COMPAQ

Software Product Description

PRODUCT: Compaq TeMIP Expert V4.0 for Tru64 UNIX   **SPD 70.65.01**

DESCRIPTION

TeMIP for Compaq Tru64 UNIX® is a family of software products for the management of telecommunications and corporate networks, including fixed wire and mobile/cellular voice and data multi-vendor, multi-technology networks. TeMIP V4.0 provides comprehensive off-the-shelf fault and trouble management functions such as Alarm Handling and Event Logging for telecommunications network management.

TeMIP supports the International Standards Organization (ISO) management standards ISO 10164-x and 10165-x. TeMIP and its features are applicable in the context of the International Telephone Union-Telecommunication Standards (ITU-T) X.73x and Telecommunication Management Network (TMN) M.3010, M3100 Recommendations. It gives network operators a global view of their networks, and enables them to activate management functions and operations from single or multiple workstations.

TeMIP is built on top of the TeMIP Framework, and fully benefits from the object oriented and truly distributed software architecture.

TeMIP Expert Features

TeMIP Expert is the expert system product in the TeMIP product family. It is the foundation for building decision support systems that use TeMIP Framework. In particular, it can can be used to perform alarm filtering and correlation.

TeMIP Expert is based on:

- ILOG Rules™, a development environment to build expert systems

- The TeMIP Expert toolkit, which includes a starter management module designed for ILOG Rules and

tools for customizing this module and integrating it into TeMIP.

These items are used to build the TeMIP Expert application, a fully integrated TeMIP Presentation Module (PM), written in C++ using TeMIP Access Library (TAL) classes).

The unique integration of the TeMIP Expert toolkit and ILOG Rules simplifies the expert system development process. By producing a true TeMIP management module, it also makes available the benefits of TeMIP distribution. The final solution is optimized; its complexity is reduced; its maintenance is made easier; and smooth evolution is possible.

TeMIP Expert simplifies the programming of the expert system by offering a ready-to-use environment for the interaction between ILOG Rules and TeMIP. The defining of rules with their `IF Condition THEN Action` syntax complements TeMIP's network view and capabilities by adding intelligent reasoning to events and conditions that happen in the network. TeMIP Expert provides a powerful environment for developing and deploying rule-based applications that manage complex, dynamic operations. An operational expert system management module is obtained by defining rules in this environment.

TeMIP Expert can process various information such as events and alarms, equipment states, route availability and usage. These are correlated by ILOG Rules to detect critical situations immediately. Actions can then be prioritized and automated to help operators take the most efficient decisions, either when a problem occurs in the network, or when a service is being adversely affected. Note that the TeMIP Expert does not support synonyms.

TeMIP Expert Components

The TeMIP Expert is made up of the following:

- TeMIP Expert Presentation Module

- ILOG Rules for C++ 6.1

- TeMIP Expert Developer's Toolkit

- Samples

- Documentation

TeMIP Expert PM

The role of the TeMIP Expert PM is to give ILOG Rules (and therefore the rule builder) simplified access to TeMIP services and data. It provides high-level TeMIP-related services suitable for expert systems. It is customizable.

ILOG Rules for C++ 6.1

Together with TeMIP, ILOG Rules can minimize disruption of services delivered by the network by:

- Continually checking for potential problems before they adversely affect operations

- Turning complex operational data into useful information by analyzing the data with knowledge-based models

- Diagnosing the root cause of time-critical problems and taking the correct actions

- Maintaining optimal operating conditions

- Co-ordinating activities and information in complex operational processes

ILOG Rules V6.1 provides an **inference engine** for C++ with a **working memory** that is based on the ILOG Rules object model. There are also **tools** supplying graphical user interfaces to work with rules at various levels.

The ILOG Rules inference engine

The ILOG Rules V6.1 inference engine makes use of an optimized RETE algorithm — the industry standard for high-performance rule-based systems — to perform pattern matching on conditions in forward-chaining mode. The performance of this algorithm is independent of the number of rules and perfectly scaleable for applications involving large numbers of objects and events.

The ILOG Rules V6.1 working memory

In TeMIP Expert, the ILOG Rules working memory is populated/updated by means of the following:

- A Population Request

- Alarms, Alarm Objects and Events received after a Collection Request or OC Monitoring Request is started

- A Reply to a TeMIP Call (especially a SHOW directive)

The ILOG Rules V6.1 tools for rule-building

ILOG Rules tools for rule building include an editor, a compiler, and a debugger. Important features of the rules environment are as follows:

- You can group rules into **rule sets** and, within a rule set, into **packets** to structure the rule base and control rule activation and deactivation.

- You can give rules a **priority**, which allows precise priority management.

- You can perform logical justification management to eliminate facts deduced from hypotheses that have since turned out to be false by defining logical rules. The resulting logical objects are maintained automatically by the ILOG Rules device known as the **Truth Maintenance System (TMS)**.

- You can use time-triggered **watchdogs** to express conditions within a relative or absolute time window.

- The flow of action is completely determined at run time, where rule activation is triggered by **asynchronous events**. For instance, the reception of an alarm by the inference engine may activate one or more rules.

- The Action parts of compiled rules can contain C++ code, while the Action parts of interpreted rules can contain methods, the assignment of values to slots, and **JavaScript,** giving a limited programming capability.

- You do not need to stop the TeMIP Expert to apply new or changed rules.

TeMIP Expert Developer's Toolkit

The TeMIP Expert Developer's Toolkit provides the following items:

- An ILOGRules Object Model Translator

- An ILOG Rules object model of basic TeMIP facilities giving the default TeMIP Expert behavior

- An Application Programming Interface (API) providing TeMIP Expert services, with stub files to fill in in order to customize the TeMIP Expert, and a makefile to automate the building of the TeMIP Expert PM that will be plugged in to TeMIP

ILOG Rules object model translator

The ILOG Rules Object Model Translator is called `msl2ilr`. It translates TeMIP MSL specifications into an ILOG Rules object model.

This tool produces the .hxx, .cxx and .ilr files needed to build the TeMIP Expert PM. Thus users can focus on writing rules without having to define a second object model with a different syntax. Furthermore, this translation makes the ILOG Rules Builder tool TeMIP dictionary driven.

ILOG Rules model of TeMIP

The TeMIP Expert provides an ILOG Rules model of TeMIP concepts useful when building rules to manage a TeMIP network. This includes an ILOG Rules class for each of the following:

- TeMIP entities (TeMIP Entity class – parent of all other TeMIP entity classes)

- TeMIP Alarm Objects

- TeMIP alarms (OSI Notification Events)

- TeMIP events (OSI Configuration Events)

- Services: a generic ESAServicesProvider class for performing TeMIP Calls, collecting alarms/events, and monitoring Operation Context (OCs) in the Action part of the production rules without having to perform C++ coding.

- TeMIP alarm generation using the SubmitAlarm directive (TeMIPNewAlarm class – new in V4.0)

- TeMIP Alarm Object creation: (TeMIPNewAlarmObject class – new in V4.0)

- TeMIP Similar Alarm creation: (TeMIPNewSimilarAlarm class – new in V4.0)

Many test predicates, some new in V4.0, are supplied for implementing comparisons between classes representing TeMIP objects.

The developer's toolkit API

The default TeMIP Expert behavior derives from management module development performed using the Expert System Access (ESA) toolkit, which is supplied with the TeMIP Expert and available as a separate product.

Replies to TeMIP Calls, collected alarms/events, and changes to monitored OCs are automatically dispatched to update the expert system's working memory (WM). All reply parameters and alarm fields are automatically decoded and made available to the user so that they can be used in comparisons in the Condition part of production rules.

This behavior is achieved through the following methods:

- *OnBuildXXXExpert().* Each *OnBuildXXXExpert()* method creates TeMIP Expert objects of a specific class; these objects are either used by TeMIP Expert to process the results of calls to TeMIP, or,

in some cases, can be created by users for use in requests to TeMIP.

- *OnTranslate()* and *OnTransmit().* These methods process the TeMIP Call Reply. The *OnTransmit()* method contains code used for asynchronous requests to assert collected Alarm Objects, Alarms and events in the ILOG Rules WM or retract them from it. The *OnTranslate()* method provides default behavior for the standard TeMIP directives SHOW, SET, CREATE, and DELETE. It can be augmented for non-standard TeMIP directives.

- *OnConnectExpert()* and *OnDisconnectExpert().* These methods are concerned with the connection to, and disconnection from, ILOG Rules. The *OnConnectExpert()* method can be used to populate the ILOG Rules WM from the contents of the TeMIP MIR, and to perform specific alarm collection and OC monitoring.

The way to customize the TeMIP Expert behavior is by filling in the TeMIP Expert stub files, which have names starting exp_stub.

The makefile compiles .hxx, .cxx and .ilr files to generate the TeMIP Expert management module, and embeds ILOG Rules. It can optionally call the ILOG Rules compiler.

The handling of rule compilation by the makefile allows the user to mix compiled rules (for greater efficiency) with interpreted rules (for greater user-friendliness).

Sample rules

Four samples of rules with documentation are provided. These show simple and more complex structures, and demonstrate the new features of V4.0

Customization of the TeMIP Expert

User customization is required principally in the following areas:

- Definitions: The TeMIP objects used during inference must be defined so that the working memory can be populated.

- Start-up processing: The details of OC monitoring, alarm/event collecting, and retrieving the contents of the TeMIP MIRs must be defined. The user must specify which OCs need to be monitored, which alarms need to be collected (and how), and which attributes of which entities must be made visible to ILOG Rules. The method to override is *OnConnectExpert().*

- Shutdown processing: If specific processing is required before shutdown, this can be defined. The method to override is *OnDisconnectExpert().*

- Rule compilation: If compiled rules are required, these must be inserted into the supplied rules file, rules.ilr, for compilation by the ILOG Rules

compiler, `ilrcmp`, when the TeMIP Expert module is built.

After the ILOG Rules object model has been generated using the supplied translator, `msl2ilr`, the TeMIP Expert must be recompiled using the supplied makefile, `expert_descrip.make`.

The details of customization at various possible levels are explained in the *Compaq TeMIP Expert Development Guide.*

DOCUMENTATION

The TeMIP Expert document set includes three categories of documents:

ILOG documentation:

ILOG Rules for C++ 6.1 - User's Manual

ILOG Rules for C++ 6.1 - Reference Manual

ILOG Rules for C++ 6.1 - Guide to Interpreted Rules

TeMIP Expert documentation:

TeMIP Expert Reference Guide, AA-RLCSA-TE

TeMIP Expert Development Guide, AA-RLCTA-TE

HARDWARE REQUIREMENTS

DIGITAL Personal Workstation au series
DIGITAL Ultimate Workstation
AlphaStation 600
AlphaServer 800, 1000A, 1200
Compaq AlphaServer DS10, DS20

AlphaServer 2000, 2100, 4000, 4100
Compaq AlphaServer ES40

AlphaServer 8200, 8400
Compaq AlphaServer GS60, GS140

Disk Space Requirements*:*
Disk space required for installation:
    100 MB
Disk space required for use (permanent)
    100 MB

These figures refer to the disk space required on the system disk. The sizes are approximate; actual sizes may vary depending on the user's system environment, configuration, and software options.

Memory Requirements:

For runtime systems the minimum memory requirement is 128 Mbytes; this also takes into consideration the memory requirements of TeMIP Framework.

For development systems the minimum memory requirement is 256 Mbytes; this also takes into consideration the memory requirements of TeMIP Framework.

Note that if more memory is made available for use with the TeMIP Expert software, performance will be improved.

SOFTWARE REQUIREMENTS
Compaq Tru64 UNIX Operating system V4.0F
DEC C++ Class Shared Libraries (subset CXLSHRDA440)
TeMIP Framework V4.0

GROWTH CONSIDERATIONS

The minimum hardware/software requirements for any future version of this product may be different from the requirements for the current version.

YEAR 2000 READY

This product is Year 2000 Ready.

"Year 2000 Ready" products are defined by Compaq as products capable of accurately processing, providing, and/or receiving date data from, into and between the twentieth and the twenty-first centuries, and the years 1999 and 2000, including leap year calculations, when used in accordance with the associated Compaq product documentation and provided that all hardware, firmware and software used in combination with such Compaq products properly exchange accurate date data with the Compaq products.

For additional information visit Compaq's Year 2000 Product Readiness web site located at http://www.compaq.com/year2000 .

To ensure that this product is Year 2000 Ready, code assessment and system tests to verify the transition between December 31st 1999 and January 1st 2000 were utilized.

To ensure that this product interoperates properly with other hardware and software, the system tests involving third-party product ILOG Rules and Compaq's TeMIP V4.0 are applicable, as these products were verified as being Year 2000 Ready.

DISTRIBUTION MEDIA

This product is distributed with the following media:

Software Media: QA-6HPAA-H8

Software Documentation: QA-69QAA-GZ

ORDERING INFORMATION

TeMIP Expert traditional license:

Software license: QM-69QAA-AA

(This replaces the TeMIP Expert V1.0 license QL-69QA9-AA)

Software Product Services: QT-69Q-****

SOFTWARE LICENSING

This software is furnished under the licensing provisions of Compaq Computer Corporation's Shrinkwrap License Terms and Conditions. For more information about Compaq licensing terms and policies, contact your local Compaq office.

Licence units for the TeMIP Expert are allocated on an Unlimited System Use basis, independently of the machine tier on which they are running.

ILOG RULES LICENSING

TeMIP Expert includes the licenses for the ILOG Rules product, both development and run-time. These licenses are restricted to the use of ILOG Rules *in conjunction with TeMIP*.

The ILOG Rules licence is valid for unlimited run-time use and for 15 developers.

TRU64 UNIX LICENSE MANAGEMENT

This product uses the FLEXlm® Software License Key system.

A FLEXlm key must be obtained using information provided with the license deliverable. An authorization number is provided for each license, which allows the user to obtain license keys from an Internet Web Server according to instructions provided with the License Certificate.

SOFTWARE PRODUCT SERVICES

A variety of service options are available from Compaq. For more information on these services or other available Network Management Services, contact your local Compaq office.

SOFTWARE WARRANTY

This software is provided by Compaq with a 90 day conformance warranty in accordance with the Compaq warranty terms and applicable to the license purchase.

The above information is valid at time of release. Please contact your local COMPAQ office for the most up-to-date information.

®   UNIX is a registered trademark in the United States and other countries licensed exclusively through X/Open Company Ltd.

®   FLEXlm is a registered trademark of GLOBEtrotter Software, Inc.

™   ILOG and ILOG Rules are trademarks of ILOG, Inc.

™   The Compaq Logo, AlphaStation, AlphaServer, DIGITAL and TeMIP are trademarks of Compaq Computer Corporation and its affiliated companies.