X Image Extension Protocol

Publication Description:

This document describes the protocol of the X WINDOW SYSTEM IMAGE EXTENSION.

Version 5.02

X Consortium Standard

X Version 11, Release 6.4

December 16, 1996

Contents

Parameter Types 3-1

Resources 4-1

Pipelined Processing 5-1

Import Elements 6-1

Process Elements 7-1

Export Elements 8-1

Events and Errors 9-1

Techniques A-1

Service Class B-1

Protocol Encodings C-1

Figures and Tables

Preface

The X architecture was a major step towards defining open, interactive application display services. X pried apart the tightly coupled, private interconnect that has existed between application and display subsystem by specifying a minimal, structured service set.

To retain a consistent, minimal core service set and yet accommodate evolving application requirements, X provides a method for extending the core protocol with additional domain specific requests.

This document defines an X extension for the imaging domain. It is the fifth version of the X Image Extension Protocol proposal and, as prior readers will immediately recognize, it is a lineal descendent of the other four.

Because the purpose of this document is to provide a clear, concise articulation of the protocol, expository materials have been pared to a bare minimum. It is assumed that the reader has a measure of conceptual knowledge about imaging.

Readers who lack familiarity with the X Window System are encouraged to begin with a selection from the related documents given below.

Related Documents

- *X Window System* (Scheifler & Gettys)
  The complete reference to Xlib, X protocol (and extension conventions), ICCCM, XLFD.
  Digital Press
- *X Protocol Reference Manual* (Nye, editor)
  The Definitive Guides to the X Window System, Volume 0.
  O'Reilly & Associates, Inc.
- *The X Window System Server* (Israel & Fortune)
  Guide to the X sample server: architecture, porting and tuning, writing extensions.
  Digital Press
- *XIE Sample Implementation Architecture* (Shelley, Verheiden & Fahy)
  An overview of the architecture of the XIE sample implementation.
  AGE Logic, Inc.
- *XIElib Specification* (Rogers)
  Reference pages for the XIE client library functions.
  AGE Logic, Inc.

Participants

Authors:

Robert NC Shelley	Digital Equipment Corporation
Robert W. Scheifler	X Consortium, Inc.
Ben Fahy	Visionary Software, Inc.
Jim Fulton	Network Computing Devices, Inc.
Keith Packard	Network Computing Devices, Inc.
Joe Mauro	Digital Equipment Corporation
Richard Hennessy	Avid Technology, Inc.
Tom Vaughan	Digital Equipment Corporation

Contributors:

Gary Grebus	Digital Equipment Corporation
Larry Hare	NetManage, Inc.
Peter Kaczowka	Hewlett-Packard Co.
Jeffrey Siegal	Congruent Corporation
Al Tabayoyon	North Valley Research, Inc.
John Weber	Big Time Software, Inc.

Revision History

rev v1.0	August 1, 1988 first protocol draft
rev v2.0	April 12, 1989 major changes based upon consortia review
rev v2.1	November 1, 1989 changes based upon FT1 implementation
rev v2.2	March 15, 1990 changes based upon FT2 implementation (pipes)
rev v3.0	October 1, 1990 changes in preparation for consortia review
rev v4.0	June 1, 1991 changes based upon consortia technical review
rev v4.08	May 29, 1992 preliminary imagework review copy
rev v4.09	June 9, 1992 imagework review copy for meeting at San Jose
rev v4.10	September 10, 1992 pre-review of encodings and contributions
rev v4.11	October 31, 1992 imagework review with initial definition of DIS
rev v4.12	December 23, 1992 initial Public Review copy
rev v4.13	May 19, 1993 changes made during Alpha phase of sample implementation
rev v4.14	October 20, 1993 changes made during Beta phase of sample implementation
rev v4.15	December 15, 1993 changes made prior to final release of sample implementation
rev V5.0	January 10, 1994 final draft
rev V5.0	April 18, 1994 cosmetic cleanup prior to releasing X11 R6
rev v5.01	July 5,1996 incorporate Digital Press edits
rev v5.02	December 16, 1996, incorporate additional Digital Press edits and X11 R6.3

Organization

This document is organized into the following chapters and appendices:

Introduction

Chapter 1	Explains the purpose of the X Image Extension (XIE).

Protocol Parameter Types and Syntax

Chapter 2	Defines protocol syntax (how the protocol is encoded on the wire).
Chapter 3	Defines types for protocol parameters.

Protocol Requests and Replies

Chapter 4	Describes the resources used by the XIE protocol and library.
Chapter 5	Describes pipelines, client data transport, and pipeline utility requests.

Pipeline Elements

Chapter 6	Describes pipeline elements used for data import.
Chapter 7	Describes the general processing elements used in pipelines.
Chapter 8	Describes pipeline elements used for data export.

Events and Errors

Chapter 9	Describes events and errors returned from XIE.

Techniques

Appendix A	Describes the XIE standard techniques and their parameters.

Service Classes

Appendix B	Summarizes required, optional, and excluded items for each XIE service class.

Protocol Encodings

Appendix C	Provides the complete protocol encoding for all XIE: types, requests, replies, elements, techniques, events, and errors.

Acknowledgments

We are all indebted to Digital Equipment Corporation where the X Image Extension was originally conceived. They persevered through numerous protocol reviews and revisions and provided the initial sample implementations. Their efforts contributed greatly towards promoting XIE into the Public Review process.

This document evolved from original specifications authored by Joe Mauro. We hope that it still shows some of his architectural strength and elegance. The majority of the current document (through version 4.11) was authored by Bob Shelley while employed at Digital. Subsequent revisions were made at AGE Logic.

The current view of pipelines emerged almost completely intact from a single, terse email message from Bob Scheifler and Keith Packard.

The need for robust geometric transforms was first promoted by Ben Fahy. We are grateful that he has provided us with detailed documentation for the basic geometry element and several retrospective sampling algorithms.

While one could debate that XIE is too big or too small, we can thank Jim Fulton for spearheading the effort to define a smaller gentler XIE, the Document Imaging Subset.

almost blank