

NXT[®] 3 CONTENT SERVER[®]

TECHNICAL OVERVIEW

INTRODUCTION

NXT 3 is a Content Networking platform that simplifies the access, management and exchange of pertinent data. It provides information with a purpose. It is the first vendor neutral platform for networking and assimilating content from multiple locations, in a variety of data formats. It answers the challenge faced by today's corporations to enhance business relationships, to give users personalized, real-time access to dynamic information, regardless of its format or its physical location, and to improve the efficiency of business operations.

The heart of NXT 3 is the e-Content Platform. This platform consists of several modules that each provide different features and services of the platform. This paper concentrates on one of those modules—the NXT 3 Content Server.

The NXT 3 Content Server provides personalized content delivery, content navigation, content management, administration, and scalability. It allows complete content integration. This component is the piece that aggregates and maintains content from various data sources on the Internet, intranet, or extranet.

PERSONALIZATION

The Web has globalized and drastically increased the scale of information exchange, but it is still far from fulfilling its promise to improve the quality and intimacy of these exchanges. Users need help getting the right level of information and finding the needed functionality at the moment that they need it. Personalization maximizes productivity by putting only needed information and tools at the user's fingertips, and by shaping all presented information to match the preferred look and feel identified by the user.

NXT 3's adaptable platform allows you to add value to the browser experience to give your users the functionality and flexibility that they need. The Content Server stores personalization information for each of your users, making personalization choices persistent across sessions for each user.

International Language Support

Content views may be associated with a particular language and will display all templates and content that correspond to that language. This feature enables multi-national corporations to provide translated content in the native language of the user—all on a single portal system.

Server-Side User Database

The NXT 3 Content Server stores personalization information in a server-side user database. Because such information resides on the Content Server, users can log in from any workstation and see their familiar portal. Future versions of this database will track the way an individual uses the system and will generate a profile based on that use.

Notifications

Groups or Users can subscribe to receive notifications of updates to content in areas of interest. In addition, concepts and agents can be implemented to notify users about information that was either submitted or found to be of interest to others users with similar profiles.

CONTENT NAVIGATION

The large body of content that resides on a portal typically comes from different sources. Much content comes from external sources in a finished form, but other content is internally generated and continuously updated. Managing dynamic content requires a system that does the following:

- allows new content submissions from various sources
- allows modification of existing content
- allows editors to organize the resulting content collections

The NXT 3 Content Server provides a platform for collecting, managing, and ensuring the quality of such content. It provides a powerful set of Component Object Model (COM) interfaces that allow complete customization of the portal presentation and easy integration into existing portal frameworks. All content services are easily accessible to Active Server Pages and other scripting engines and application servers. The COM interfaces are also fully accessible from C++.

These interfaces support the development of presentation components, content services, and Access Control Modules (ACMs). Additional interfaces allow the creation of display filters for translating content from one format to another (for example XML to HTML), document source extensions for content conversion and indexing, and language modules for international support.

All components and services use standard interfaces for communication with external systems, both inside and outside the enterprise. Data and document services rely on ODBC, SQL, ADO, or LDAP. SMTP or LDAP provide email service access. Relational data is dynamically converted to XML for indexing, report generation and display. All standard components and services produce XHTML- and XML-compliant outputs to be used in conjunction with eXtensible Stylesheet Language (XSL) and Cascading Style Sheet (CSS) conversions.

Support for XML Content

The NXT 3 Content Server takes full advantage of XML document structure for navigation, for full text indexing, and for indexing specific elements. The Content Server module allows administrators to specify which elements define structure such as those used to build the table of contents.

Content from different sources is likely defined using different schemas and elements. To make a single search effective across such a broad range of data, the administrator may associate analogous tag names. For example, while one document may use the <author> element to refer to the individual that wrote the document, a document from a different source might use an analogous <creator> element. These elements may both be mapped to a single indexed field named "Document Author." This technique can be extended to unify searching across formats that are not even XML. This is particularly useful when the content contains mixes of HTML, XML documents, and XML generated from relational data.

The NXT 3 Content Server sets the rules for indexing and navigation through a mechanism called Extensible Indexing Language (XIL). In the same way that stylesheets define formatting through CSS or XSL, NXT 3 indexsheets define content indexing through XIL. Indexsheets give a content publisher or administrator control over what gets indexed, how it gets indexed, and which elements depict structure useful for sub-document navigation.

XIL is a rule-based system based on XSL Transformation (XSLT). However, rather than applying formatting with "formatting objects," indexing rules are applied with "indexing objects." Just as XSL can potentially format each element type or even a single element instance differently, indexsheets can index each according to specified indexing properties.

Since element selection is based on the XSLT standard, the syntax and use is both familiar and standard. According to the XSLT W3C Recommendation, "XSLT is . . . designed to be used independently of XSL for the kinds of transformations that are needed when XSLT is used as part of XSL." Applying indexing properties to elements is a great example of how XSLT can be used for other applications.

Indexsheets also allow you to index an element for searching only, without delivering that element to the consumer. Thus you leverage value-added metadata for searching but protect it from unauthorized re-use.

Dynamic XML Processing

The NXT 3 Content Server obtains relational data from a database service and translates it into XML documents. These resulting documents may be managed in the same manner as any other XML document.

Although the newest browsers support XML rendering using XSL, Internet publishers can't assume that their users always have the latest Web browser technology. The Content Server addresses this problem through display filters. Each display filter converts a designated document format at run time. For example, an XML/XSL display filter can determine the user's browser version and make a run-time decision about what file format would work best for the browser. Users that have the latest browsers that support XML and XSL will get the XML documents natively for a richer display. If the user has an HTML-only browser, then the display filter will apply the XSL transformations to the document and then serve up the resulting HTML document to the application. This gives you the ability to publish XML content even for applications that do not support it.

Each item of content known to the system is represented as a node within the Content Server. Each of these nodes may have metadata associated with it that is maintained separately from the content itself. This does not preclude the content containing its own metadata definitions, but is used to augment that information or provide it if it does not

exist. The Content Server manages metadata that conforms to the Resource Description Framework (RDF) standard. The actual elements defined using RDF are configurable. The site administration application manipulates a site definition file (SDF), an XML file that tells the Content Server which information collections to deliver.

NextPage supports the standards efforts within the industry and endorses the following works:

- ICE (Information and Content Exchange Format and Protocol)
- PRISM (The Publishing Requirements for Industry Standard Metadata)
- WebDAV (Distributed Authoring and Versioning)
- RDF (Resource Description Framework)

CONTENT MANAGEMENT

A Portal Administrator defines the basic layout, updates, content connections, syndication links, and access rights of the site. The Access Control System facilitates user role assignment based on job responsibilities. For example, one user may have rights to access a portion of the content, but not to submit or change content. Another user may be allowed to author or update, but not to remove or organize content. Another user may be allowed to edit and organize content within a particular section of the site. These roles are not mutually exclusive. For example, a user may be the designated editor for a department, but still be able to submit cross-departmental documents. The NXT 3 Content Server provides a mechanism for handling all of these situations.

Adding or Modifying Content

An author can use an editor or word processor to create new documents or to modify existing documents. Authors may submit documents to the portal, specify location in the content hierarchy, and specify document metadata such as author, title, and description. A user may also modify an existing document and document metadata. During modification, the author checks out and locks the document, which prevents other users from checking out the document. Documents are not available for access until approved.

Integration with External Content Management Systems

NXT 3 provides basic content management functionality. However, some content management features, such as storing old versions of documents or viewing differences between two documents, are more suitable for specialized content management applications. If more advanced functionality is required, an NXT 3 Content Collection Service can be used to integrate with a specialized content management system.

ADMINISTRATION

Administration of the Content Server is available through the Content Network Manager application.

[[need info on this application]]

SCALABILITY

Quality access makes or breaks a corporate portal. As the point of access to a network of converging information, poorly architected content delivery systems can easily become the bottleneck. As a result, requests for mission-critical information can get tied up in traffic. Add the Internet and extranet traffic to your portal network, and your bottleneck nuisance can become a serious liability. As information changes and as new sources are added to the network, the variety, sheer volume, and dynamic nature of the sources compounds the problem. As your quantity of access through the bottleneck increases, the quality of access decreases.

Multithreaded Architecture

NXT 3 replaces the bottleneck with a multithreaded content delivery solution designed for thousands of users who need to access multi-gigabyte collections of frequently updated information. As additional users increase demands on your system, the NXT 3 Content Server allows you to extend your portal's scalability by adding processors. You can easily scale the user side by adding servers as well as processors, employing a load balancer to accommodate traffic.

Distributed Processing

The Content Network Protocol provides scalability to the volume of content by distributing processing over multiple back-end systems. Multiple repositories can be searched simultaneously rather than sequentially, allowing a greater number of users to access a greater pool of data, in less time.

Multiple installations of the Content Server can be load balanced allowing sites to scale with additional hardware. The NXT 3 Content Server supports hundreds of gigabytes of information distributed across dozens of servers while maintaining optimal system performance.

CONCLUSION

The NXT 3 Content Server lies at the heart of any Content Network application. As its name suggests, it provides content for any number of applications that exist at the presentation layer of the Content Network architecture. These applications make requests to the Content Server; based on these requests, the Content Server provides the appropriate content.

The whole purpose of a portal is to provide access to a variety of sources that contain documents in various formats. The NXT 3 Content Server allows complete content integration and ensures the information is appropriate and relevant to the user who needs it.