Design and Deployment of a Dynamic Information System on the World Wide Web

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ABSTRACT: *The Cray Research customer information system, CRInform, makes Cray system information, software, and support resources available to customers around the world via the World Wide Web (WWW). The information is dynamic; resides in many sources including an Oracle relational database, Fulcrum Ful-text collections, and files; and needs to be accessible around the world.*

This paper describes the purpose of the WWW-based CRInform system, the requirements of the system, and a CRInform system overview. Also, deployment issues related to the distribution of dynamic information to a worldwide user community will be described. Finally, the current status of the deployment and future plans will be described.

Purpose of the CRInform Program

The purpose of the CRInform program is to provide electronic delivery of customer support services. It was developed in response to customer requests via the Cray User Group (CUG). It augments the services that customers receive from on-site personnel and support centers, with the primary goal of making service more efficient for both the customer and Cray Research personnel.

CRInform Requirements

The requirements for CRInform are customer driven, with the primary mechanism for gathering requirements being the Cray User Group (CUG). The main objective is to provide service information to the Cray customer. In addition, the information must be dynamically updated as necessary, and status notification must be proactive, i.e., the user must be automatically notified when something changes. CRInform must also provide a mechanism for communication between Cray analysts and customers and between Cray customers.

The information sources are varied and in multiple formats. They include Oracle data, Fulcrum Ful-text collections, Unix files, binary patches and updates, and HTML files including order forms, catalogs, and graphics.

Finally, the system must be accessible worldwide via X.25, the Internet, and dial-up modem.

CRInform System Overview

The CRInform 4.1 system consists of five major components:

- Technical assistance and problem reporting
- CRInform/Software Problem Report (SPR) database
- Service and marketing information repository
- Software, publications, and training catalogs
- Customer bulletin board

These five components will be described below.

Technical Assistance and Problem Reporting

The technical assistance and problem reporting component allows customers to request assistance and report problems in the customer's native language. The request is entered as a Request for Technical Assistance (RTA) that is forwarded to the customer's regional support center. An RTA can be any request or question, or it can be a software problem report. Through this mechanism, the customer can request that the RTA be converted into a Cray Research Software Problem Report (SPR). If this occurs, the customer will be notified of the SPR number in the RTA's resolution. When an RTA is submitted, it is assigned a number immediately for future reference. When an RTA is closed, the resolution field is updated by the customer's regional support center. The status of a customer's RTAs can be queried using the Status of RTA query screen, and new information can be added to an RTA that hasn't been closed.

CRInform/Software Problem Report (SPR) Database

The CRInform/SPR database contains software problem reports for released CRI products. Customer SPRs are included for all customers that are participating in the CRInform program, i.e., for customers that have signed the CRInform Program Agreement. In addition, CRI internal SPRs are included for released products. All SPRs in the CRInform/SPR database are accessible to all users with the site information removed from the SPRs.

The CRInform/SPR database can be queried using the Query SPR Database screen. Using this mechanism, the user can quickly view the SPRs that originated at his/her site, and/or view SPRs from other customer sites in order to determine if a particular problem has already been reported and, if so, if and how it has been solved.

The customer can add information to an SPR that hasn't been closed. This information is added to the CRInform database (as well as the Cray Research internal SPR database), and is immediately forwarded to the Customer Service analyst handling the SPR. This allows for a dialog between the customer and the Cray Research analyst.

Information Repository

CRInform includes a repository of service and marketing information. The service and marketing information includes:

- The Cray Research Service Bulletin (CRSB)
- Field Notices (FNs)
- Software release documents
- Software problem fix information
- Company and product announcements

Catalogs

CRInform contains on-line versions of the following Cray Research catalogs:

- Cray Research Software Catalog
- Directory of Application Software
- User Publications Catalog
- Software Training Catalog

The CRInform user can order from the software and publications catalogs and communicate with the regional training registrar.

Customer Bulletin Board

The objective of the CRInform customer bulletin board is to provide communication among Cray Research customers. The Bulletin Board System (BBS) is based upon Usenet, a network message-sharing system that exchanges messages in a standard format. Messages are arranged into topical categories called newsgroups. The CRInform newsgroups are only accessible by CRInform users, that is, Cray Research customers who have signed the CRInform Program Agreement, and Cray Research employees who have requested access to the newsgroups. Messages sent to the unicos-1 e-mail alias are being archived in a CRInform newsgroup, cray.crinform.unicos-1.

CRInform 4.1 System Components

The CRInform 4.1 system components include the CRInform 4.1 application, the Data Generator, and the E-mail Handler.

CRInform 4.1 Application

The CRInform 4.1 application is available both inside of the Cray Technical Network to Cray employees, and outside of the firewall to Cray customers. It is World Wide Web (WWW) based, and makes use of the NCSA Mosaic HTTP server. The majority of the HTML in CRInform is dynamic, i.e., it is generated using cgi-bin programs written in C. Oracle data is used in most of the HTML pages and forms, and the interface to Oracle is through the Oracle Call Interface for C. In addition, data from the Fulcrum Ful-text collections is retrieved from the Fulcrum Ful-text search engine using the API from C. Examples of the dynamic nature of the HTML pages and forms include:

- A user specific "What's New?" based upon user registration that can be configured by the user
- User/site specific software order forms that are built based upon software licensing data

Data Generator

The Data Generator collects files, text collections, and Oracle data to be transferred to the CRInform system. It detects new items and changes in user requests, software problem reports, software orders, etc. Based upon user profiles, it e-mails status information as requested by the user. In addition, it builds the user specific "What's New?" HTML files. Finally, it rcps the files, collections, and Oracle data to the external CRInform machine.

E-mail Handler

All database updates and user requests are processed internally via electronic mail, which is the only communication mechanism available between the external CRInform system and any system inside the Cray Technical Network. The database is duplicated inside the Cray Technical Network and kept consistent by the E-mail Handler. User requests are processed and sent to the appropriate Cray person for action.

Deployment Issues

Most of the deployment issues are related to the requirement that access to the CRInform system be provided to all customers located worldwide. This requirement translates to the need to provide interfaces that are both character-based and graphical. In addition, e-mail interfaces are also necessary. Different methods of communication must also be allowed, including X.25, Internet, and dial-up.

Performance problems are typical because the HTTP server is located in Eagan, Minnesota, USA. We believe that the performance problems that international customers are experiencing will be resolved by distributing the HTTP server internationally.

Future Plans

Our future plans are to improve the performance of the CRInform application for all of our users. We are investigating the deployment of distributed HTTP servers around the world, and also looking into the use of the Netscape CommerceNet Server encryption mechanism to allow us to move the servers inside of the Cray Technical Network.