



THE QUICK BROWN FOX JUMPED OVER THE LAZY
DOG. the quick brown fox jumped over the lazy dog

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APPENDIX F

Linearized PDF

A Linearized PDF file is a file that has been organized in a special way to enable efficient incremental access in a network environment. The file is valid PDF in all respects, and is compatible with all existing viewers and other PDF applications. Enhanced viewer applications can recognize that a PDF file has been linearized and can take advantage of that organization (as well as added hint information) to enhance viewing performance.

The Linearized PDF file organization is an optional feature available beginning in PDF 1.2. Its primary goal is to achieve the following behavior:

- When a document is opened, display the first page as quickly as possible. The first page to be viewed can be an arbitrary page of the document, not necessarily page 0 (though opening at page 0 is most common).
- When the user requests another page of an open document (for example, by going to the next page or by following a link to an arbitrary page), display that page as quickly as possible.
- When data for a page is delivered over a slow channel, display the page incrementally as it arrives. To the extent possible, display the most useful data first.
- Permit user interaction, such as following a link, to be performed even before the entire page has been received and displayed.

This behavior should be achieved for documents of arbitrary size. The total number of pages in the document should have little or no effect on the user-perceived performance of viewing any particular page.

The primary focus of Linearized PDF is optimized viewing of read-only PDF documents. It is intended that the Linearized PDF be generated once and read many times. Incremental update is still permitted, but the resulting PDF is no

- After a transaction has completed, obtaining more data requires a new request-response transaction. The connection between client and server does not ordinarily persist beyond the end of a transaction, although some implementations may attempt to cache the open connection to expedite subsequent transactions with the same server.
- Round-trip delay can be significant. A request-response transaction can take up to several seconds, independent of the amount of data requested.
- The data rate may be limited. A typical bottleneck is a slow modem link between the client and the Internet service provider.

These properties are generally shared by other wide-area network architectures besides the Web. Also, CD-ROMs share some of these properties, since they have relatively slow seek times and limited data rates compared to magnetic media. The remainder of this appendix focuses on the Web.

Some additional properties of the HTTP protocol are relevant to the problem of accessing PDF files efficiently. These properties may not all be shared by other protocols or network environments.

- When a PDF file is initially accessed (such as by following a URL hyperlink from some other document), the file type is not known to the client. Therefore, the client initiates a transaction to retrieve the entire document and then inspects the MIME tag of the response as it arrives. Only at that point is the document known to be PDF. Additionally, with a properly configured server environment, the length of the document becomes known at that time.
- The client can abort a response while the transaction is still in progress if it decides that the remainder of the data is not of immediate interest. In HTTP, aborting the transaction requires closing the connection, which interferes with the strategy of caching the open connection between transactions.
- The client can request retrieval of portions of a document by specifying one or more byte ranges (by offset and count) in the HTTP request headers. Each range can be relative to either the beginning or the end of the file. The client can specify as many ranges as it wants in the request, and the response consists of multiple blocks, each properly tagged.
- The client can initiate multiple concurrent transactions in an attempt to obtain multiple responses in parallel. This is commonly done, for instance, to retrieve inline images referenced from an HTML document. This strategy is not