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Costpoint Content Management Integration

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Overview

In today's enterprise, the demand to store non-structured content is rising exponentially. Documents, blueprints, images, videos, and other content contain information that is just as important as database transaction records. ECM (Enterprise Content Management) systems have become ubiquitous tools for content storage and business decision making. According to Gartner®, the ECM market is showing steady growth of 12% per year.

To capture these trends and provide additional value to Deltek customers, Costpoint 8 includes the Content Management Integration (CMI) framework.

Costpoint CMI supports all editions of Microsoft® SharePoint® 2007, 2010, 2013, 2016, 2019, and SharePoint in Office 365, using a native SharePoint API, and supports other ECM systems through the CMIS API, which is a standard specification developed by major ECM vendors and moderated by the OASIS consortium.

Note: Deltek supports integration through CMIS, but Deltek has not fully tested all ECM systems that expose CMIS API. So far, verified CMIS integrations are: IBM FileNet P8, OpenText, Hyland OnBase, and Alfresco.

If you have other CMS system that supports CMIS and would like to integrate it with Costpoint, Deltek will work with you and your CMS vendor to solve any issues that arise. Contact Deltek ahead of time to discuss the CMS product you use and the level of support you will need.

The primary goal of Costpoint CMI is to provide access to the CMS (Content Management System) from within Costpoint application screens. Access means the ability to:

- View content
- View and change content properties (metadata)
- Associate (or link) content files to Costpoint records
- Upload files to CMS

Linking is done at the business entity level. For example, a specific Costpoint voucher is linked to the image of the scanned invoice. Regardless of the Costpoint application screen that processes or views the voucher, the CMS invoice image is always visible and accessible after the link is created.

Costpoint CMI functionality is fully configurable. It is not activated for any Costpoint application by default, but can be activated for most applications.

Purpose of this Guide

This guide describes how to configure and tune Costpoint CMI.

Because SharePoint is the first CMS that is fully supported by CMI, the remainder of this guide will focus on specific SharePoint configuration requirements and on recommendations for Costpoint to SharePoint integration.

CMI Terminology

This document uses the following terms and abbreviations common to CMI applications.

Term	Definition
(E)CMS (Enterprise Content Management System)	A third-party product (for example, Microsoft SharePoint, EMC® Documentum®, IBM® FileNet®, Hyland OnBase) used to store content such as documents and other electronic content files.
Costpoint CMI (Content Management Integration)	The collection of Costpoint system applications and framework features that enable integration with a CMS.CMS Connection (or Endpoint)A CMS service point, which is a set of protocol, address, and security configuration parameters used to connect Costpoint to the CMS service.
CMS Repository	A logical storage facility for content within a CMS. The same CMS connection can provide access to more than one repository. In SharePoint, "Document Library" is the name for a repository.
CMS Content Type	A category of content items or documents in a CMS. It includes a collection of attributes, properties, and metadata definitions.
CMS Content Property	A field associated with an object in a CMS to describe that object or allow users to search for content based on a property value.
Costpoint Content Type	An abstract business entity defined as an integration point to CMS content types.
Costpoint Application	A self-contained business unit within the Costpoint system.
Costpoint Result Set	An application screen object in Costpoint that contains data. All screens in Costpoint require at least one result set. Complex Costpoint application screens can contain several result sets, organized in tree structures.

Functional Overview

Once enabled and configured, CMI brings the following features and functionalities to Costpoint applications:

- You can link a document in Costpoint with a document in the CMS (for example, link a voucher to a scanned image of an invoice).
- You can pre-populate Costpoint documents based on scanned documents in the CMS (for example, pre-populate a new voucher with data extracted by Optical Character Recognition from a scanned invoice).
- You can change CMS document metadata or synchronize it with Costpoint document fields.
- You can view linked CMS documents from within Costpoint.
- Linked CMS documents stay attached to a Costpoint document as it is processed through various applications (for example, the link for an attached invoice will be preserved when you post an invoice, and will be available through the Voucher History application).
- You can use the CMS as a replacement for shared network folders:
  - You can print from Costpoint directly to the CMS.
  - You can point Costpoint pre-processors and interfaces directly to documents in the CMS.

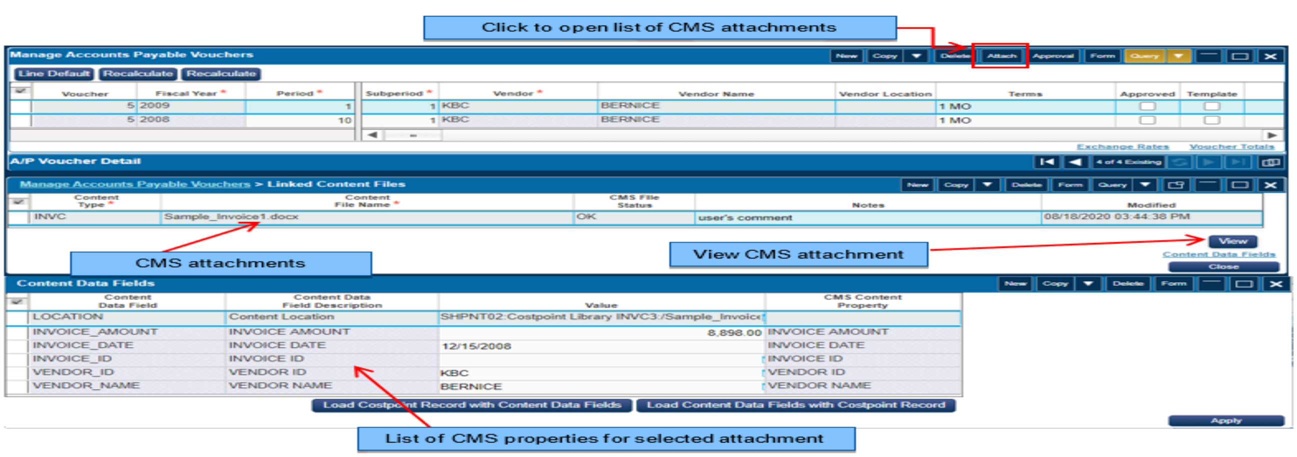
Overview of Linking to CMS Content Files

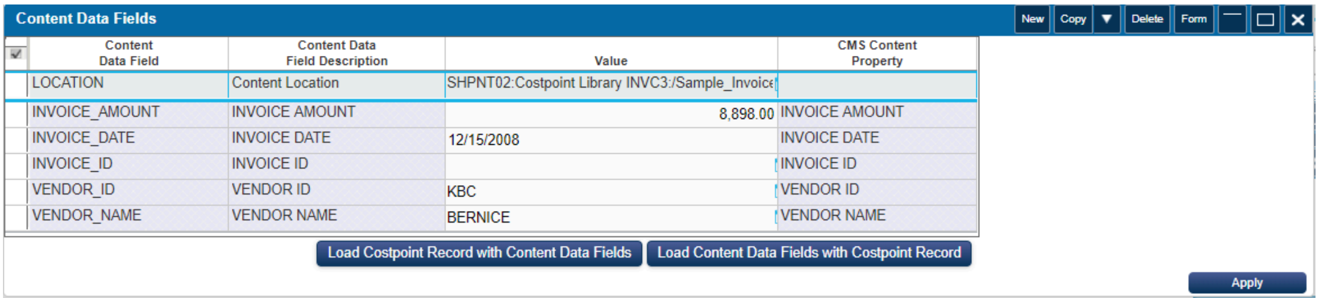
When CMI is configured for a particular Costpoint application screen, the **Attach** button on the toolbar becomes enabled. Click this button to display the Linked Content Files system subtask. This table (initially empty) displays a list of content files from the CMS that are linked to the current Costpoint transaction record.

You can create a new association (link) from the Costpoint record to the CMS content files by entering a new record into the Linked Content Files table. As part of the entry process, you can query CMS documents and identify which ones to link to by viewing the document's metadata and contents.

Click the **Content Data Fields** link to display the content data property (metadata) subtask. Based on your CMI configuration and CMS metadata setup, you can change the content file properties and synchronize them with the transaction record.

All of these features are discussed in detail in this document.

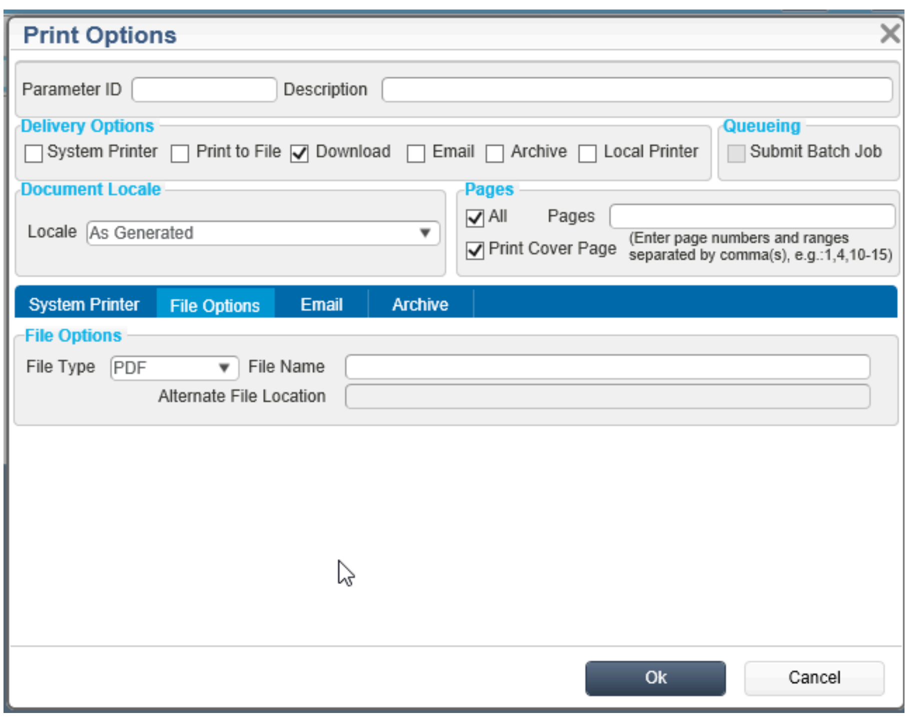




Overview of Printing to CMS

Printing to a CMS is the same as printing to a file system. The only difference is that you can set up an **Alternate File Location** as a CMS destination.

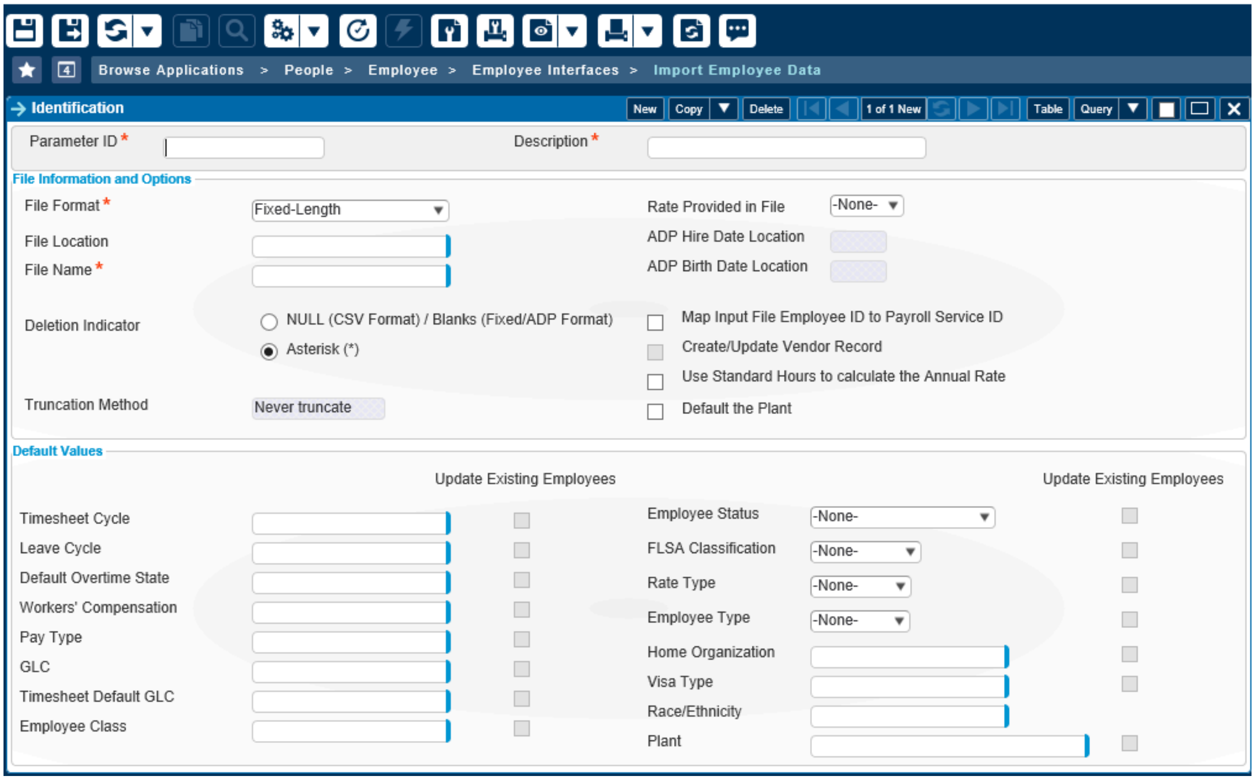
Attention: See the Use the CMS as an Alternate File Location section for more details.



Overview of Importing Documents from the CMS

This feature is basically the same as importing from a file system. The only difference is that you can set up an **Alternate File Location** as a CMS source.

Attention: See the Use the CMS as an Alternate File Location section for more details.



Configure SharePoint Authentication

Costpoint uses SharePoint Web services to communicate with SharePoint. CMI connectivity is configured using the Costpoint Configuration Utility. CMI supports most of the SharePoint authentication scenarios including: **Windows Authentication** (NTLM), **Basic Authentication**, and **Federated Authentication** utilizing **ADFS**. For SharePoint in Office 365, CMI supports app-only authentication using OAUTH2.

CMI uses single user account to access SharePoint and this user must have full privileges to specific SharePoint site that is being integrated with Costpoint.

Configure SharePoint Site and Libraries for CMI

Note: The configuration steps described here are just suggestions. Costpoint CMI should work with any SharePoint site, but following these guidelines will make all features fully functional.

Repository

In a CMS, the basic storage facility for content is called the repository. The equivalent SharePoint storage unit is called a Document Library. Any reference to repository in Costpoint can be interpreted as referring to a SharePoint Document Library. If your SharePoint deployment has multiple Document Libraries, they will be visible from Costpoint as separate repositories.

Note: Deltek recommends using separate SharePoint Document libraries (repositories) for different document types. While it is possible to use folders inside the library, separation by document libraries provides significantly better performance and access control.

Content Types

A content type is a reusable collection of metadata, workflow, behavior, and other settings for a category of items or documents in a repository. For example, you can set up and maintain separate content types for invoices, expense reports, or purchase orders. Content types let you manage the settings for a category of information in a centralized, reusable way.

When you use Costpoint CMI, Deltek recommends that you set up SharePoint content types, and configure Document Libraries to use them. Using content types is not required for Costpoint CMI, but it brings additional value by helping you manage content by using content metadata.

Note: The management of content type hierarchies is a complex subject and an awareness of it is a prerequisite for establishing an effective ECMS taxonomy

Note that SharePoint always uses content types internally. These are built-in content types such as Page, Picture, Document, Item, Message, and Task.

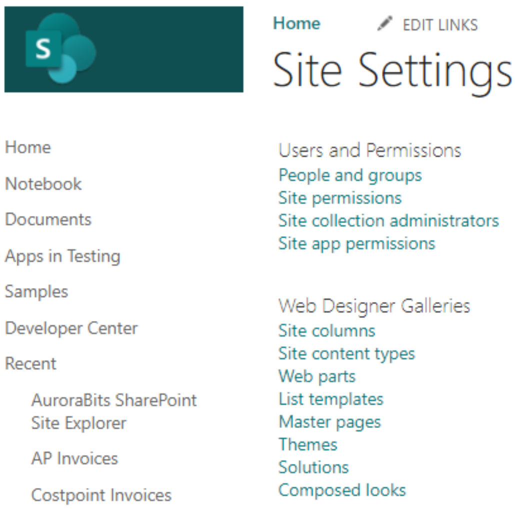
If a SharePoint document library is set up to *not* manage content types, all content files in the library belong by default to the Document content type.

When the SharePoint administrator creates a custom content type, it always inherits properties from its base type.

Important: If you are not familiar with SharePoint administration, you can let Costpoint set up document libraries and content types in SharePoint for you. See the Automatic SharePoint Configuration in Manage Content Types section.

Configure Content Types at the Site Level

In SharePoint, you define content types at the Site level:



On the Site Content Types page, you will see a long list of predefined SharePoint content types. Here you can create brand new content types or new types that inherit properties from existing content types.

For example, if you want to store invoices, create an Invoice content type, or if you want to store employee resumes, create an Employee Resume content type. What defines a content type (besides its name) and differentiates one content type from another are the content type properties, or metadata. For example, an Invoice content type would normally have fields for a Date, Invoice number, Vendor ID, Vendor Name, Due Date, and so on, while an Employee Resume content type would benefit from having fields for a Last, First, and Middle Name, Address, City, State, Zip Code, Phone, and so on.

Configure Content Types at the Document Library Level

After you configure content types, it is time to configure the Document Library. Document libraries can be organized using a folder structure, in much the same way as a disk-based file system is organized. In addition, Document Libraries can store documents that belong to different content types.

Before you can begin using content types in a Document Library, you must enable Management of Content Types for that library. By default, when a Document Library is first created, this option is disabled, meaning that the library has no awareness of content types—every file stored in the library is simply considered a Document. When you enable the option, the library recognizes content types.

To enable a library to manage content types:

1. From within the library, click **Library Settings » Advanced Settings.**

2. In the Content Types section, set **Allow Management of Content Types** to **Yes**.

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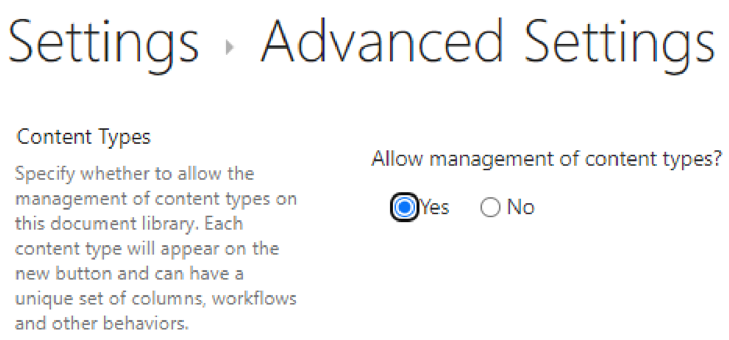


After Content Type Management is enabled for the Document Library, you can select one or more preferred content types for the library, from among the content types already defined for the site.

To enable select preferred content types for the libraries:

1. From within the library, click **Settings » Document Library Settings**.

2. Go to the **Content Types** area.

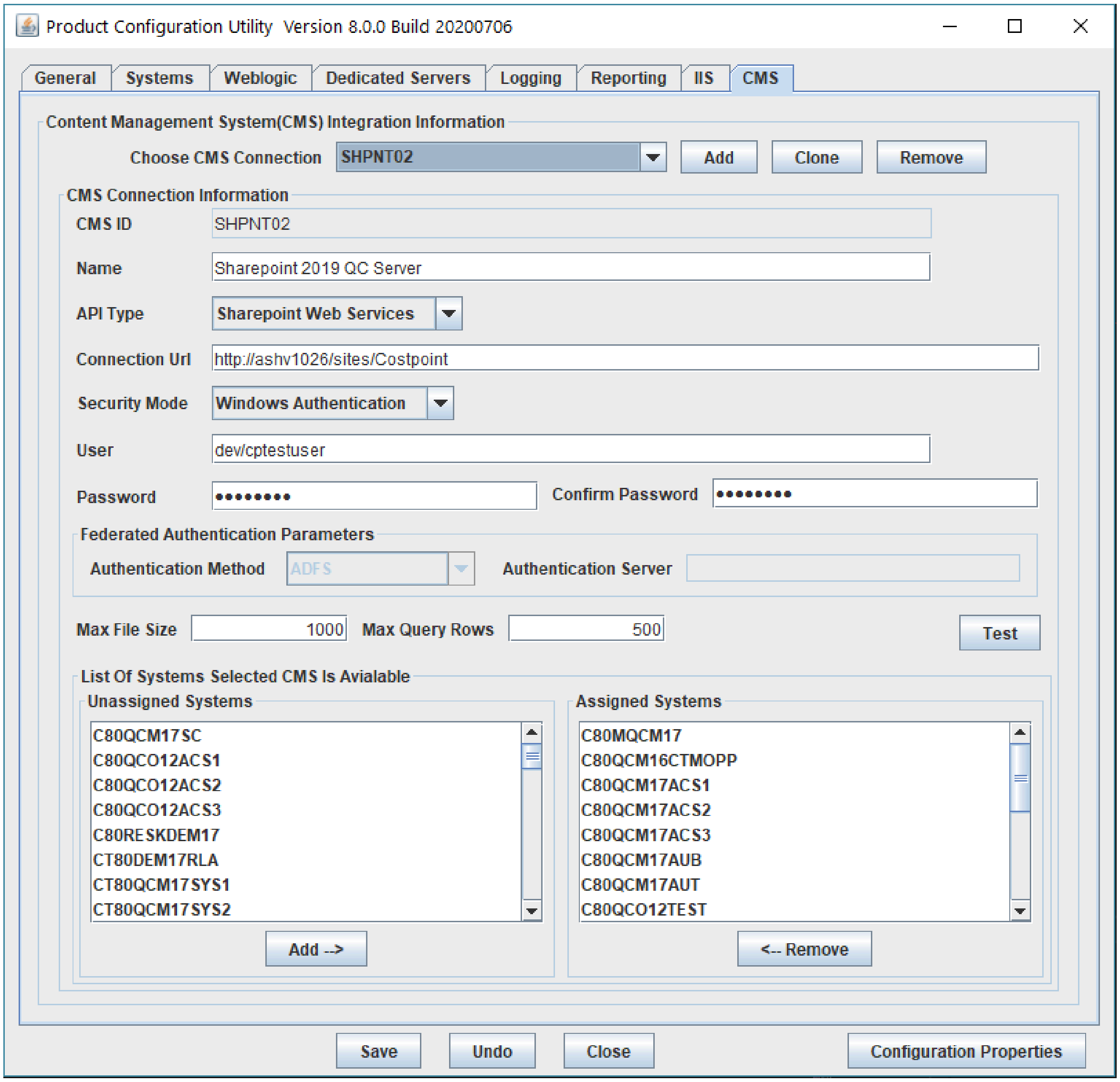
3. Click **Add from Existing Site Content Types**.

4. Move content types from the list of available content types to the list of preferred content types for this library.

Costpoint Configuration Utility: Connecting to CMS

The Costpoint Configuration Utility lets you perform all Costpoint configuration tasks, including setting up the connection to one or more content management systems. The utility has a number of tabs, with one dedicated exclusively to CMS connections.

Attention: For more information about the Configuration Utility, see the *Deltek Costpoint Configuration Utility* guide.



You can configure Costpoint to work with multiple content management systems simultaneously. You must name and configure each CMS connection.

To add a new CMS:

1. Launch the Costpoint Configuration Utility.

2. Click the **CMS** tab.

3. Click **Add** to display the dialog box for the new connection.

4. Enter data in the following fields:

   - **CMS ID**: Enter a unique ID for the connection.
   - **Name**: Enter a descriptive name for connection.
   - **API Type**: For SharePoint, select **SharePoint Web Services** from the drop-down list. For other CMS types, select **CMIS**.
   - **Connection URL**: For SharePoint, enter the URL of the SharePoint site. For the default SharePoint site, use the format **http://servername:port** (or just **http://servername** because the SharePoint port is usually 80). If SharePoint sites are configured and the connection should point to a specific site, enter this parameter using the format **http://servername:port/sites/SiteName**. Connection can use SSL; in which case, the URL starts with **https://**.
   - **Security Mode**: Enter the Web service authentication mechanism. Available options for SharePoint are **Windows Authentication**, **Federated (SAML)**, and **Federated (OAUTH2)**.
   - **User**: Enter the username. If this is an Active Directory user, enter the username in the format **domainname/username**.
   - **Password and Confirm Password**: Enter the user's password, and then re-enter it to confirm.
   - **Federated (SAML) Authentication Parameters**: When you select **Federated (SAML)** for the **Security Mode**, additional selection and parameters are required:
     - **Authentication Method**: Options include **Office 365 with Windows Live authentication**, **Office 365 with ADFS on premises**, and **SharePoint on premises with ADFS on premises**.
   - **Federated (OAUTH2) Authentication**: This option enables the application-only authentication with Sharepoint in Office365.
     Attention: For more information, refer to the Costpoint to Sharepoint App Only Authentication section.
   - **Authentication Server**: This is the name of the ADFS server.
   - **Max File Size**: This is the maximum allowed file size in kb for download of the content file from the Costpoint screen.
   - **Max Query Rows**: The CMS location can contain thousands of records, and it is not functional to show all records in Costpoint. This parameter limits the number of returned rows in the Content File Lookup when Costpoint queries rows from CMS. It is important to note that Costpoint queries all documents, and only the number of resulting rows is limited by this parameter.

5. Click **Test** to validate the connection entries and attempt a connection to the CMS. If the connection succeeds, the following message displays.

6. For each CMS connections entered, you will need to assign a list of systems in which this CMS connection will be available in the **List Of Systems Selected CMS Is Available**.

Costpoint to Sharepoint App Only Authentication

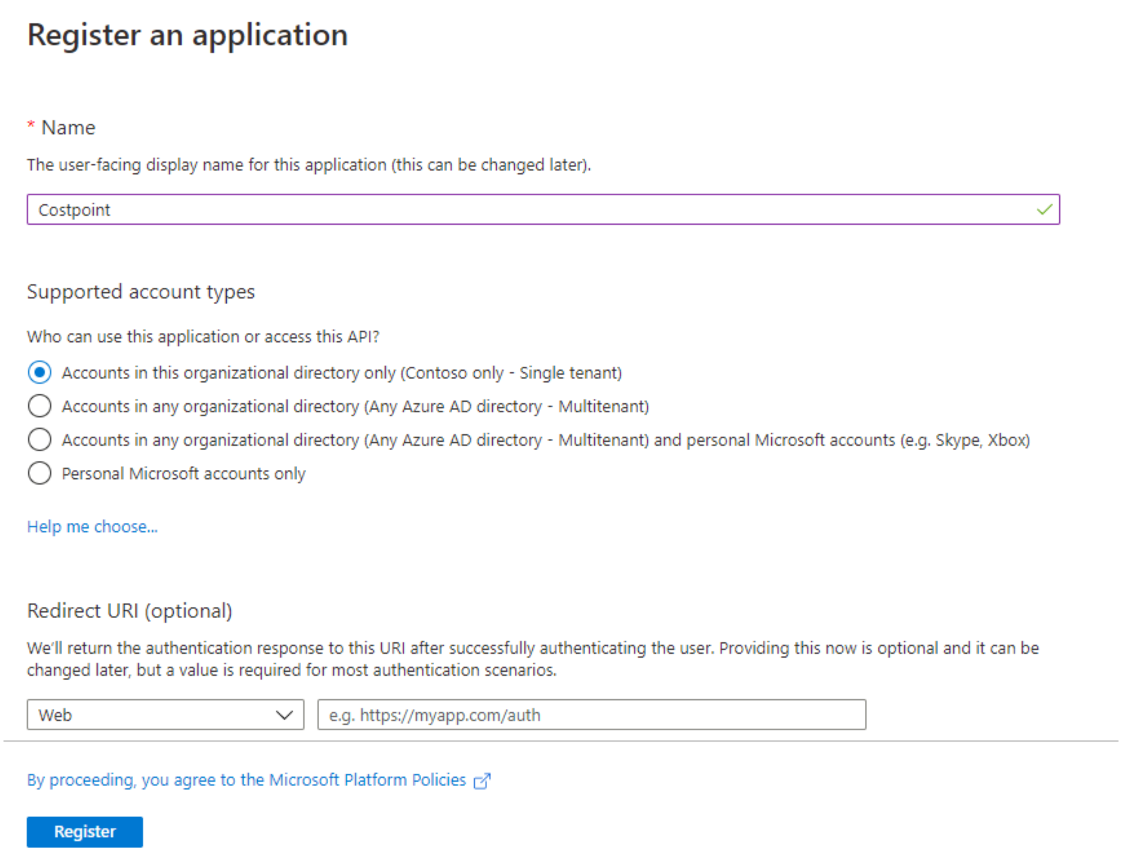
Integration with Sharepoint in Office365 is possible without a username and password.

When using SharePoint Online, you can define Costpoint as an application in Azure AD and grant permissions to SharePoint as well as to all the other services in Office 365. This model is the preferred model in case you are using SharePoint Online.

Azure Portal

After you have access to the Azure portal https://portal.azure.com, select the **Microsoft Entra ID** section and select the **App registrations** option.

The **App registrations** tab contains the list of Azure AD applications registered in your tenant. Click **All Applications**. Verify if Costpoint is already registered as an Enterprise Application, and click it. If the Costpoint application is not already registered, click the **New Registration** button in the upper left part of the page. Next, provide a name for your application (for example, “Costpoint”) and click **Register** at the bottom.



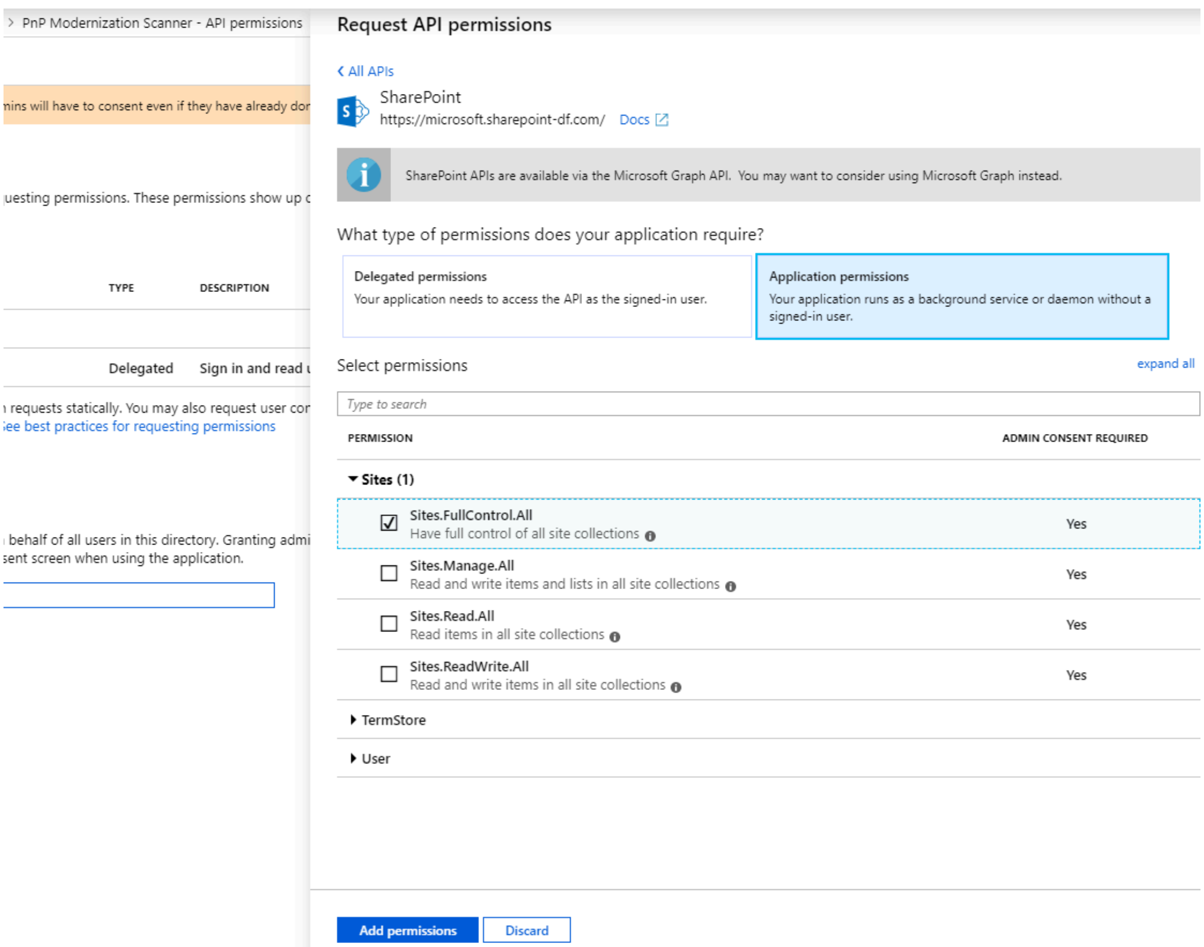
Important: Save the values for the **Application (client) ID** and **Directory (tenant) ID** for the Costpoint app registration. They will be needed to enter into the Configuration Utility.

Next, click **API permissions** in the left menu bar, and click the **Add a permission** button. A new page displays. Here you can choose the permissions that you grant to this application. Choose:

SharePoint » Application permissions » Sites » Sites.FullControl.All

Click the blue **Add permissions** button at the bottom to add the permissions to your application. The **Application permissions** are those granted to the application when running as App Only.

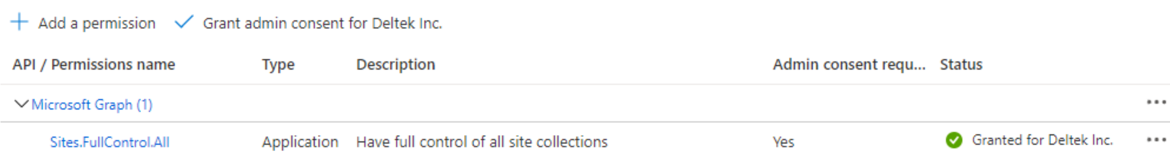
Note: Optionally, you can select the **Sites.Selected** permission option. In that case, you must assign permission to a specific site using the PowerShell or Graph API. One of these methods is described in Appendix 5 or Appendix 6 of this document.



The **Sites.FullControl.All** application permission requires admin consent in a tenant before it can be used. To do this, click **API permissions** in the left menu again. In the **Grant consent** section at the bottom, click the **Grant admin consent for** button, and confirm the action by clicking the **Yes** button that displays at the top.

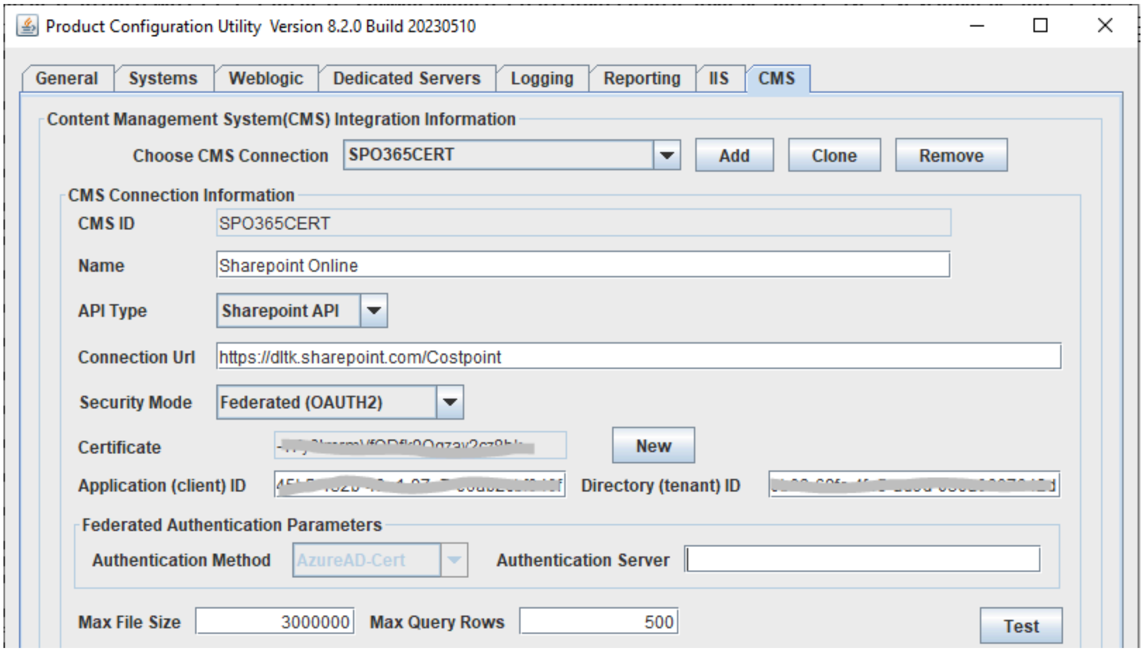
Sharepont in GCC High: Requested Sharepoint permission is in a different place. Open the APIs my organization uses tab, and search for Office. Select Office 365 SharePoint Online and click Application permissions. Required Sites.FullControl.All is located there.

Important: Repeat the same permission process for **Microsoft Graph » Sites.FullControl.All**



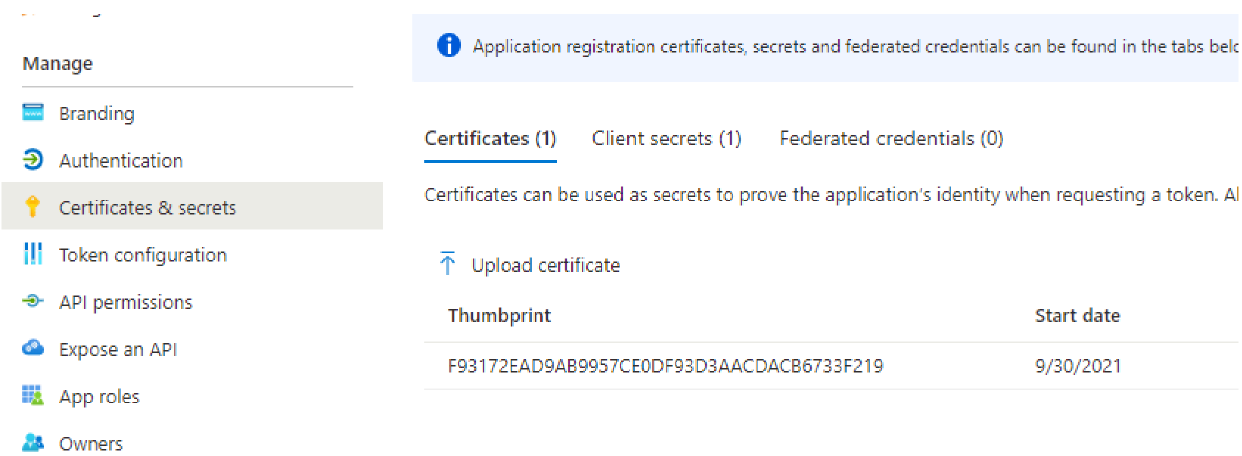
Costpoint Configuration Utility – CMS Tab

- Select Security Mode: **Federated (OAUTH2)**
- The authentication method changes to Azure AD Certificate (value **AzureAD-Cert**) and that is the only option
- The authentication server field is editable. Leave it blank. (It can be used for some special client cases in the future.)
- Username and Password disappear, and instead there are:
  - **Certificate**
  - **Application (client) ID**
  - **Directory (tenant) ID**
- The **Certificate** field is read-only. If a certificate is already generated, then this field contains a certificate thumbprint.
- Clicking the **New** button does the following:
  - The Costpoint Config Utility generates the private key and certificate. A new certificate thumbprint displays in the **Certificate** field.
  - You are prompted to save the certificate to your local drive as **Costpoint.cer** or you can change the name.
- Fill in the **Application (client) ID** and **Directory (tenant) ID** fields with previously saved ids from the Azure portal.
- You can save the configuration now, but a connectivity test can be performed only after the certificate is uploaded to Azure.



Back to the Azure Portal

The final step is uploading the certificate created with the Config Utility to the application registration in the Azure portal. Click **Certificates & secrets** in the left menu bar. Click on the **Upload certificate** button, select the CER file from your local drive, and click on **Add** to upload it.



Back to Costpoint Configuration Utility

After the Azure Portal app registration is complete and the certificate uploaded, you can click the **Test** button to test the connectivity to Sharepoint as well as save the configuration if it was not saved previously.

Manage Content Types

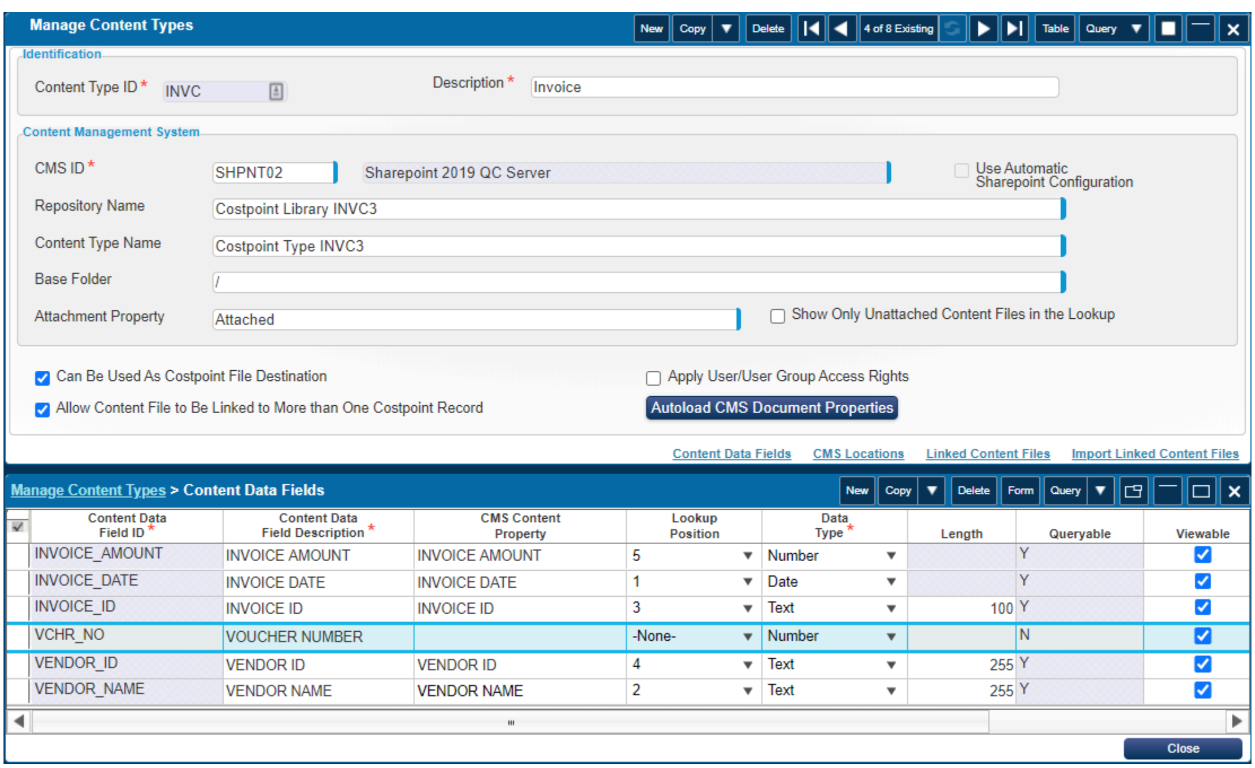
Use the Manage Content Types (SYMCMICT) application in Costpoint to launch the screen where you define Costpoint content types and map them to CMS content types and/or folders.

Before you do this, it is very important to understand the distinction between Costpoint and CMS content types.

A Costpoint content type defines the mapping to a specific CMS content type at a specific CMS endpoint (connection) and repository. Costpoint content types and their association with CMS content types at a specific CMS endpoint and repository define integration points between Costpoint and CMS. They create an abstraction of CMS content types and provide transparent operation regardless of missing or extra CMS content type features.

Furthermore, a Costpoint content type contains properties that can, but do not have to be, mapped to CMS content type properties. Costpoint and CMS content type properties do not have to match each other exactly. A CMS content type can contain properties that are not relevant for integration with Costpoint. And, similarly, a Costpoint content type might require properties that do not exist in the CMS.

All Costpoint applications that use CMI work exclusively with Costpoint content types and have no knowledge of CMS content type properties.

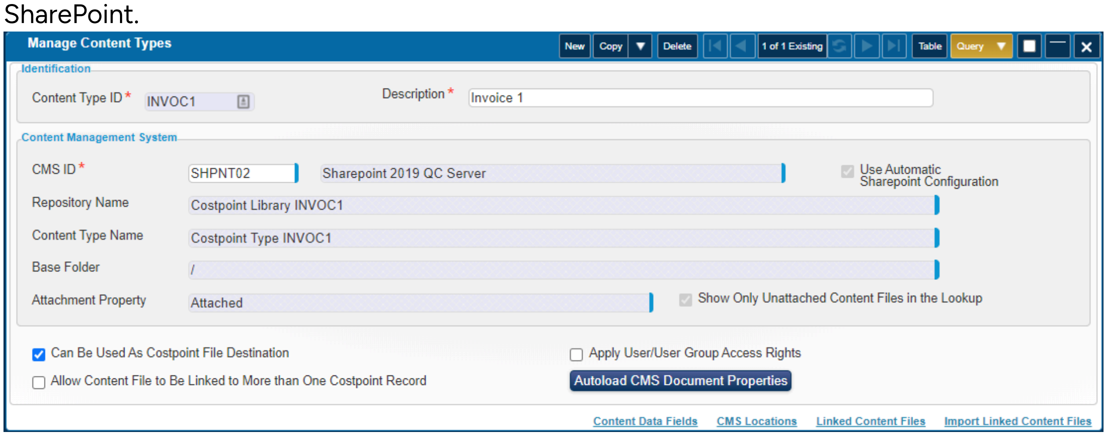


To set up a Costpoint content type:

1. From Costpoint, click **Administration » System Administration » Content Management » Manage Content Types**.

2. Perform the following:

   - **Content Type ID**: Enter a unique ID (name) for the content type.
   - **Description**: Enter a descriptive name for the content type
   - **CMS ID**: Use Lookup to select one of the CMS connection IDs that you configured using the Costpoint Configuration Utility.
   - **Use Automatic SharePoint Configuration**: This checkbox is enabled only if SharePoint is a chosen CMS. If selected, Costpoint has complete control over SharePoint site operations: create document libraries, content types, and columns.
     Note: This option is suitable for clients who do not possess expertise in SharePoint administration and are comfortable with Costpoint having full administrative control over associated SharePoint site.
     After selecting this checkbox, the **Repository Name**, **Content Type name**, **Base Folder**, and **Attachment Property** fields become disabled. After saving your selection, Costpoint populates the fields with references to objects automatically created in SharePoint. The newly created SharePoint library is named by combining “Costpoint Library” and ID of the Content Type. SharePoint Content Type is named accordingly as “Costpoint Type” and ID. The **Attached** property is automatically created and assigned to the screen. The base folder is set as root (/). The system assumes that subfolders will not be used in SharePoint.

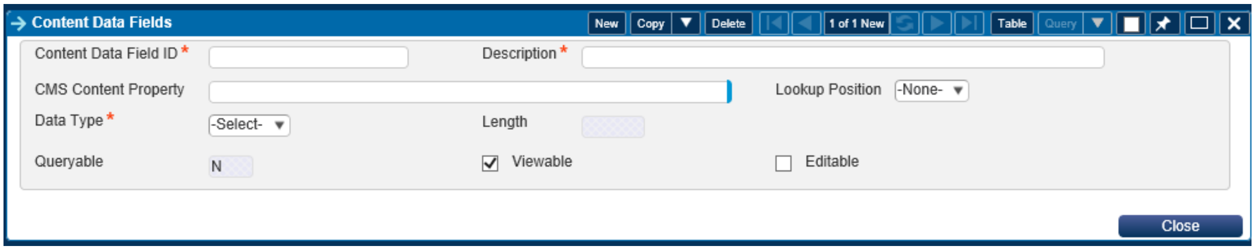


   - **Repository Name**: Select the name of the associated CMS repository. The Lookup contains a list of all the available repositories for the CMS ID you entered.
   - **Content Type Name**: Select the name of the associated CMS content type. The Lookup contains a list of all the available content types for the entered CMS ID and repository.
     Note: It is important to emphasize that only the content types available for the specified repository will be displayed in the Lookup.

- **Base Folder**: (Optional) Enter a folder path if you want to limit the search for content to a specific root (base) folder. By entering a folder path, you indicate that relevant content will be stored in that folder and its subfolders. If this field is blank, then the application assumes that content belonging to this content type can be stored anywhere in the repository.
  Attention for Sharepoint Users: Sharepoint folders are just properties and not separate repositories. As a result, all documents in all folders count towards the Sharepoint threshold. See Appendix 2: Costpoint CMI and SharePoint List View Threshold.
  Using different document libraries for different content types, not folders, is highly recommended.
- **Attachment Property**: (Optional) Enter a CMS content type property name. This property shows, in the CMS, whether a content file is attached to one or more Costpoint records. Values for this property are usually **Y** (the CMS file has been attached to a Costpoint record) or **N** (the CMS file has not been attached to a Costpoint record). The property name must be a text string of at least one character. Costpoint CMI will attempt to update this CMS property every time a document is attached to (or detached from) a Costpoint record.
  If this property is missing or if the field is blank, the CMI will ignore it and not report any error.
- **Show Only Unattached Content Files in the Lookup**: If you enter a value in the **Attachment Property** field and then select this checkbox, only unattached content files will be shown in the content query lookup when you link a content record to a transaction record.
  Note: Deltek recommends that you use this option. The option allows CMS queries to perform faster and only new, not-yet-attached documents are shown in the lookup.
- **Can Be Used As Costpoint File Destination**: Select this checkbox to enable the use of this content type as a file location.
  Attention: See the Use the CMS as an Alternate File Location section for more details.
- **Allow Content Files to Be Linked to More than One Costpoint Record**: By default, a content file can be linked only once, but there are specific situations where it is necessary to link the same content file to multiple records. Select this check box enable this behavior.
- **Apply User/User Group Access Rights**: Select this check box to apply access rights to multiple locations for the content.
  Attention: See the "CMS Locations" section for more information about locations and access rights.
- **Autoload CMS Document Properties**: Click this button to speed up the process of populating the Content Data Fields subtask table. When you use this feature, CMI will pull all CMS properties for the associated CMS content type and generate new records for the Content Data Fields subtask.
  Note: This process is described in more detail in the following section.

Content Data Fields

Click the **Content Data Fields** link to go to a required subtask of the Manage Content Types process, where you define properties of Costpoint content types and their mapping to CMS content type properties.



Properties are important because they define and differentiate content types. The **Invoice** content type is defined by invoice number, invoice date, vendor name, due date, and so on. The **Expense** content type is defined by expense ID, expense type, amount, and so on. For each individual content file belonging to a specific content type, the properties store information about that content. Data stored in properties is called content metadata.

If You Use the Autoload Feature

The definition of CP Content Type Properties usually mirrors the definition of CMS content type properties. This is why the **Autoload CMS Document Properties** button is useful. Click this button to populate the properties table in Costpoint with CMS content type properties and automatically map the Costpoint and CMS properties to each other. If you use the Autoload feature, you will probably need to delete some properties that were automatically populated in Costpoint, because maintaining them in Costpoint does not make sense.

If a CMS property exists to store **Attached to Costpoint** information, delete it from the Content Data Fields table because this property is automatically updated through the linking process.

Mapping Costpoint and CMS content type properties to each other enables metadata exchange, meaning that:

- CMS content properties can be read and modified from Costpoint screens.
- Costpoint data can be updated with CMS content metadata.

However, there are situations where mapping is impossible. Some properties are required on the Costpoint side, but do not exist on the CMS side. For example, consider the **Invoice** content type. Costpoint assigns a voucher number to each voucher created for an invoice, but that information is important and relevant only for Costpoint. The voucher number does not exist in the invoice metadata in the CMS. Even after scanning the invoice and extracting its information through an OCR process, you cannot expect that the voucher number exists as a property in the CMS content. On the other hand, the voucher number is critical information for attaching invoices to vouchers in Costpoint. That is why you create the voucher number as a property in Costpoint and leave blank CMS property.

If You Do Not Use the Autoload Feature

If you don't use the Autoload feature, or if you are making changes to existing record, perform the following:

- **Content Data Field ID**: Enter unique ID (name) for the content type property in Costpoint.

- **Description**: Enter a descriptive name for the content type property.
- **CMS Content Property**: Enter the CMS content type property to which the Costpoint property is mapped.
- **Queryable**: This value is pulled from the content management system and cannot be changed. The Queryable flag determines whether or not users can search the CMS for content based on this field. If the field is not flagged as queryable, users will not be able to include it in a CMS query.
- **Data Type**: Select the data type (text, number, or date) of the property. The data type for the Costpoint property must be the same as the data type for the mapped CMS property.
- **Length**: This value is pulled from the content management system and cannot be changed. If the data type is **Text**, the Costpoint property's field length must match the length of the mapped CMS property field.
- **Lookup Position**: Select the order of appearance for this property in the content query lookup.

Attention: See the Use the CMS Content File Lookup section of the Link Content Files topic for more details on how the **Lookup Position** option affects the order of the properties.

If You Use Automatic SharePoint Configuration

After you select the **Use Automatic SharePoint Configuration** checkbox, Autoload is no longer available. The **CMS Content Property** field is disabled, and saving records in the Content Data fields result set will create appropriate fields (called columns) in SharePoint.

Costpoint will use **Description** as a name, **Data Type**, and **Length** (if type is **Text**) to create a column in SharePoint and assign it to the SharePoint content type.

Note: SharePoint creates columns at the site level, and they can be assigned to any content type. For that reason, column names must be unique across the site. If the same field name is used by different Costpoint content types, the system will attempt to reuse an existing SharePoint column. That is possible only for matching data types and lengths; otherwise, Costpoint will display an error message.

CMS Locations

Click the **CMS Locations** link to go to a subtask of Manage Content Types that lets you associate multiple locations with a content type. A location can be a different folder, another content type and repository, or even another CMS system.

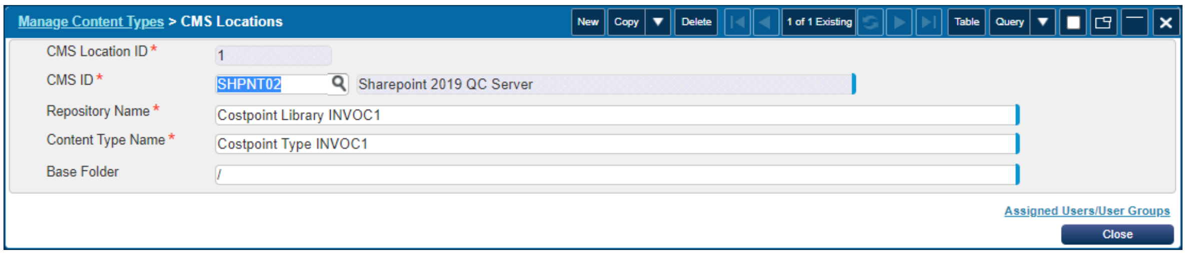
Note: This subtask is used only when you need to set up multiple CMS locations or to configure restricted access rights; a default location is already entered in the content type master record and is enough when you need only one location.

Also, the subtask assumes advance knowledge and control over CMS, and Deltek does not recommend using it with Automatic SharePoint Configuration.

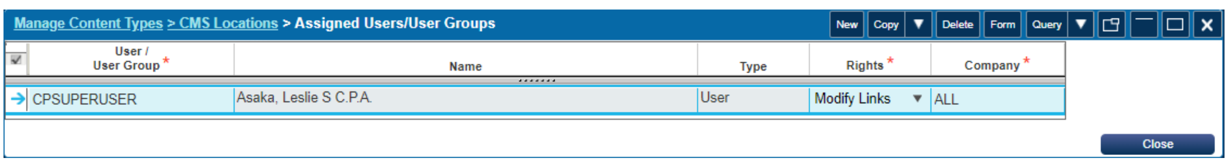
For example, you might set up multiple locations when content files from different time periods are stored in different places in the CMS, or when a CMS system upgrade is performed or a new repository installed. You can use a new location for all new documents, but the old location must stay active. Content files in the old location are linked to Costpoint and you do not want to lose those links.

Location parameters entered here are the same as the parameters for the default location. But if you set up locations here, a default location is no longer relevant for searching and linking. The default location must be entered again here as one of many locations.

The CMS content type and its properties from each location must match the default CMS content type. You cannot map to locations with different CMS content types. Costpoint will check to make sure that differences do not exist when you save the location.



Additionally, locations can be combined with user rights that are defined in the Assigned Users/User Groups subtask:



There might be some restricted CMS areas that only a limited group of users can access. By specifying user rights for locations, you can prevent unauthorized users from searching, viewing, and modifying link content from the restricted location. User rights for location can be **None**, **View**, or **Modify Links (Full)**.

If you do not have multiple locations, but you still need to define user rights to an overall content type, you must enter a location that is the same as the default and define user rights for it.

Linked Content Files

Click the **Linked Content Data Files** link to go to a Content Type maintenance subtask. This subtask is described in the Maintain Content Links section.

Integrate CMS with Costpoint Applications and Screens

After content types are established, you can begin integrating Costpoint content types with Costpoint applications so that you can link CMS content files to Costpoint records, view and modify content metadata, view content, and so on.

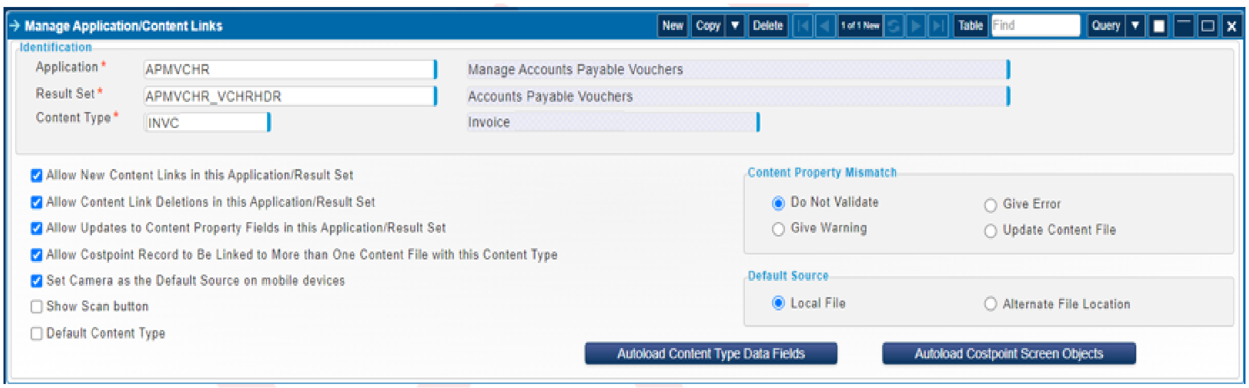
Costpoint applications usually contain multiple application screens, organized in a tree hierarchy. Any application screen in the application hierarchy can be integrated with a CMS. By default, CMI is invisible for all applications and application screens.

Define Application and Content Links

You configure integration using the Manage Application/Content Links (SYMCMIAL) application.

To use this application, from Costpoint, click **Administration » System Administration » Content Management » Manage Application/Content Links**.

In the header area of the application screen, you define the basic linking—associate application X and application screen Y with content type Z.



Enter the following information on the screen:

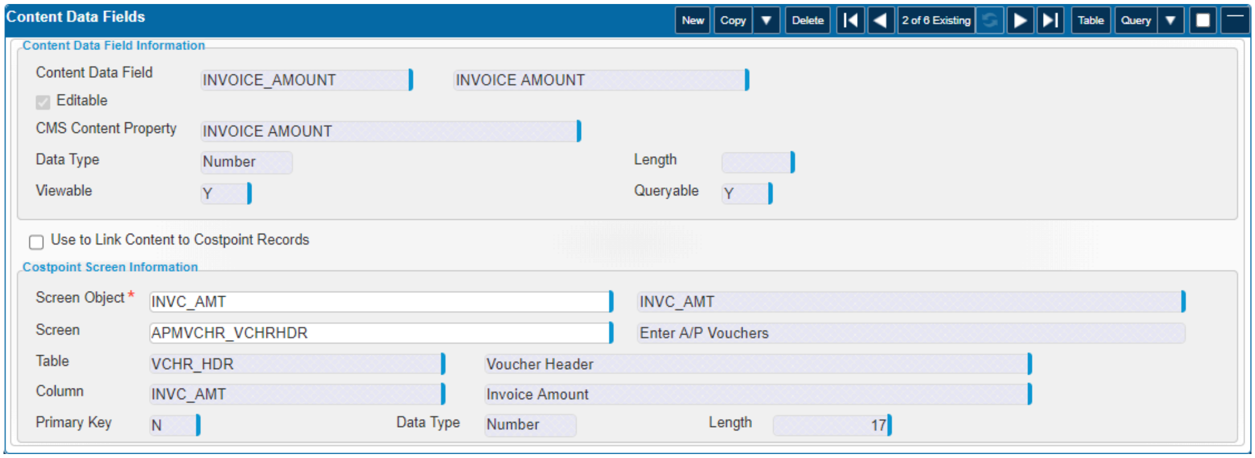
- **Application**: Select the appropriate Costpoint application.
- **Result Set**: Select one of the application screens that are part of the application.
- **Content Type**: Select one of the content types that you have configured.
- **Allow New Content Links in this Application/Result Set**: Select this checkbox to allow the creation of new links to CMS content files for the application screen.
- **Allow Content Link Deletions in the Application/Result Set**: Select this checkbox to allow users to delete existing CMS links, if they have the user rights to do so.
- **Allow Updates to Content Property Fields in this Application/Result Set**: Select this checkbox to allow users to update CMS content metadata from the Costpoint application screen.
- **Allow Costpoint Record to Be Linked to More than One Content File with this Content Type**: Select this checkbox to allow more than one CMS content file of the given content type to be linked to the same application screen record.

- **Set Camera as the Default Source on mobile devices:** Select this checkbox to make the camera on your mobile device the default method to attach documents. This setting is active by default. Clear the checkbox to disable the setting
- **Show Scan button:** Select this checkbox to enable the Attach & Scan option in the Choose File window and the Scan function in the Linked Content Files subtask when users attach documents to records in this application/result set.
  Attach & Scan enables users to link the document to a record and populate the record with information scanned from the document. They must click Save to save and link the file.
  Note: The Attach & Scan button only displays in applications that are integrated with an ICR tool. Currently, only Manage Accounts Payable Vouchers in Costpoint Accounting supports the Attach & Scan feature
- **Default Content Type:** Select this checkbox to set the current Content Type as the default for the selected Result Set. You can select only one default content type per result set.
- **Default Source:** Specify the default location of content files for the application/result set. Select Local File when most files for the application/result set need to be uploaded to Costpoint. When a user attaches a document to a record, Local File is pre-selected in the Choose Source field in the Choose File window.
  Select **Alternate File Location** when most files are already uploaded to Costpoint. When a user attaches a document to a record, Alternate File Location is pre-selected in the Choose Source field in the Choose File window.
- **Content Property Mismatch**: When a content file is linked to a Costpoint record, CMI will compare the CMS content file properties with mapped application screen fields. If CMI detects a mismatch in their values, Costpoint will act according to this setting by either ignoring the mismatch, displaying a warning message, displaying an error message and forbidding the attachment, or eliminating the mismatch by performing the silent update of CMS content file properties with Costpoint data values.

Map Application Screen Fields to Content Type Fields

For each linking that you set up between an application screen and a content type, you must also map the screen fields to content type fields. Since you have already mapped Costpoint content type fields to CMS content type properties, this new mapping defines the complete path from the application screen fields to CMS content properties. Use the following buttons to simplify and accelerate entry:

- **Autoload Content Type Data Fields**: Click this button to load the Content Data Fields table with Content Type fields. To complete the configuration, you must fill in mapped Costpoint screen objects. This is usually the more convenient action.
- **Autoload Costpoint Screen Objects**: Click this button to load the Content Data Fields table with the Costpoint application screen objects. To complete the configuration, you must fill in mapped Content Type properties. This action is less likely to be used because there could be many more screen objects than Content Type properties.



Key Linking Fields

The most important option on this screen is the **Use to Link Content to Costpoint Records** option, which identifies the content data fields that will be used as key values for linking content.

To understand the significance of this setting, it is important to understand the CMI linking process. CMI does not use database keys, nor does it link CMS content to database tables. CMI links CMS content to Costpoint business entities.

For example, the business entity "voucher" can appear in multiple Costpoint applications. As vouchers are processed in Costpoint, they actually travel from one application to another. If a voucher is linked to a CMS scanned invoice in the Enter Voucher application, you want to maintain this linking after the voucher is posted and exists only in Voucher History. For this reason, you need to establish a unique identifier for the voucher and use it as a key.

Assume that the unique identifier is a voucher number. If you configure multiple Costpoint applications to integrate with the Invoice content type and establish the voucher number as the key linking value, all applications will show the invoice attached to the voucher even though only one application actually created the link.

Note that by using the four **Allow…** checkboxes on the Manage Application/Content Links screen, you can fine-tune linking rules by making some applications read-only for CMS content. Some applications will be able to create links to CMS files while the read-only applications will only be able to view them.

Of course, the “voucher number” field must exist in Costpoint content type data fields, but it does not matter if “voucher number” does not exist in CMS content type properties. When the content link is saved, CMI saves the value of the Costpoint key field and the pointer to the content file in CMS. The content link is visible whenever key fields are matched. This is why it is important to properly define key fields.

Good candidates for key fields are application screen primary keys. If a field is a primary key for an application

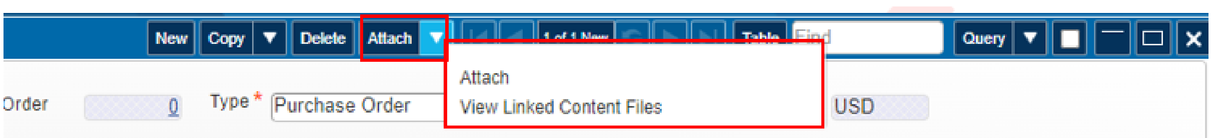
Selecting Mapped and Key Linking Fields

Mapped and key fields are usually chosen from an associated screen (result set). There are occasions where a key field does not exist in the associated screen, but it is defined in the parent screen. In that scenario, you can select the key field from the parent screen.

Link Content Files

After you have set up the integration between a Costpoint application/screen and CMS, you can begin attaching documents from the CMS to Costpoint records.

The **Attach** button will now display on the toolbar of any application screen that is configured to work with CMS.



Note: Permissions to modify linked content files are dependent on design and security restrictions of the parent record. If the parent record does not permit updates or deletes, the Linked Content Files table will be read-only.

For editable records, additional restrictions can be set in the Manage Application/Content Links (SYMCMIAL) application.

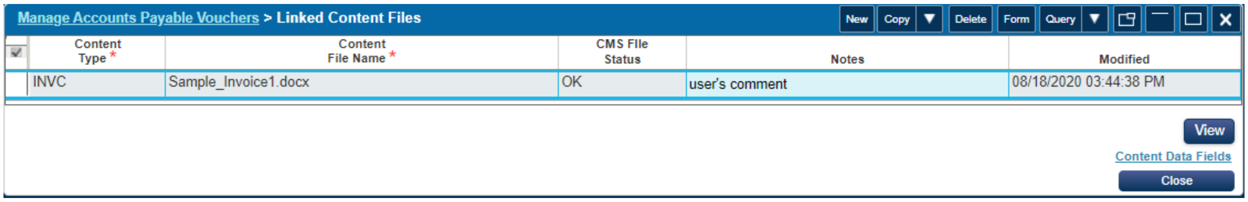
See Content Files Linked to a Record

To see all CMS content files attached to the current Costpoint records:

1. Select a record from the Costpoint application screen.

2. On the Application Toolbar, click the **Attach arrow** and select **View Linked Content Files**.

The Linked Content Files table displays, listing all the content files attached to the record. If you select voucher 123, for example, and then click the **Attach arrow** » **View Linked Content Files**, you see all documents attached to voucher 123.



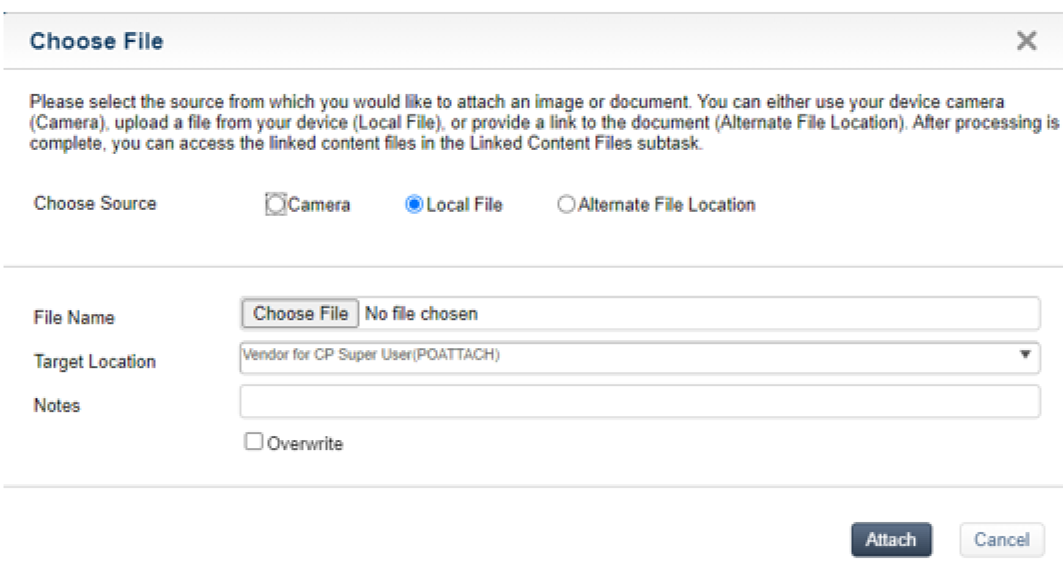
Information about attached documents is stored in the Costpoint database. When the Linked Content Files table opens, it connects to CMS to find the attached file. If the file is found, then the **CMS File Status** field displays **OK**. If the file cannot be found, the field displays **Missing**. If the CMS system gets shut down or if Costpoint is unable to connect to it for some reason, the **CMS File Status** field displays **Error**.

Links created in one application/result set for the specific content type are visible in other applications if both applications have defined linking rules to the same content type. When you link a content file to a record, the link is created using the key values defined using the **Use to Link Content to Costpoint Records** option in the Manage Application/Content Links (SYMCMIAL) application.

Attention: For more information on this option, see the Integrate CMS with Costpoint Applications and Screens section.

Attach a New Content File

When you click Attach, the Choose File window displays. In the Choose File window, you can either upload a document and attach a file from your computer, scan the document with your computer or mobile camera, or just attach the document from the alternate file location in Costpoint.



If your mobile camera is your preferred source for attaching documents, you can make it the default source by selecting the **Set Camera as the Default Source on mobile devices** checkbox on the Manage Application/ Content Links screen.

If you choose **Alternate File Location**, you can click **View** on the Lookup screen to review the file before you link it to the Costpoint record.

Attention: For more information about viewing files, see the Open and View Content Files section.

Tip: Selecting a file can be challenging because your CMS might contain thousands, if not millions, of content files from which to choose. Fortunately, if you configured CMI carefully, your choices are already narrowed down. If you have carefully organized CMS repositories, content types, and folders, your pool of possible files is already limited. Furthermore, you can choose only those files with a content type that is valid for the current application screen.

You can also choose to exclude any files that are already attached. This exclusion is based on the **Attachment Property** field in the Manage Content Types (SYMCMICT) application. When a content file is linked to a Costpoint record, the **Attachment Property** is set to **Y**. You can choose to exclude all files with an **Attachment Property** of **Y** from future content queries. To set up this exclusion, use the **Show Only Unattached Content Files in the Lookup** option in the Manage Content Types application.

CMS lookup will never return more rows than it is set in the Costpoint configuration parameter **Max Query Rows**.

To attach a new content file:

1. Select a record from the Costpoint application screen.
2. On the Application Toolbar, click **Attach**.
3. Select the source from which to attach the image or document.
4. Based on the source selected, specify the file name and target location or the source location and file name.

   Attention: For more information about queries, see the "Run a CMS Content File Query" and "Use the CMS Content File Lookup" sections.
5. (Optional) Before you attach the file, enter notes about the attachment in the **Notes** field.
6. If multiple content types are associated with the application screen, make sure to select a correct **Target Location**.

7. Click **Attach** to plainly attach the file to the record or click **Attach & Scan** to link the document to the record and populate the record with information scanned from the document.

   Note: The **Attach & Scan** button displays in applications that are integrated with an ICR tool. Currently, only Manage Accounts Payable Vouchers in Costpoint Accounting supports the attach and scan feature.

8. Repeat steps 3 to 8 to attach additional files to the same record, if needed.

   Your ability to attach multiple files to a single record is controlled by the **Allow Costpoint Record to Be Linked to More than One Content File with this Content Type** option in the Manage Application/Content Links (SYMCMIAL) application.

   Attention: For more information on this option, see the Integrate CMS with Costpoint Applications and Screens section.

Run a CMS Content File Query

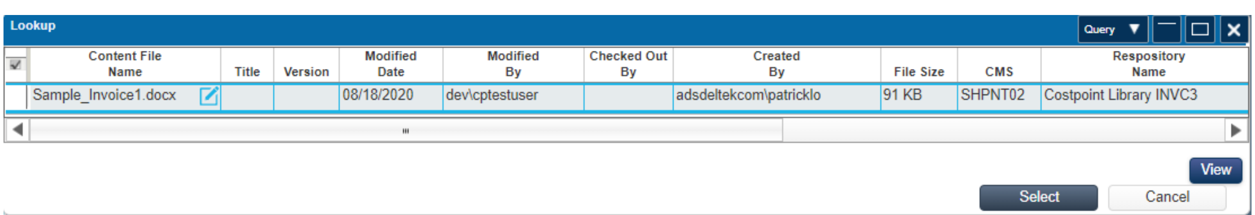
If you know the name of a file, you can just enter the name in the **Content File Name** field without running a query on property data, or you can enter part of the name and Lookup will display matching filenames.

But if you do not know the filename. you can use a query to further filter your selection of available content files. The **Query** dialog box looks the same as a standard query dialog box, but it functions differently.

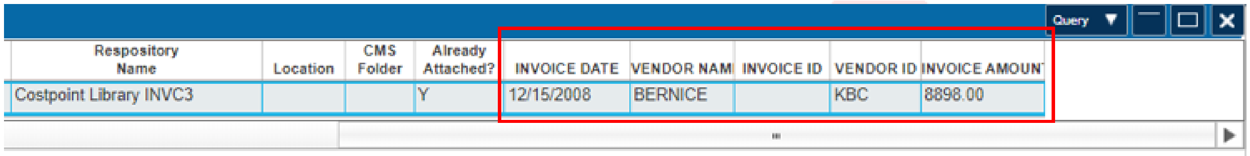
Before you run the query, your selection is already limited to a specific content type. But remember that a content type can be stored in multiple locations. The query will be executed against, and matching content files returned from, all predefined locations. If you do not have access rights to a specific location, it will be excluded from the query.

Use the CMS Content File Lookup

Results of a query are displayed on the CMS Content File Lookup screen. The Lookup application screen has many columns that contain data about content files originating from the CMS. The first columns are the default columns that always display in the Lookup.



You can also add up to seven additional columns to reflect the metadata properties used in your own CMS. You set up these columns using the **Lookup Position** settings in the Manage Content Types (SYMCMICT) application.



You should be aware that the presented data comes from the CMS system, and performance of the response will be faster if the query result contains a smaller number of files. This is why it is very important to properly define the content query conditions.

Open and View Content Files

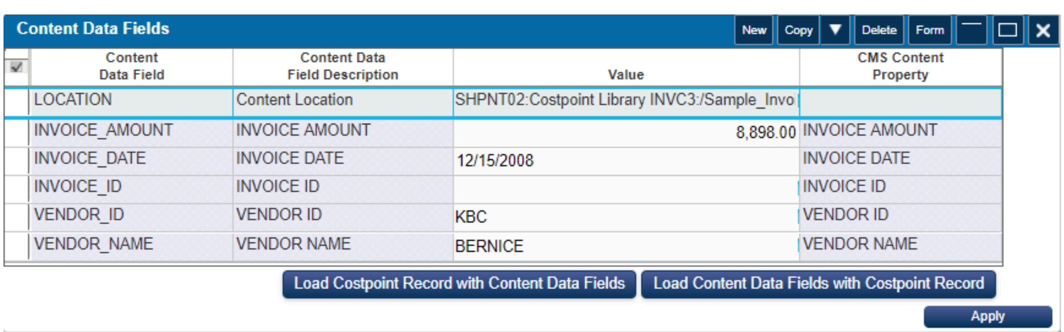
To open and view a file from the Lookup screen, select the file, and click **View**. The file opens using the default system application on the user's workstation that is registered for that file type. For example, if the content file is a PDF document, it will likely open using Acrobat Reader. If it is a JPG image, the registered image viewer will open the file. It is up to the users (or the administrator) to make sure that the proper system applications are registered on the user's workstation as default viewers for the CMS content.

Note: By default, content files over 10MB cannot be viewed because that would put too much of a burden on the Costpoint CMI and application server. Max file size value can be modified using "Max File Size" parameter in Costpoint Configuration Utility.

This limit applies only for viewing. There is no size limit for content file linking.

Review Content Data Fields

After you select a CMS content file from the lookup or after linking, you can view its properties. Click the **Content Data Fields** link on the Linked Content Files screen.



These fields are defined for a particular content type in the Manage Application/Content Links (SYMCMIAL) application. Only fields that are mapped to a CMS content property and marked as **Viewable** are displayed. Data appears in the appropriate column based on data type (text, number, or date). If a field is marked as **Editable**, you can change its value and save the change into the CMS system.

The first row, named **Location**, is not a content data field; it is the unique URL for the content file. This URL is in the form:

Endpoint:Repository:/Folder/FileName.ext

This URL can also be used to identify a content file for linking to a Costpoint record instead of using the lookup and query process. This feature is particularly useful when a Costpoint application is accessed using a Web service integration.

Synchronize Content Data Fields and Application Screen Fields

The Content Data Fields screen contains two buttons for synchronizing content fields with application screen fields:

- **Load Costpoint Record with Content Data Fields**: Click this button to update the Costpoint application screen with the values from the CMS content file properties. Click **Save** to save these values.
- **Load Content Data Fields with Costpoint Record**: Click this button to update the Content Data Fields screen with values from the Costpoint application screen. Click **Save** to save these values.

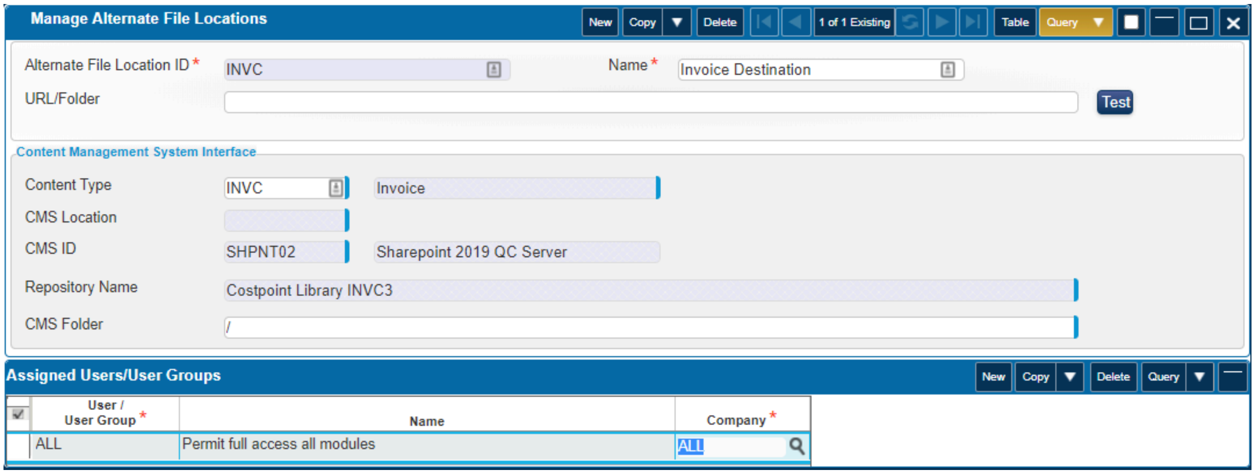
Synchronizing content metadata with the application screen data is an optional feature configurable in the Manage Application/Content Links (SYMCMIAL) application. The administrator can choose to ignore discrepancies, show warnings but continue, or disable saving if values do not match.

Note: If you use the Update Content File option on the Content Property Mismatch screen and Define Application and Content Links, this synchronization is performed automatically. See the Define Application and Content Links section in the Integrate CMS with Costpoint Applications and Screens topic for details.

Use the CMS as an Alternate File Location

Many Costpoint applications require access to a file system. The file system can be a simple storage area, such as a local or network drive, but it can also be a CMS repository, such as a SharePoint document library.

The Costpoint Alternate File Locations (SYMFLOC) application, part of **System Administration » File Management**, lets you define the file locations that can be used by a Costpoint application as a source or destination for files. This application creates an internal abstraction of a location that can be implemented in different ways.



To define an alternative file location:

1. Take one of the following actions:

   - If you are identifying an existing folder on a local or network drive, enter its URL or path in the **URL/Folder** field. That is all you need to do.
   - If the location is in your CMS, leave the **URL/Folder** field blank and complete the fields in the **Content Management System Interface** area:
     - **Content Type**: In the Manage Content Types (SYMCMICT) application, you defined the content types and their integration with your CMS. If you selected the **Can Be Used as Costpoint File Destination** option for a content type, that content type will be available for selection here.
     - **CMS Location**: If the content type was defined as having multiple CMS locations, select one of them. If in the content type has only one CMS location, leave this field blank.
     - **CMS Folder**: (Optional) If you want to specify a particular folder within the CMS location, enter the URL or path to the folder

The remaining fields on this screen are for informational purposes only and cannot be edited.

Maintain Content Links

Costpoint users and administrators should be aware that Costpoint CMI is a loosely coupled integration. This means that Costpoint has full control over the integrity of its database system. Any change to transactional data is fully controlled by Costpoint. Even direct changes to Costpoint database tables are verified using strict referential integrity rules and triggers.

Your CMS is a standalone and independent software system with its own user interface and probable integration with other environments. Costpoint cannot control nor automatically detect changes in the CMS. Still, there are some Costpoint maintenance options that enable detection and deletion of possible inconsistencies between Costpoint and CMS.

Problems sometimes arise when content files are moved or deleted in the CMS.

When Content Is Moved

If the move operation is done properly in the CMS, the impact to Costpoint is minimal. All content management systems (including SharePoint) have content move operations that enable a content file to retain its unique ID as it moves from one place to another. If you use this move functionality, all existing links to content files remain functional.

However, administrators should be aware of a few issues. The move will not be successful from a CMI perspective if the new location is not defined for the content type that is being moved. You need to define the new location for the content type if you want links to continue working. You may also need to review and update user rights for the new location so that the appropriate users have access to the content.

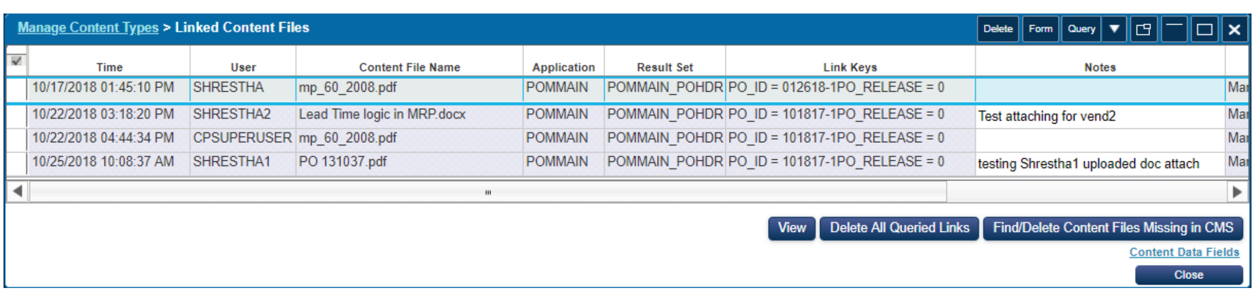
Note: Deleting content in one CMS location and creating it in another is not a proper move operation. This sequence creates new content, meaning that Costpoint is longer be able to find the linked content file.

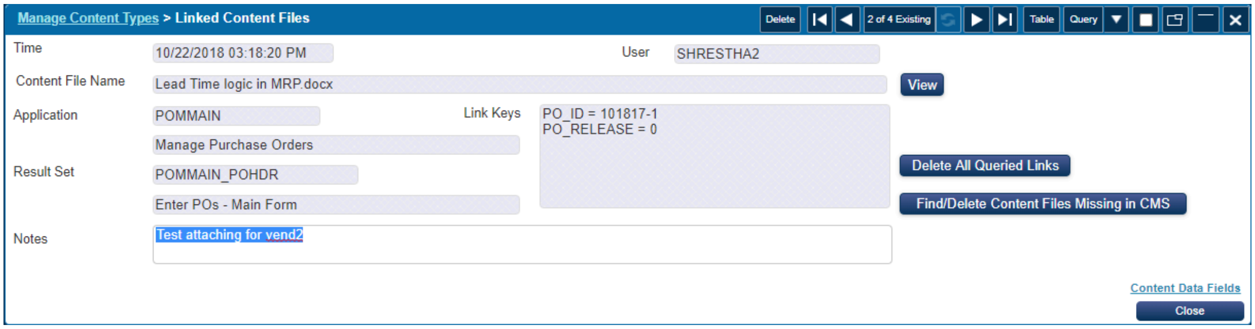
When Content Is Deleted

If content files are deleted in the CMS, they are lost forever. All links to these files become orphan records. In most cases, you can assume that users have deleted content files because they are no longer needed. Therefore, you can assume that the links to deleted content files are irrelevant and should be deleted, too.

Delete Orphan and Unwanted Links

Costpoint provides a maintenance subtask in the Manage Content Types (SYMCMICT) application. If you select a content type and open the Linked Content Files screen, you can see all the links to CMS content files created for the content type. For each link record, you can see when the link was created, who created it, in what application/result set it was created, and what linking keys were used.





Use this screen to view content, view content data fields, and delete links if necessary by using the following buttons:

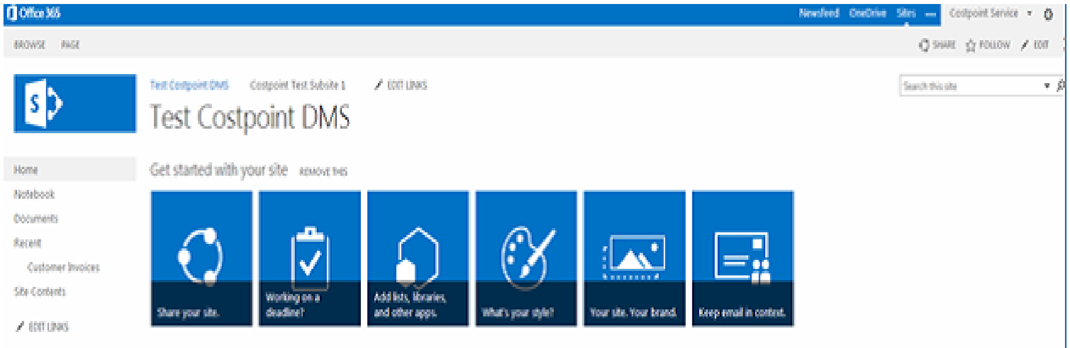
- **Delete All Queried Links**: Click this button if you simply need to start over. This operation will mark all records for deletion. To complete the delete operation, click **Save**.
  Warning: Do not perform this operation unless you are sure that you want to delete all links for the selected Costpoint content type. This is a non-reversible operation that deletes all links to CMS files.
- **Find/Delete Content Files Missing in CMS**: Click this button to verify the existence of a content file in the CMS for every link record listed on the screen. Records with non-existent content files are deleted. To complete the delete operation, click **Save**.

Appendix 1: Configuring Office 365 SharePoint Online for Integration

This appendix describes the steps to set up content types in SharePoint to enable Costpoint to communicate with them.

Step 1: Create a Site

Create a site under which content types are to be created. Since content types are children of a site, they cannot be shared with another site. However, they can be shared to sub sites of that site. If you have a site set up already, you can skip this step.

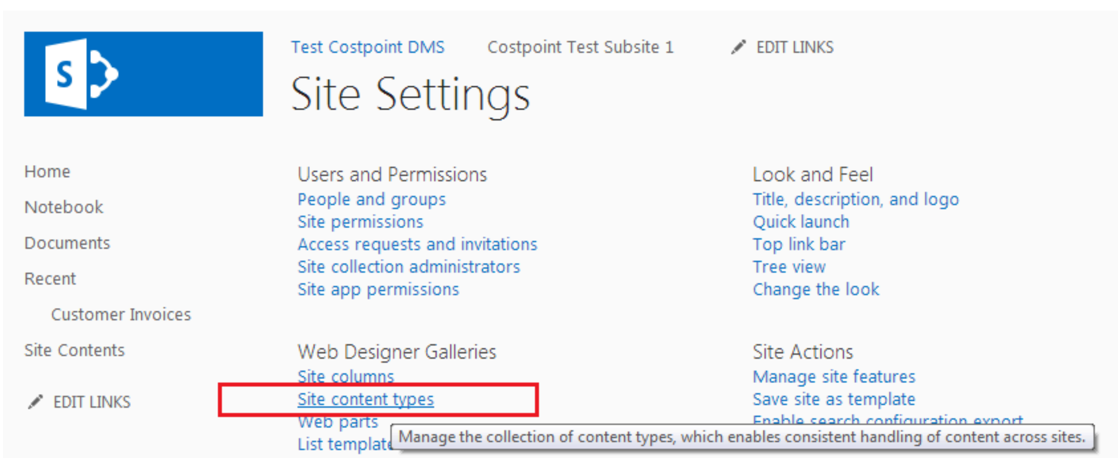


Step 2: Create Content Type

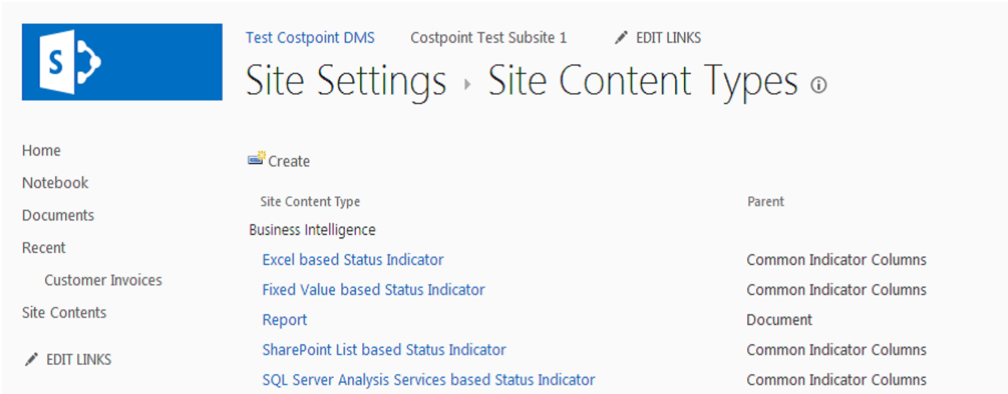
Now that you have a site, you can set up the custom content type(s) within the site.

To set up custom content types:

1. Select **Site Settings** from the drop down on the top right.
2. On the Site Settings page, click **Site content types**.

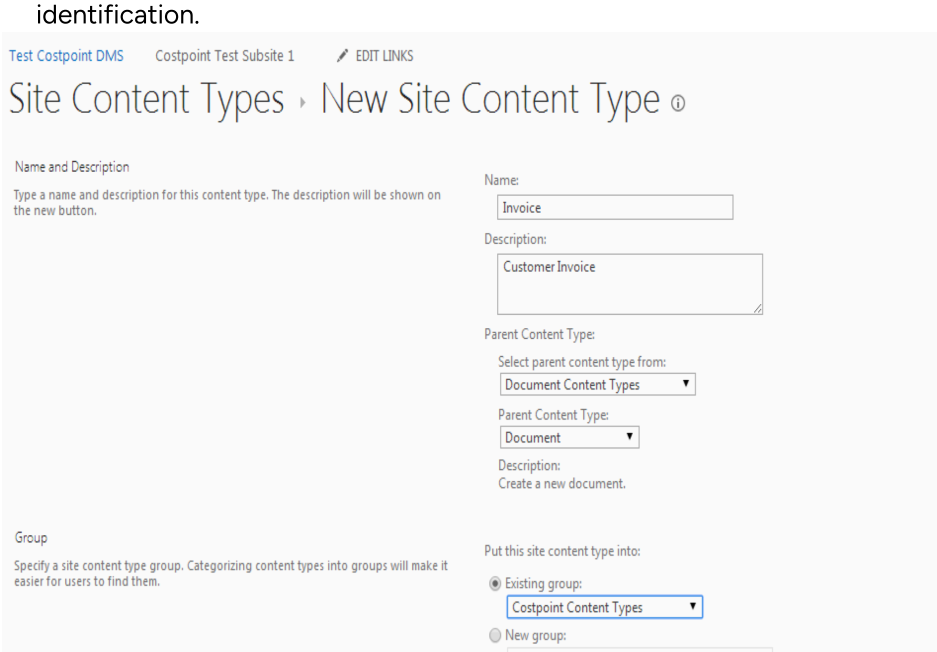


3. On the Site Content Types page, click **Create** at the top.



4. On the New Site Content Type page, do the following:

- Enter the **Name** and **Description.**
- In the **Parent Content Type** section, select **Document Content Types** in the first drop-down list and **Document** in the second drop-down list.
- Specify an existing group to which it belongs, or create a new group. Group is just an identifier to easier identification.

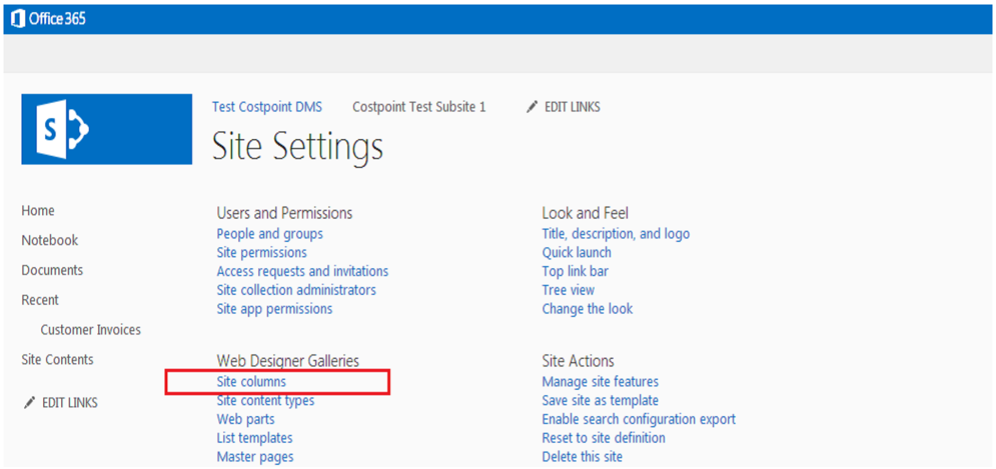


Step 3: Create Content Type Columns

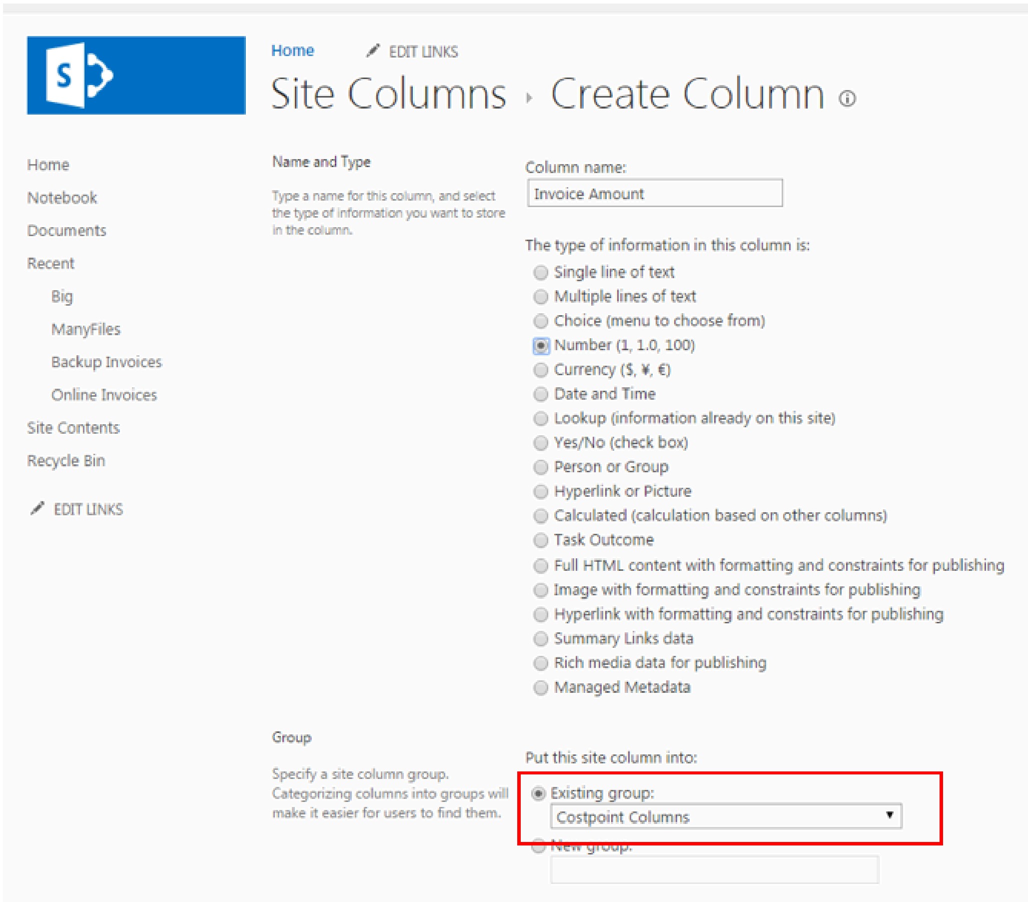
Now that you have a custom content type, you can create custom columns. Custom columns are defined at the site level and are associated with (assigned to) any content type under the same site.

To create custom columns:

1. Go back to the site Settings page and click **Site columns**.



2. At the topic of the Site Columns page, click **Create** to create a new site column.



3. Enter a **Column name**, and select the data type.

4. In the group section, you can include this column in an existing group or create a new group.

   Similar to Content Type, Groups for a site column is for easy grouping, identification, and searching.

5. Repeat this procedure to create additional columns.

   When complete, the columns display on the Site Column page in the group specified.

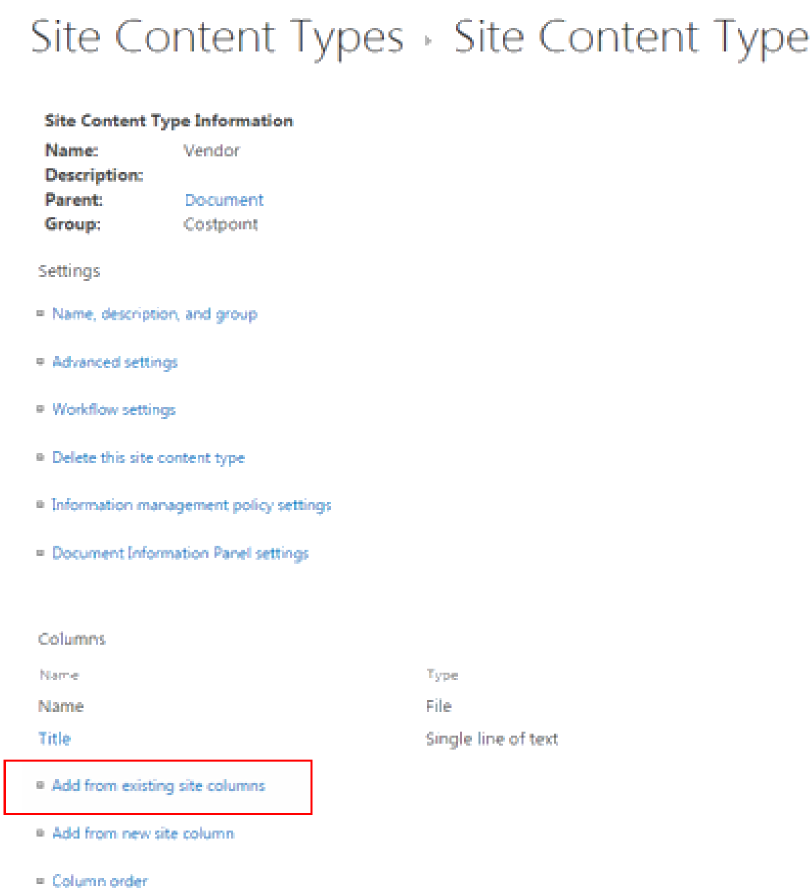
Costpoint Columns	
Invoice Amount	Number
Invoice Date	Date and Time
Invoice Number	Single line of text
Linked in Costpoint	Single line of text
Vendor ID	Single line of text
Vendor Name	Summary Links
Voucher No	Number
Custom Columns	

Step 4: Associate Content Type with Site Columns

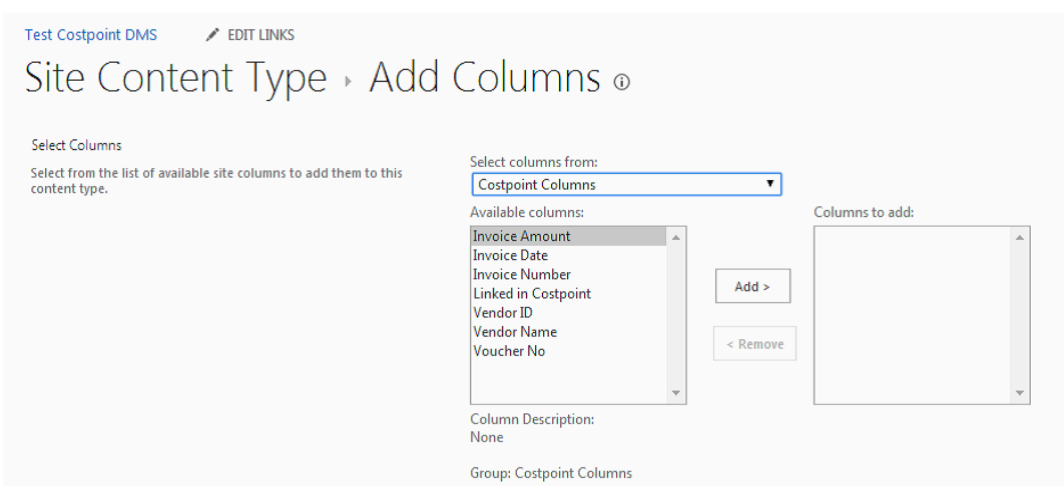
To associate content type with site columns:

1. Open the new Content Type created earlier.

2. On the Site Content Type page for this content type, scroll down to the **Columns** section and click **Add from existing site columns**.



3. On the Add Columns page, filter the column group, and add the desired columns to this content type.



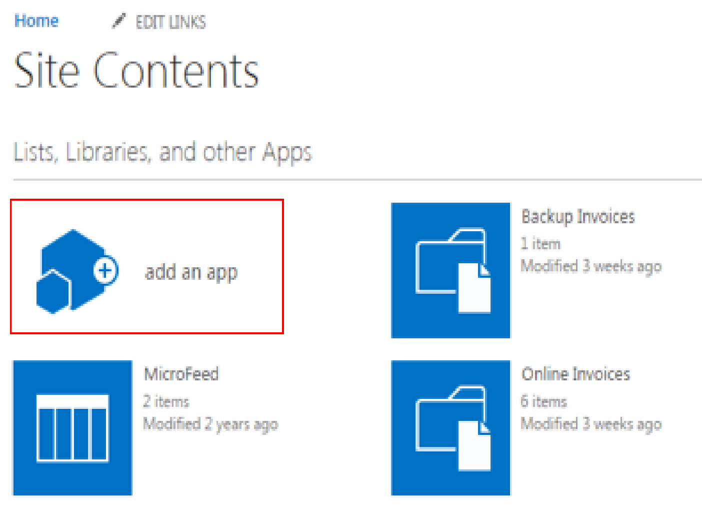
Step 5: Create a Document Library

The Document Library is where you store documents that Costpoint will communicate with for retrieving, viewing, and linking.

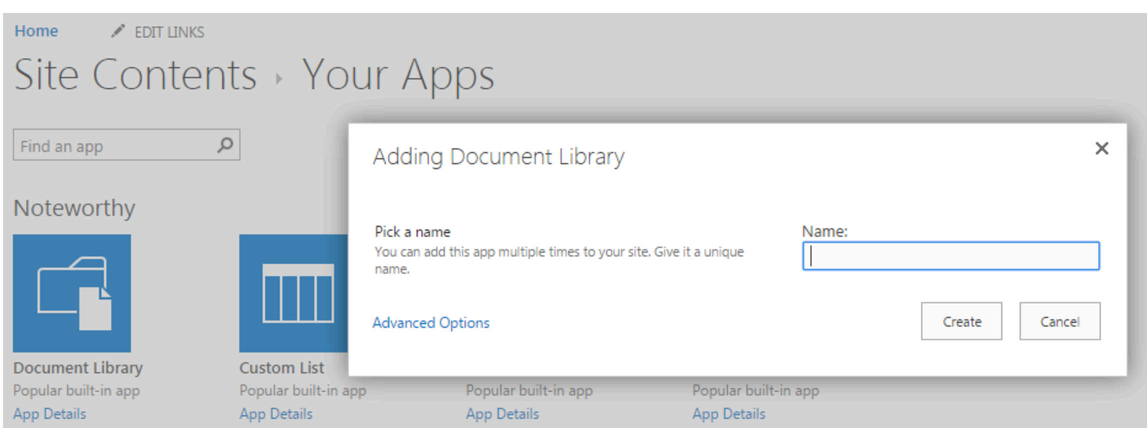
To create a document library:

1. Go to the site and click **Site Contents**.

2. On the Site Content page, click **add an app**.



3. On the Your Apps page, click **Document Library** to create a new document library.

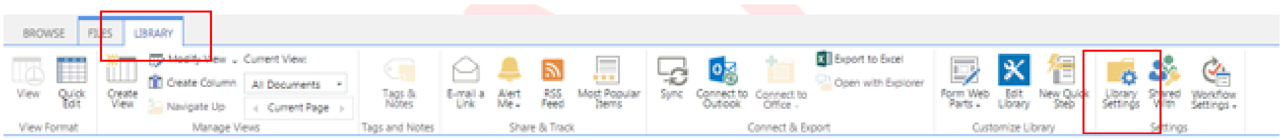


Step 6: Associate Document Library with Content Type

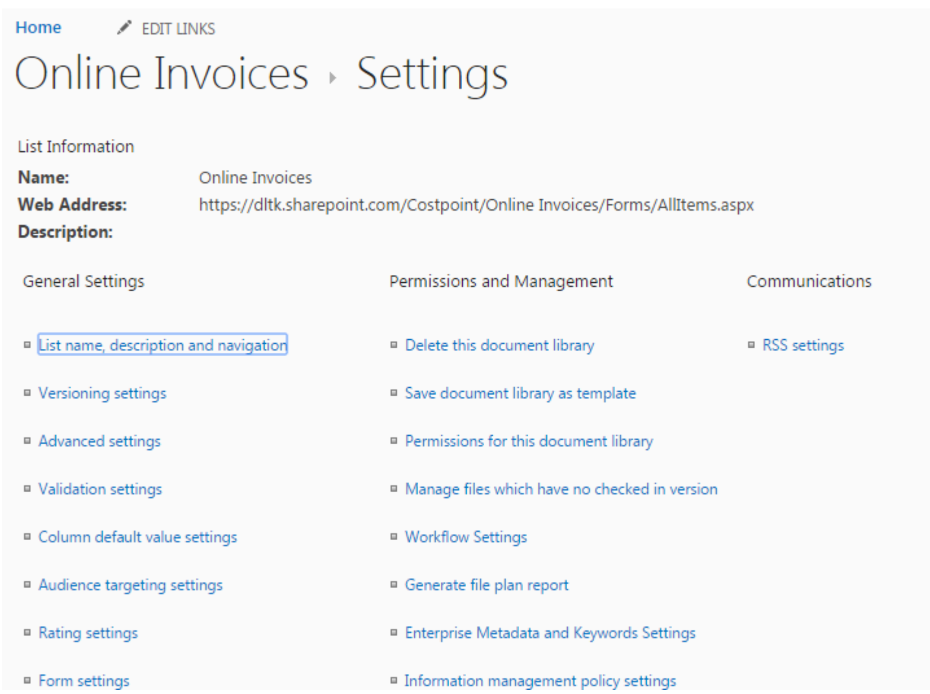
To associate a document library with content type:

1. Open the document library.

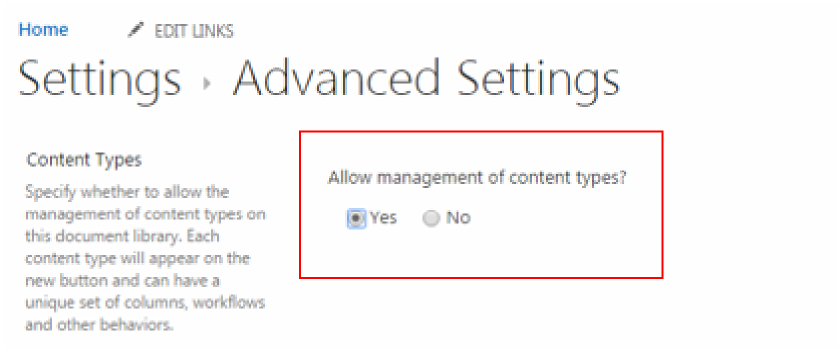
2. Click the Library tab on the top left, and click **Library Settings** on the ribbon.



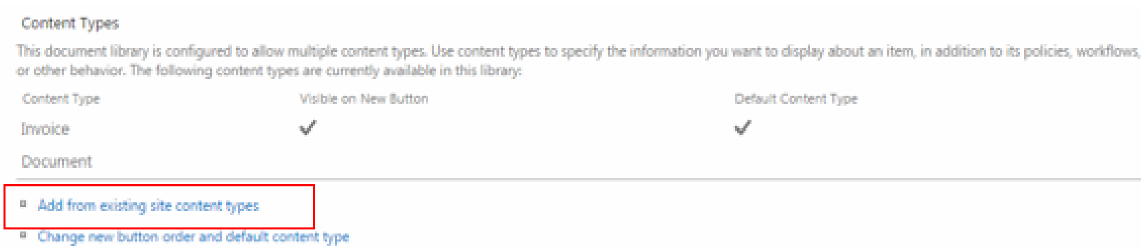
3. On the Library Settings page, click **Advanced settings**.



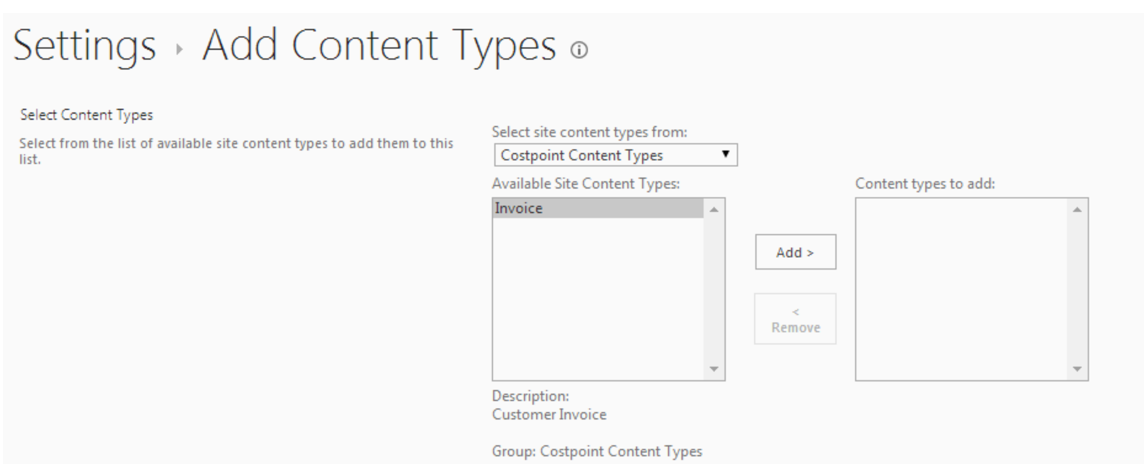
4. On the Advanced Setting page, select **Yes** for **Allow management of content types**.



5. Go back to the library Settings page, scroll down to the **Content Type** section, and click **Add from existing site content types.**

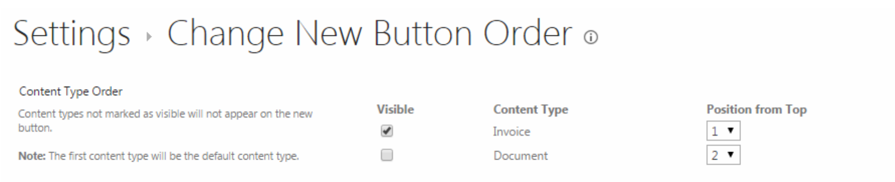


6. On the Add Content Types page, select a desired Content Type group, select the desired content type from that group, and click **Add** to add it to this library.



7. Go back to the Library Settings page, scroll down to the **Content Type** section, and click **Change new button order and default content type**.

8. On the Change New Button Order page, order the content type to be the first **Position from Top**. This will make any new document uploaded into this library automatically inherit this content type.



Step 7: Upload a Document

After the document library is setup, you can upload documents into this library.

To view the site columns associated with the new content type for these documents:

1. Go to this Library Settings page.

2. On the Library tab, click **Modify View**.

3. On the Edit View page, add the additional columns to the view.

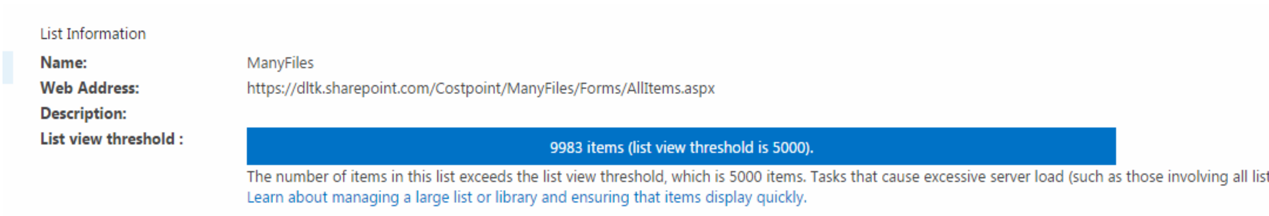
In Costpoint, you need to set up the equivalent Costpoint content type and columns, and map them to their SharePoint counterparts. After this is complete, documents in SharePoint can be linked to transaction records in Costpoint, and values stored in documents in SharePoint can be retrieved by Costpoint for efficient and accurate data entry.

Attention: Please refer to the Costpoint documentation for how to configure the Content Types setup and column mapping in Costpoint.

Appendix 2: Costpoint CMI and SharePoint List View Threshold

Any SharePoint administrator or power user working with large lists is familiar with the SharePoint boundary called the **List View Threshold**. While a single list or library can contain millions of items, threshold is set much lower: 5000 items for regular users, 20000 for administrators for on-prem Sharepoint, and 5000 for all in

Sharepoint Online. It is important to understand this boundary as the View threshold, and not the List threshold. You can fill the List with millions of items, but you cannot view them all, nor can you run a View that queries more items than the threshold limit.



View is the visual presentation of list items resulting from a predefined CAML query that is run against the list. Accordingly, a better name for this boundary would be the List Query Threshold. CAML queries are processed by SharePoint and translated to SQL queries for execution by the SQL Server. According to Microsoft's MSDN documentation, queries accessing (reading or writing) less than 5000 rows in SQL Server are optimized because they require only SQL Server page level locking while queries accessing more rows require table level locking. SharePoint database is designed with a single database table containing information about items from all lists, and table locking can cause SharePoint farm performance problems and/or a complete server freeze. Because of this, List View Threshold is a limitation that needs to be carefully considered.

Costpoint uses SharePoint Web services to access SharePoint objects and CAML queries to query data from SharePoint document libraries. List Query Threshold limits the Costpoint queries in the same way as it limits SharePoint Views.

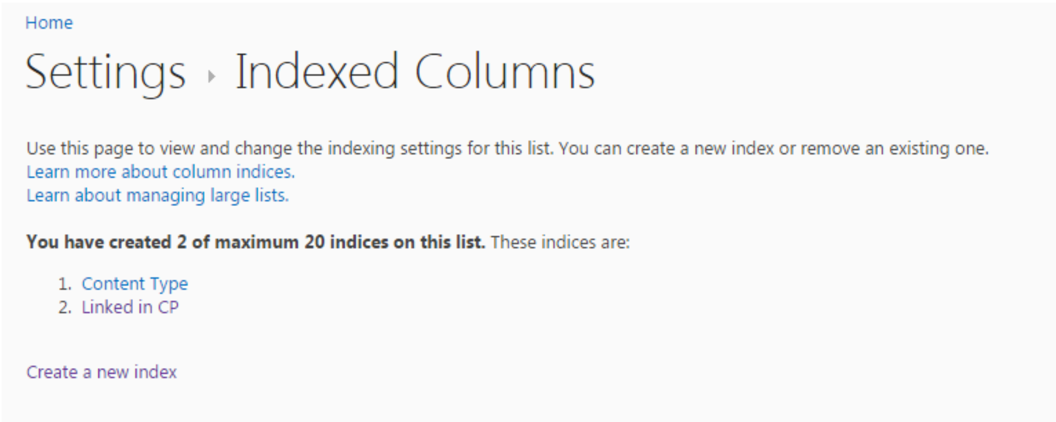
Suggestions and Techniques for Dealing with "List Query Threshold"

Indices

Creating an index on a column that is used in a CAML query makes the translated SQL use an index in the execution plan. When using an index, the number of rows accessed by the query can drop below the threshold, and the query can be executed against more items than the threshold limit.

If the number of items is greater than the threshold, then you **must** index the two following fields:

- Content Type
- Attached in Costpoint: This is a text field with a user-defined name that is configured in Costpoint to store **Y** for linked or **N** for not linked in Costpoint.

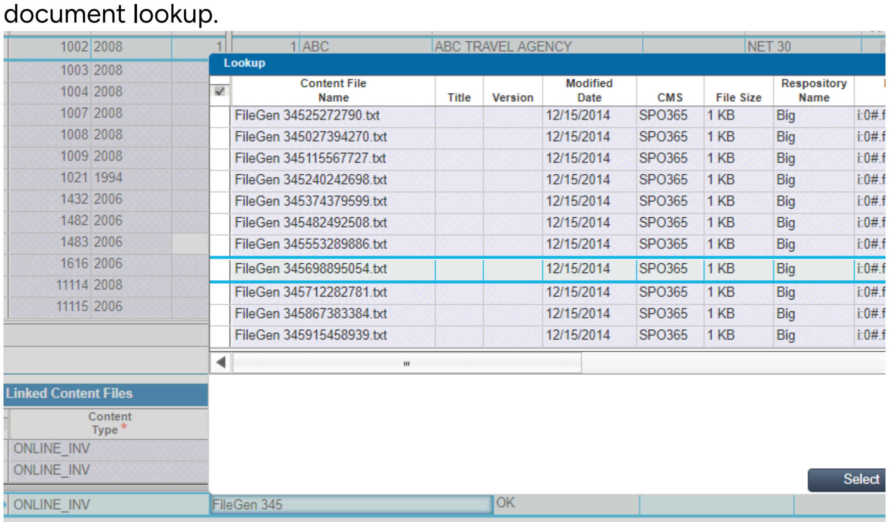


Costpoint Content Management Integration (CMI) framework is upgraded to take advantage of indexed columns and optimize CAML queries. When the number of items in the library is greater than the threshold, Costpoint divides the CAML query into sub-queries that are executed in sequence. Their results are then merged for presentation. This process is internal and invisible for the end user who only sees that the query is executed against all items in the library. This technique ensures successful query execution regardless of the number of documents in the SharePoint library (list). This technique still uses indices by Content Type and Linked fields, and indexing is a prerequisite for this upgrade to function properly.

Good Practices for Optimizing Query Performance

The best result is accomplished when following all of these suggestions:

- Use **Attached in Costpoint**. This limits query results to only those documents that are not yet attached to Costpoint transaction records.
- Query by document name. If you know first letters of the document name, enter them before opening the document lookup.



- Use the new configuration parameter **CMS endpoint maximum query row count** (cmsMaxQueryRowCount). This parameter limits the maximum number of rows returned by Content File Query. The default value is 500.

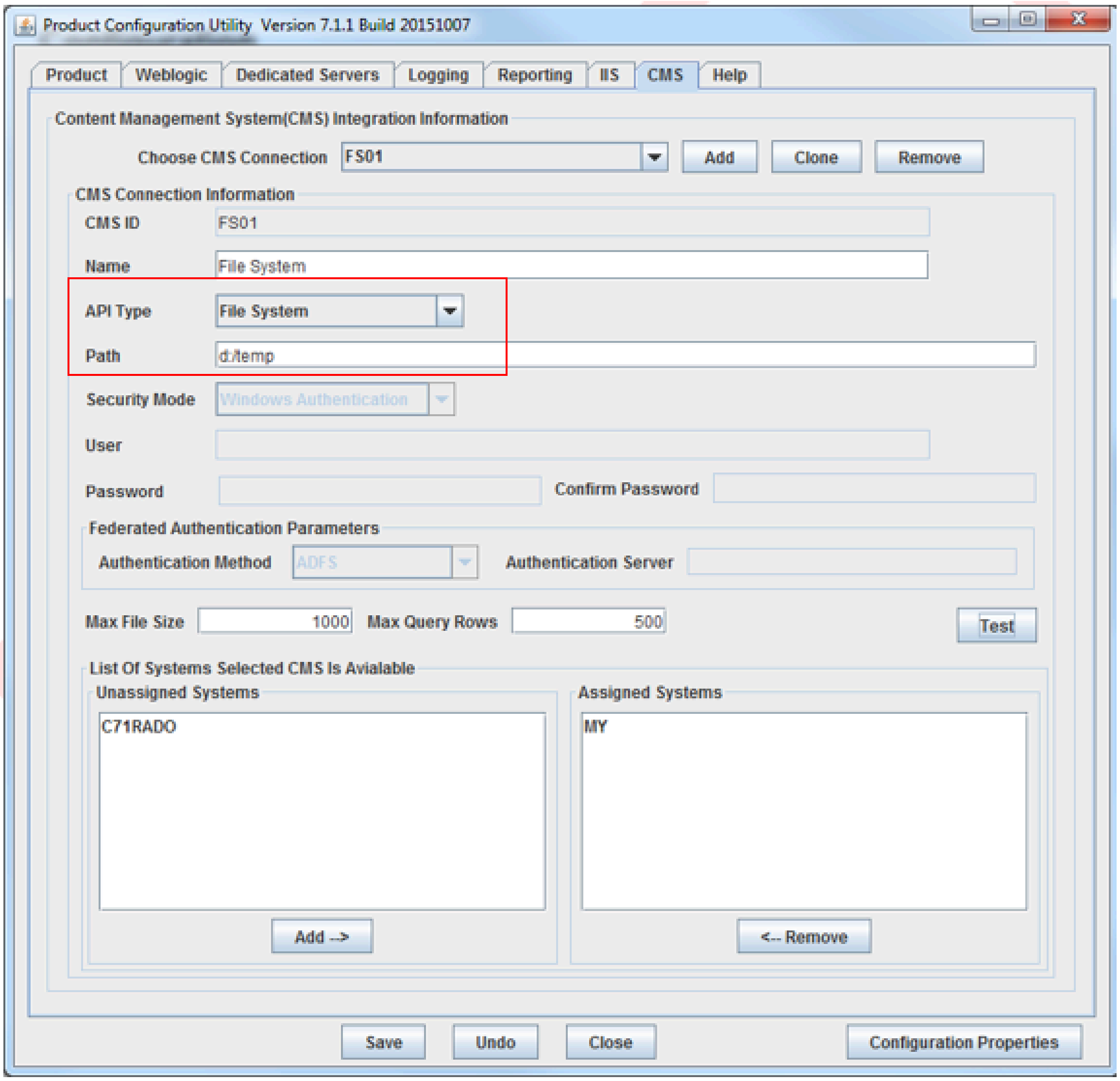
Appendix 3: Using File System as CMS

Deltek Costpoint 8 can use the NTFS File System as the Content Management System. It is important to note that only the NTFS file system is supported. All features that are available in integration with the CMS like SharePoint are also available for the file system.

Deltek considers this an add-on feature, and not a suggested feature to use extensively in production. Deltek recommends using a sophisticated CMS like SharePoint. The File System CMS can still be very functional for low cost and low volume scenarios, or maybe for demos and evaluations of Costpoint CMI.

Configuration

You configure the File System CMS integration first as a separate CMS connection in the Configuration Utility. After selecting **File System** for the **API Type**, all security fields are disabled. Then you select a **Path** to the root file location where documents will be stored.

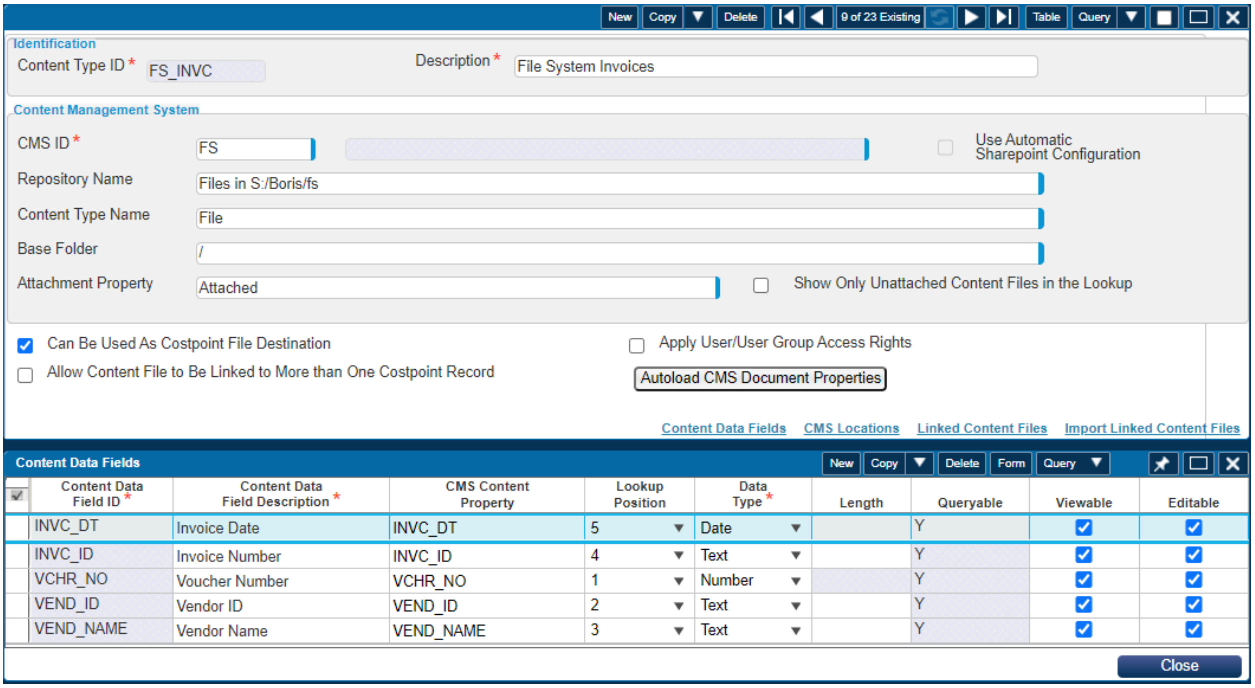


Defining File System Content Type

Defining the **Content Type** in the SYMCMICT: Manage Content Types application for the File System CMS is almost the same as for any other CMS. The differences are:

- **Repository Name**: There is only one repository name: **Files in** <*path*> where <*path*> is the configured file system root path.
- **Content Type Name**: There is only one content type called **File**.
- **Base Folder**: The lookup for this field list all subfolders that exist in the configured root folder for the File CMS.
- **Attachment Property**: The value for this field is forced to **Attached**. This property is always present and cannot be changed.
- **Content Data Fields**: The only major difference is in the **Content Data Fields**. File properties cannot be easily

configured in the file system. You use the Identification screen to define the property structure that will be managed by Costpoint. You must enter the value for the **CMS Content Property** name as text, and not selected from the lookup. This name will be used by the file system. It can be descriptive, and does not have to match the **Field ID** or **Field Description** that are Costpoint values.



Configuring links in the SYMCMIAL: Manage Application/Content Links application is exactly the same. This screen is not aware of any differences between CMS types.

After you configure the application links, the File System CMS can be used as the CMS location or destination as with any other CMS source. This means that all the features that are available for integration with SharePoint documents are fully functional for documents in File System CMS.

Appendix 4: Migrating Content to New CMS Server

Content Management Systems are evolving rapidly. It is very probable that sooner or later you will have to make a decision to move your existing file content to a new CMS server or version, or even to a different CMS on premises or in the cloud.

Costpoint CMI links its transactional data to CMS files using internal identifiers that are unique to a particular server and repository instance. After you move the content to a new server/repository, the internal identifiers are changed and Costpoint is not able to reference the moved content with old links.

There are two ways to address this problem:

- Keep the old CMS server functional and all files that are attached there. Set up the new server and repository with the same content type structure. In Costpoint, define two locations for the Content Type: one for old server/repository and one for the new. The old links will stay active and accessible in Costpoint from old server while new links can be created for content files on the new server. When setting up the location user rights, you can completely disable adding new links for files in old location.
- Create new a Content Type pointing to new server. Move all files from the old CMS server to the new CMS server. Use the **Import Linked Content Files** feature to import the content file links to the new Costpoint content type. Then delete all the links to old content type.

Import Linked Content Files

To migrate to a new CMS:

1. In CMS, create a new repository with the same content type definition as the old one.

2. Copy all the files from the old CMS repository to the new CMS repository.

   For SharePoint, upload all the files to the new document library. Make sure that the newly copied files are of the correct content type. In SharePoint, this means that you have to set the correct default content type for the library.

   Note: Sometimes steps 1 and 2 can be performed using the backup/restore utilities, but that is outside of this guide’s scope.

3. Use the Manage Content Types application (SYMCMICT) to create a new Costpoint Content Type that points to the new CMS repository (SharePoint document library).

4. Map the Costpoint Content Type properties to the new CMS content type.

   Property names and data types must match the old content type properties. The new content type can have more properties, but all old ones must be there.

5. Use the Manage Application/Content Links (SYMCMIAL) application to define the application screen links to new content type.

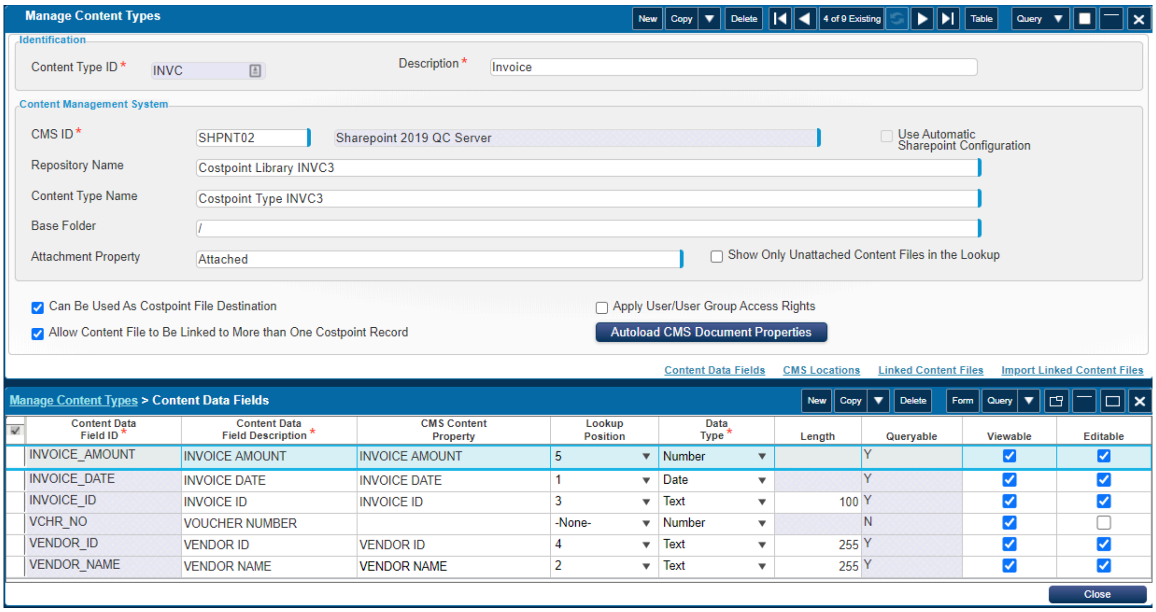
   All the screen links that are defined for the old content type must be also defined for the new.

6. Map the Content Type Properties to Screen fields.

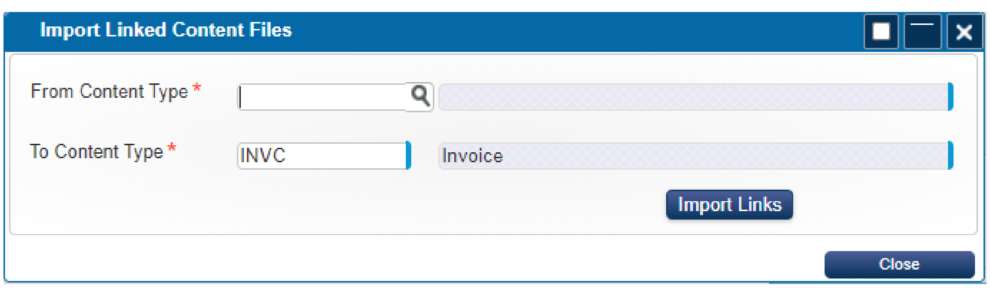
   Mapping can be the same as the old or slightly different. The only restriction is that the selected key fields must be the same as they were for the old content type.

Warning: If something is wrong in steps 1 to 6, the import action will warn you. You can then go back and correct the error(s).

7. Use the Manage Content Types application (SYMCMICT) application to query for the new Costpoint Content Type, and click **Import Linked Content Files**.



8. On the Import Linked Content Files dialog box, select the **From Content Type** (old) and **To Content Type** (new).



9. Click **Import Links**.

Before performing the import operation, Costpoint performs the following validation steps and interrupts the process if something is wrong:

- Verifies that the old and new Content Type Properties names and data types match.
- Verifies that all application/content type links are entered
- Verifies that all application/content type link keys are the same
- Verifies that all linked files exist in the new repository.

This is the longest step, and if some files are not found you have two options: upload the missing files to the CMS, or delete the old links to files that do not exist.

If validation fails, correct the error(s) and restart the process.

After all the validation steps are successfully completed, the new links are imported.

10. After Import operation is completed, use the Manage Content Types (SYMCMICT) application to re-query for the new content type.

11. Click the **Linked Content Files** subtask, and verify the count of linked files for the old and new content types.

    All imported linked files should be listed there.

12. After you have verified that all the links are functional for the new content type, you will have duplicate links: one for old content type and one for the new. To clean old links you have to do the following:

    a. Delete all the links for old content type in the Linked Content Files subtask of the Manage Content Types (SYMCMICT) application.

    b. Delete all the application/content type links (mappings) for the old content type in the Manage Application/Content Links (SYMCMIAL) application.

    c. Delete the old content type in the Manage Content Types (SYMCMICT) application.

Appendix 5: Set Up Sites.Selected Permissions for Costpoint App-Only Access to SharePoint

To set up the Sites.Selected permissions:

1. After you register the application and grant Sites.Selected permission in the Azure portal Entra ID, copy following ids:

    - Application (client) ID
    - Application name

2. Open Graph API Explorer at https://developer.microsoft.com/en-us/graph/graph-explorer.

3. In the top-right corner, click the user icon and login to your tenant.

4. Select the GET method and enter the following URL:

   https://graph.microsoft.com/v1.0/sites/root:/sites/[CPSite]

   Where **CPSite** is the name of the site for which to give permissions.

5. Click the Modify permissions tab and ensure that **Sites.Read.All** is consented.

6. Run the GET query

7. In the results, find the ID (long ID value) and copy it.

8. Change the URL to https://graph.microsoft.com/v1.0/sites/[long_id_value]/permissions.

9. Click the Modify permissions tab and ensure that **Sites.FullControl.All** is consented.

10. Run the GET query.

11. Inspect the permissions.

12. Change the query type to POST.

13. Change the request body (replace application ID and name with actual values), and execute the POST query.

```
{
  "roles": ["fullcontrol"],
  "grantedToIdentities": [
    {
      "application": {
        "id": "[Application (client) ID]",
```

```
          "displayName": "[Application name]"
        }
      }
    ]
  }
```

14. Run the GET query again to verify that the site permissions have been granted to the application.

Appendix 6: Set Up 'Sites.Selected Permissions' for SharePoint in GCC High

Create PowerShell Application

Unfortunately, Microsoft does not permit executing the following steps in the user context. You need to create a new Entra ID application registration for PowerShell, and run the site permissions assignments in the context of the PowerShell app.

1. Open the Entra ID and App Registrations section.

2. Create a new application and name it as you like (i.e., PowerShell).

3. Record the values for the application (client) ID and tenant ID separately.

4. Record the PowerShell application client ID. Note, this is different than the Costpoint application ID. Tenant ID is the same. Go to Certificates and secrets and create a new secret key. Record the secret key separately. You will need these values later.

5. Go to API Permissions and assign the Microsoft Graph API Sites.FullControl.All to the PowerShell app.

Make sure to grant admin consent to this permission.

Note: This **Sites.FullControl.All** is not a permanent permission assignment used by Costpoint. This is registration for the application that will be used to assign access to the selected site used by the Costpoint application. This app registration (PowerShell) can later be deleted or its permissions removed once the process is completed.

Site Permissions Assignment to Costpoint Application

Open PowerShell

Open PowerShell as Administrator, preferably PowerShell 7. Install the Graph API module:

```
Install-Module Microsoft.Graph -Scope CurrentUser
```

If prompted for installation from untrusted source, select Y.

Authenticate PowerShell Application

The first step is to get the PowerShell OAUTH2 access token that will be used for all the following commands:

```
$tenantId = "[your tenant id]"
$clientId = "[PowerShell application (client) id]"
$clientSecret = "[PowerShell application secret]"
$resource = "https://graph.microsoft.us"
$body = @{
    grant_type    = "client_credentials"
    client_id     = $clientId
    client_secret = $clientSecret
    resource      = $resource
}
$tokenResponse = Invoke-RestMethod -Uri "https://login.microsoftonline.us/$tenant
Id/oauth2/token" -Method Post -Body $body
$accessToken = $tokenResponse.access_token
Write-Output $accessToken
```

Find the Site ID

We assume that your organization will dedicate a separate site for Costpoint integration. With the **Sites.Selected** option, SharePoint remains secure and inaccessible for Costpoint, except for the site that you want to assign. After you create the dedicated site in SharePoint, you need to retrieve the site ID that is the required parameter for permissions assignment and inspection. In this command, insert the name of the site that you want to assign to Costpoint:

```
$siteUrl = "https://graph.microsoft.us/v1.0/sites/root:/sites/[name of the site]"
$site = Invoke-RestMethod -Uri $siteUrl -Method Get -Headers @{Authorization = "B
earer $accessToken"}
$siteId = $site.id
```

```
Write-Output $siteId
```

Inspect/Get the Current Permissions

To check the current permissions for the site, use this command:

```
$permUrl = "https://graph.microsoft.us/v1.0/sites/$siteId/permissions"
$perms = Invoke-RestMethod -Uri $permUrl  -Method Get -Headers @{Authorization =
"Bearer $accessToken"}
$permId = $perms.value.id
$perms  | ConvertTo-Json -Depth 10
```

Delete the Current Permissions

If you made a mistake, you can delete the existing permission that was identified by the $permId value in the previous step:

```
$permUrl = "https://graph.microsoft.us/v1.0/sites/$siteId/permissions/$permId"
$perms = Invoke-RestMethod -Uri $permUrl  -Method Delete -Headers @{Authorization
= "Bearer $accessToken"}
```

Assign full Control Site Permission to Costpoint Application

For this command, you need to replace the following placeholders in the script with the Costpoint application name and ID from the Entra ID:

```
$appDisplayName = "[name of the Costpoint application]"
$appClientId="[Costpoint application (client) ID]"
$body = @"
{
    "roles": ["fullcontrol"],
    "grantedToIdentities": [
        {
            "application": {
                "id": "$appClientId",
                "displayName": "$appDisplayName"
            }
        }
   ]
```

```
}
"@
$headers = @{
    Authorization = "Bearer $accessToken"
    ContentType   = "application/json"
    Accept    = "application/json"
}
Invoke-RestMethod -Uri $permUrl  -Method Post -Headers @{Authorization = "Bearer
$accessToken"} -ContentType application/json -Body $body
```

After the permission assignment is completed, you can run the Get permissions command again to verify assignment. The result must be something like this:

```
{
  "@odata.context": "https://graph.microsoft.us/v1.0/$metadata#sites('mydeltekgcc
dev.sharepoint.us%xxxxxx-xx-xxx-xxxx-xxxxxxxxxxxxxxxxxxx-xxxxxxxxxxxxxxxxxxxxxxxx
xx')/permissions",
  "value": [
    {
      "id": "aTowaS50fG1zLnNwLmV4dHxlOTcwOWRjMS1jOWJiLTRhYTctYWQ4YS1mZmM5YmQzYWM2
OWRANWY0ZjY2YTMtMTBkOC00MGU2LThkYjItMTIyZjUzN2Y0ZGM1",
      "roles": [
        "fullcontrol"
      ],
      "grantedToIdentitiesV2": [
        {
          "application": {
            "displayName": "Costpoint",
            "id": "xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx”
          }
        }
      ],
      "grantedToIdentities": [
        {
          "application": {
            "displayName": "Costpoint",
            "id": "xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx”
          }
        }
      ]
    }
```

```
    ]
}
```