

# BPS22 Page-on-Demand Viewing

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## Abstract

*This document describes the page-on-demand viewing features for BIRT 2.0*

## Document Revisions

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## 1. Introduction

Page-on-demand, also referred to as demand paging, is a mechanism for dealing efficiently with large report documents over a remote connection such as the Internet. Instead of reading an entire report into memory or sending an entire report over a network, pages are requested by the application and sent as needed. This method of data transfer improves response time for the end user and optimizes resource usage.

When integrating BIRT into applications, particularly web applications, page-on-demand capabilities are needed to ensure that the application can be built with acceptable performance.

A table of contents shows the hierarchical structure of the report to the end user. The hierarchy is defined by the group and sub-report structure of the report, with customizations possible by the report developer -- such as providing custom text for each node in the hierarchy. When the user clicks on a TOC link, he is taken to the first page of that group. This creates another way to quickly navigate to a section of the report.

This document specifies the behaviors end user sees about page-on-demand viewing, and TOC. It also covers the operations that application developers can access to build such UI.

## 2. UI Features

### 2.1 Page-On-Demand Viewing

End user sees a paginated viewing tool bar with several buttons/links or input box. The toolbar has an input box for user to enter a specific page. If the number entered is smaller than -1 or larger than the last page, the first or last page is displayed. The UI has buttons for going to next, previous, first, or last page. If the user is already on 1<sup>st</sup> (last) page, the first and previous (last and next) page buttons are disabled.

The UI should also display the number of viewable pages in the report. Different users may be able to view different number of pages in the report if the report has certain security features built in.

### 2.2 TOC

TOC is displayed as a separate tree to the left of the report content. TOC trees are expanded incrementally, meaning that clicking the root of the tree only expands the next level. As a result, TOC performance is bounded by the number of items in the expanded level, not the total size of the TOC entries.

If each TOC level has more than 500 entries, the TOC is truncated there, with a 501<sup>st</sup> entry added reading "More entries truncated".<sup>1</sup>

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<sup>1</sup> If a report has more than 500 TOC entries at one level, the report developer should consider adding additional group levels for the TOC to be useful.

Clicking on each TOC entry navigates to the first report page that displays the TOC group.

### 3. Report Engine operations

This section describes report engine operations that application developers can use to construct the page-on-demand viewing UI.

#### 3.1 Page-on-Demand Viewing

Given a report document, report engine supports two page-related operations:

1. Render page X.
2. Get Page Count.

It is application developer's responsibility to keep an active viewing session, which tracks the page that is currently viewed. Knowing the page count and current page, going to next, first, previous or last page can all be implemented accordingly.

BIRT viewer provides a reference implementation of page navigation UI.

#### 3.2 TOC

At design time, the `toc` property for each group and subgroup is by default set to the same as the group key; the `toc` property is left blank for other report items. Users can customize the `toc` expression or add `toc` expressions to other report items. TOC index is generated at factory time and stored into report document.

Given a report document, report engine supports an operation to get TOC nodes as an array. The caller can also specify the TOC parent node, the TOC depth, and the maximum number entries returned for each TOC level. By default, the parent node is report root, the TOC depth is 1, and the number of TOC entries is infinite. To use only the first 500 entries in TOC, one can specify the maximum entries to be returned for a level to 500.

#### 3.3 Security Considerations

If a report has security features implemented, different users may see different report content. Report pages seen by each user is based on the content that the user could actually see. The TOC only includes groups that are viewable by the end user.

BIRT 2.0 does not implement advanced security features.