

# TECHNOLOGY BRIEF

CROSS have worked with multi-value technologies for over thirty years to build and support long lasting business solutions. In the last decade, as IT systems required greater integration and users demanded enhanced interfaces, CROSS have responded with the development of software for PDF generation, Email processing, HTTP processing and LDAP interfacing. These have been offered both as retail packages and as embedded libraries in custom solutions on various multi-value platforms.

To gain maximum benefit from these developments, CROSS have used a modularised software process which implements shared libraries and separate name spaces in U2 BASIC. The approach makes the inclusion of software libraries directly in programs or via tailored BASIC subroutines a simple process. In addition, since all the application code is held in a common library, any program using the code can be readily updated by nothing more than recompilation.

The more important libraries such as PDF have been implemented on both UniVerse and UniData while other packages implemented on UniVerse have been ported to other platforms as required. The CROSS

## PDF

Libraries to support the creation of graphically rich PDF documents including images, lineart and form field or overlay runtime data. These libraries have been packaged into a BASIC API and a set of TCL routines.

standard approach is inherently designed to support multiple platforms and porting efforts

thus far

have been accomplished with ease.

## LDAP

Libraries to support several styles of LDAP authentication and extensions allowing a user to update their password as well as full support for LDAP queries and updates. These libraries have been packaged into a BASIC API.

CROSS desired a standard method to take a well defined technology such as the Simple Mail Transfer Protocol (SMTP) defined in RFC821 and implement it as a reusable library of code which could either be used in a purpose

specific routine or to implement generic routines such as a BASIC subroutine to send an email. As an example of the first case, this library could be included as part of a program to generate PDF documents from UniVerse spooler items which are then delivered by email.

Wherever a particular technology or standard has been required in this development framework it has been implemented as another reusable library. Thus, to support the email routines, libraries implementing various RFC standards for SMTP, Post Office Protocol (POP3), Multi-purpose Internet Mail Extension

## DNS

Libraries to support DNS queries. These libraries have been used to support real time validation of the domain portion of email addresses.

sions (MIME) and RFC822 (Standard for the format of ARPA Internet text messages) have all been developed. These have then been reused where their functionality was applicable for other standards such as Hypertext Transfer Protocol (HTTP). This approach leads to a high degree of modularisation and reuse in the code libraries.

## Email

Libraries to support the sending and receiving of email, using SMTP and POP3, and working with MIME compliant email containing multiple attachments. The email creation and sending portions of these libraries have been packaged into a BASIC subroutine and a TCL routine.

Where libraries have been packaged for release as generic routines, CROSS have developed a "build and licensing" system to allow object code to be delivered on the U2 platforms applying appropriate build rules for demo/

expiry or full licensing and platform or

version specific compilation. This system produces an installable package that can be deployed by the client.

## HTTP

Libraries to support both the parsing and generation of HTTP request/response messages. These libraries have been applied to implement an HTTP server using UniVerse sockets and as a sub-server process running initiated by a super-server.

Similarly, libraries included in custom routines use compile time switches to tailor the resulting program based on a common code base.

## XML

Libraries to support the parsing of XML documents including support for namespaces.

In addition to the technologies developed using the modularised build method CROSS have also developed some other packages for sale. These include an interface to IBM MQ Series and a content-generation system for BASIC similar to other xSP systems.

