make access to all the servers.

SERVER Licensing

There are different types of server license for use when the LinkWorks software is bundled with Oracle or Ingres. There are server licenses for:
- LinkWorks.
- LinkWorks bundled with Oracle database, different licenses per platform
- LinkWorks bundled with Ingres database.

The server license is independent of the type of server platform (e.g. OpenVMS, Compaq® TRU64™ UNIX®) except when LinkWorks is bundled with Oracle. It is independent of the language used.

There are different server packages with the following software:
- LinkWorks.
- LinkWorks bundled with Oracle database, different packages per platform
- LinkWorks bundled with Ingres database.

The server package contains the software and documentation on CD-ROM, and one server license.

The server license grants the right to install the LinkWorks Server software. It does not grant the right to make access to it from other software. For that purpose, either a client license is required, or a Client Access License (CAL). A server licence is required for each server on which the software is installed.

This product does not provide support for the Compaq® TRU64™ UNIX® License Management Facility. A Product Authorization Key (PAK) is not required for installation or use of this version of the product.

Client Access Licenses

When LinkWorks client software is used, the corresponding license grants access to the server software. When a connection is made to the server using the WWW and a browser, there is no LinkWorks client software. Then a Client Access License (CAL) is needed to grant rights of access to the server.

A license is needed for every name which can be used to log-in to the LinkWorks server. The license is either a LinkWorks client license or a CAL. So, for example, on a server with 200 LinkWorks clients and 500 users which can make access using the WWW, 200 client licences would be needed, and 500 CALs.

Many LinkWorks configurations have more than one server. A CAL grants access to all a customer's servers. So, in the example with 200 LinkWorks clients and 500 other users, if a new server were to be added, an additional server license would be needed (for installation) but no new CALs would be required. This applies even if the servers are in different domains.

ORDERING INFORMATION

LinkWorks Server

For all supported platforms

License	Kit	Upgrade License	Upgrade Kit
QM-11D9A-AA	QB-11D9A-SA	QM-11D9A-CA	QB-11D9A-MA

LinkWorks WebWorker

For Compaq® Tru64™ UNIX® and Windows NT (Requires LinkWorks Server)

License	Kit	Upgrade License	Upgrade Kit
QM-5RF9A-AA	QB-5RF9A-SA	QM-5RF9A-CA	QB-5RF9A-MA

Traditional LinkWorks Clients

For use with servers running LinkWorks. Not allowed for LinkWorks servers bundled with Oracle or Ingres. For all supported platforms

Number of Clients	License	Kit	Upgrade License	Upgrade Kit
1	QM-1189A-AA	QB-1189A-SA	QM-1189A-CA	QB-1189A-MA
20	QM-1189A-AB		QM-1189A-CB	
100	QM-1189A-AC		QM-1189A-CC	
200	QM-1189A-AD		QM-1189A-CD	
500	QM-1189A-AE		QM-1189A-CE	
1000	QM-1189A-AF		QM-1189A-CF	
2000	QM-1189A-AG		QM-1189A-CG	
5000	QM-1189A-AH		QM-1189A-CH	
10000	QM-1189A-AJ		QM-1189A-CJ	

LinkWorks Client Access Licenses (CALs)

For use with servers running LinkWorks or servers with LinkWorks bundled with Ingres. For all supported platforms. Only needed for users without a Traditional Client License

Number of users	License	Kit	Upgrade License	Upgrade Kit
50	QM-1189B-AB		QM-1189B-CB	
100	QM-1189B-AC		QM-1189B-CC	
200	QM-1189B-AD		QM-1189B-CD	
500	QM-1189B-AE		QM-1189B-CE	
1000	QM-1189B-AF		QM-1189B-CF	
2000	QM-1189B-AG		QM-1189B-CG	
5000	QM-1189B-AH		QM-1189B-CH	
10000	QM-1189B-AJ		QM-1189B-CJ	

LinkWorks Servers bundled with Oracle

Part number varies depending on underlying platform.

Platform	License	Kit	Upgrade License	Upgrade Kit
Compaq® Tru64™ UNIX®	QM-3E59A-AA	QB-3E59A-SA	QM-3E59A-CA	QB-3E59A-MA
OpenVMS Alpha	QM-3E69A-AA	QB-3E69A-SA	QM-3E69A-CA	QB-3E69A-MA
HP-UX	QM-4CP9A-AA	QB-4CP9A-SA	QM-4CP9A-CA	QB-4CP9A-MA
IBM AIX	QM-4CQ9A-AA	QB-4CQ9A-SA	QM-4CQ9A-CA	QB-4CQ9A-MA
NT Intel	QM-4NU9B-AA	QB-4NU9B-SA	QM-4NU9B-CA	QB-4NU9B-MA

Traditional LinkWorks/Oracle Clients

For use with servers running LinkWorks bundled with Oracle. For all supported platforms

Number of clients	License	Kit	Upgrade License	Upgrade Kit
1	QM-3EK9A-AA	QB-3EK9A-SA	QM-3EK9A-CA	QB-3EK9A-MA
20	QM-3EK9A-AB		QM-3EK9A-CB	
100	QM-3EK9A-AC		QM-3EK9A-CC	
200	QM-3EK9A-AD		QM-3EK9A-CD	
500	QM-3EK9A-AE		QM-3EK9A-CE	
1000	QM-3EK9A-AF		QM-3EK9A-CF	

LinkWorks/Oracle CALs

For use with servers running LinkWorks bundled with Oracle. For all supported platforms. Only needed for users without a LinkWorks/Oracle Client License.

Number of users	License	Kit	Upgrade License	Upgrade Kit
50	QM-3EK9B-AB		QM-3EK9B-CB	
100	QM-3EK9B-AC		QM-3EK9B-CC	
200	QM-3EK9B-AD		QM-3EK9B-CD	
500	QM-3EK9B-AE		QM-3EK9B-CE	

LinkWorks Servers bundled with Ingres

For all supported platforms

License	Kit	Upgrade License	Upgrade Kit
QM-4C49A-AA	QB-4C49A-SA	QM-4C49A-CA	QB-4C49A-MA

LinkWorks/Ingres Clients

For use with servers running LinkWorks bundled with Ingres. For all supported platforms

Number of Clients	License	Kit	Upgrade License	Upgrade Kit
1	QM-4C69A-AA	QB-4C69A-SA	QM-4C69A-CA	QB-4C69A-MA
20	QM-4C69A-AB		QM-4C69A-CB	
100	QM-4C69A-AC		QM-4C69A-CC	
200	QM-4C69A-AD		QM-4C69A-CD	
500	QM-4C69A-AE		QM-4C69A-CE	
1000	QM-4C69A-AF		QM-4C69A-CF	

LinkWorks Developer's Source

For all supported platforms

License	Kit	Upgrade License	Upgrade Kit
	QB-3RB9A-SA		

Language Versions

LinkWorks V3.2 DTA files are available in the following languages (completely checked):
American English, Dutch, French and German;
and (partially checked) in:
Brazilian, Chinese traditional and simplified, Czech, Danish, Finnish, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Slovak, Spanish, Swedish and Thai.

The LinkWorks User Guide and User Help files will be available in:
American English, Dutch, French, German, Hebrew, Korean, Swedish and Thai.

The LinkWorks WebWorker is supplied with messages in English only. Most message are issued from the WebWorker itself; some are issued from JavaScript or contained in the template HTML pages. The messages from the WebWorker are contained in a software component that is delivered in the WebWorker kit.

The WebWorker has been prepared for translation to languages other than the primary language (American English) in a process normally known as internationalisation. This includes cultural aspects of languages such as reading right to left. The result is that WebWorker messages are suitable for translation to languages which use 8-bit character representation.

Product contents

LinkWorks Client package

Contents:
- Client software and manuals on CDs.
- Client Software on CD-ROMs for Windows 95, Windows 3.1 and 3.11, Mac PowerPC & 68K and Motif
- Documentation CD-ROM
- Client License
- Client booklet and release notes

The LinkWorks Client software and the documentation include add-ons to perform integration with external mail where applicable.

LinkWorks Client packed with database

This content of this package is the same as the basic LinkWorks Client package; the license allows the client to be used in combination with the respective LinkWorks database bundle.

LinkWorks Server package

Contents:
- Server software and language-dependent files on CD-ROMs for OpenVMS, Compaq® TRU64™ UNIX®, HP-UX, IBM AIX and Windows NT
- Documentation CD-ROM
- Server License
- Server booklet and release notes

LinkWorks Server packed with database

Contents:
- All LinkWorks software and documentation as specified above.
- Database Software on separate CD-ROM;
- Database Documentation Library on CD-ROM;
- License for the LinkWorks server software and the bundled database.

LinkWorks WebWorker

Contents:
- WebWorker software on CD-ROM
- Booklet and Release Notes

LinkWorks Developer's Sources

Contents:
- Source files of the User Guide for all supported languages in Word for Windows 7 format (Office95)
- Source of the on-line User Help for all supported languages
- License to modify and distribute the modified User Guide and modified Help text
- Information explaining the directory structure, the house-style templates and how to modify the User Guide and on-line help

INSTALLATION

Compaq advises that only experienced customers install LinkWorks. Other customers should use the services of Compaq or the reseller from whom LinkWorks was obtained.

SOFTWARE PRODUCT SERVICES

A variety of service options are available from Compaq. For more information, contact your local Compaq office.

SOFTWARE WARRANTY

The warranty support period for this software product is ninety (90) days.

INFORMATION RESOURCES

- LinkWorks on the WWW: http://www.digital.com/info/linkworks/
- LinkWorks Partner Forum at http://www.linkworks.aware.net/ requires registration
- Licensing information at http://www.digital.com/info/software-licensing/
- Pricing information at http://www.businesslink.digital.com/ requires registration