# **INGENIUX**

www.ingeniux.com

# **Content Management System 8.0**

# **Installation Guide**

**Revision 2** 



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## 1 Ingeniux CMS Basics

A standard implementation of the Ingeniux Content Management System (CMS) comprises two server environments: the Content Management Server (CMS) and the Dynamic Site Server (DSS). Each server has its own API and its own store of XML content. Typically, XML content is created and updated on the CMS and served to site visitors from the DSS.



In many implementations, the CMS server is placed behind a firewall and integrated with an enterprise's authentication processes, data repositories, and legacy applications.

#### 1.1 Content Management Server

The CMS provides an environment in which users can create, update, and publish content. As content is published, it is replicated to the DSS, where site visitors can view it.

One server environment can have several CMS instances installed. Each instance can manage one or more websites.

The CMS API—called the CSAPI, or Content Store Application Programming Interface—is the interface for programmatically managing a CMS instance, its settings, and all of its content. The CSAPI runs behind an IIS web server. Every feature available in the CMS web application user interface is available through the CSAPI.

The CSAPI also provides the interface for several extensibility features that are often used by customers. Extensibility features include the CMS event model (called Custom Hooks) and various customer-specific UI components (called Custom Tabs).

All content in the CMS is stored in native XML documents, and the CMS and DSS applications manage and process this content using internal XML processors. Content can be published from the CMS in several formats:

• As XML to be consumed by a DSS instance



- As Multi-Format-Output (MFO) content for other technologies
- As static HTML

The CMS can be implemented in each of the following configurations:

- With a standard TCP connection over port 80
- Using a TCP port other than port 80 for TCP traffic
- Using a secure SSL connection (HTTPS)
- Behind a reverse proxy

The CMS requires additional configuration to support a reverse proxy. To specify the URL for a reverse proxy server, go to Administration > System Options > CMS > Reverse Proxy.

#### **1.2 Dynamic Site Server**

Built on the Microsoft .NET framework, the Dynamic Site Server (DSS) delivers content published by the CMS. The DSS supports ASP.NET 4.0, MVC 3, and mobile device detection. It also provides out-of-the-box support for existing XSLT implementations.

The DSS is designed to serve site content in dynamic, multi-format environments. Key features include:

- Default support for ASP.NET MVC 3 and the Razor view engine
- Leveraging of the MVC 3 output cache and authentication/authorization system
- Simple structured traversing of XML documents with the .NET API
- Deferred execution of query statements using LINQ syntax
- Strong-typed support for CMS elements, including Navigations, Links, and Taxonomy Navigations
- Support for runtime-executed element types, including Insert, Component, ComExecute, and Password elements
- Strong-typed support for the CMS taxonomy system at runtime
- Out-of-the-box support for the CMS 7.5 structured URL system
- Integrated support for CMS preview and In-Context Editing
- Support for the User Agents and Sites model employed by the CMS
- Support for all transform options

#### 1.3 Publishing vs. Replication

Updating content on the DSS is a two-step process. First, content is published on the CMS. Then the published content is replicated to the DSS. This two-step process ensures the availability of the DSS and prevents complications that could arise if the DSS accessed files as they are being published.

The two-step model works as follows:

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- **Publishing** Performed by the CMS. Publishing is the process of creating XML files from the pages in the site tree and sending these files to a publishing target folder. This folder is always located on the CMS server in the \xml\pub\ directory.
- **Replication** The process of copying XML from a publishing target on the CMS to a target directory on the DSS. On the DSS, the replicated XML functions as the model (the data store) for the MVC site. For a single-server implementation, the XML can also be replicated to another directory on the CMS.

#### 1.4 Authentication

The CMS supports two types of authentication: Windows domain and LDAP directory.

For both types, the CMS captures user credentials, passes them to the authenticating agent, and authorizes the user based on a successful authentication. For a particular user to work with content in the CMS, the user's Ingeniux ID has to match the user ID in the authenticating directory or database.

In a Windows domain environment, the user ID syntax has to follow the pattern domain\user when a new user is created in the Users/Groups manager.

| Info Member of | Effective Permissions Assignments |
|----------------|-----------------------------------|
| User ID:       | igxhosting\author1                |
| User Name:     | Author1                           |
| Email:         | sales@ingeniux.com                |
|                | Receive Workflow Notifications    |
|                | Integrated Account                |

For LDAP and for custom authentication mechanisms, the user account syntax must match that used by the authenticating method.

The DSS relies on standard IIS security to determine access to published content. Typically, this entails the use of anonymous access in conjunction with an account such as IUSR.

Both the CMS and the DSS can be configured in IIS to use Secure Sockets Layer (SSL) connections. The server application handles this level of security, so configuring SSL won't impact the CMS or DSS sites as long as client requests can get through.



### 2 System Requirements

This section of the Installation Guide describes basic hardware and software requirements for the CMS system.

#### 2.1 CMS Environment

For optimum performance and stability, Ingeniux recommends installing the CMS and DSS on different physical servers. Under this architecture, the CMS is typically located within an organization's Local Area Network (LAN), behind a firewall. Published content is then replicated to the DSS.

Although Ingeniux recommends using two physical servers, the software can run on a single server. This is sometimes useful for an internal intranet site or for low-load, low-security external sites.

In a typical two-server configuration, the two servers perform under significantly different loads. A CMS generally handles a small number of content contributors performing processor-intensive and disk-intensive activities. A DSS handles a comparatively large number of visitors browsing the site. As a result, the DSS has to manage less processor and disk load.

Content contributors access the CMS through the web-based CMS client. Users can work remotely as long as they have a web connection and permission to access the software. The CMS client is browser and platform independent.

#### 2.2 CMS Requirements

The CMS is a Windows-based platform that runs on Windows Server 2003 or Windows Server 2008/R2. Detailed hardware and software requirements are described below.

#### 2.2.1 Minimum Hardware Requirements

- Quad core Intel Xeon (3 GHz or better)
- 2 GB RAM
- 4 GB free disk space (plus 2x content)
- Serial ATA or Ultra SCSI disks; 10,000 RPM minimum; RAID optional

#### 2.2.2 Hardware Recommendations

Note: Increased hardware requirements are based on server load and user count.

- 4 GB RAM or better
- Gigabit Ethernet



• Dual NICs

#### 2.2.3 Software Requirements

- Operating Systems
  - Microsoft Windows Server 2003 or 2003 R2
    - 32-bit only
  - Microsoft Windows Server 2008 or 2008 R2
    - 32- and 64-bit
    - Web Server Role all features
  - Windows Vista Business or Windows 7 Professional (for test environments only)
    - 32- and 64-bit
    - Web Server Role all features
- MSXML 4.0 XML Parser SP3
- Microsoft .NET Framework 4
- Microsoft IIS 6.0 or later
- SMTP or MAPI compliant messaging system

#### 2.3 DSS Requirements

The DSS is an optional part of the Ingeniux CMS solution. The DSS runs on Windows Server 2003 or Windows Server 2008/R2. Detailed hardware and software requirements are described below.

#### 2.3.1 Minimum Hardware Requirements

These are minimum hardware requirements. Load factor may require higher performance servers or multiple servers. Multiple servers can be load balanced.

- Quad core Intel or AMD processor, 2 GHz or better, depending on site traffic and load. Hyper-threaded servers are recommended for heavily trafficked sites.
- 1 GB RAM or better
- 500 MB free disk space (plus 2x content)
- Serial ATA or Ultra SCSI drive; 7,200 RPM minimum; RAID optional

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#### 2.3.2 Hardware Recommendations

- 4 GB RAM or better
- 500 MB free disk space (plus 2x content)
- Serial ATA or Ultra SCSI drive; 7,200 RPM minimum; RAID optional

#### 2.3.3 Software Requirements

- Operating systems
  - Microsoft Windows Server 2003 or 2003 R2
    - 32-bit only
- Microsoft Windows Server 2008 or 2008 R2
  - o **32- or 64-bit**
  - Web Server Role all features
- Windows Vista Business or Windows 7 Professional (for test environments only)
  - o **32- or 64-bit**
  - Web Server Role all features
- MSXML 4.0 Parser SP3
- Microsoft .NET Framework 4
- Microsoft .NET Framework 3.5
- ASP.NET MVC 3.0
- Microsoft IIS 6.0 or later

#### To Install .NET 4 and MVC 3:

- 1. Download and install *Microsoft Web Platform Installer*, located at http://www.microsoft.com/web/downloads/platform.aspx
- 2. Click Products.
  - Search for .net 3.5, and click Add for .NET Framework 3.5 SP1: http://prntscr.com/lhsss
  - Search for .NET 4, and click **Add** for *Microsoft .NET Framework 4*: <u>http://prntscr.com/lhqr6</u>



- Search for MVC 3, and click Add for ASP.NET MVC 3 (Visual Studio 2010): http://prntscr.com/lhqus
- 3. Click Install.

#### 2.4 Browsers Supported by the CMS Client

The CMS client requires one of the following Internet browser/operating system combinations:

#### Windows XP/Vista/7:

- Internet Explorer 6
- Internet Explorer 7
- Internet Explorer 8 (supported as of CMS 6.0 SR5)
- Internet Explorer 9 (supported as of CMS 6.0 SR6 and higher)
- Firefox 3 or higher
- Chrome 9 or higher
- Safari 3.2x or higher

#### Mac OS X 10.4+:

- Safari 3.2x, 4.x, and 5.x
- Firefox 3 or higher

Support for additional browsers may be added at a future date. Check the <u>Ingeniux Support Site</u> for the most current list of supported browser/operating system combinations.

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### 3 Installation

Most installation projects fall into one of the following categories:

- Installing a new CMS
- Upgrading to a new major release of the CMS
- Upgrading to a new minor release of the CMS

This section describes, in general terms, the process of installing the CMS. Upgrades are described in section 8. Before proceeding with an installation or upgrade, read the pertinent sections of this guide. If you have questions, contact Ingeniux Support.

The steps for installing the CMS are as follows:

- 1 Install Internet Information Services (IIS) in Native Mode to support Application Pools.
- 2 Install Indexing Service.
- 3 Install ASP.Net support.
- 4 Install Microsoft XML 4.0 SP 3 Parser.
- 5 Run IGXSetup on the CMS.
- 6 Install and configure the CMS site by running either the IGX\_CMS\_Site\_Setup or IGX\_CMS\_Site\_Upgrade.
- 7 Run IGXSetup on the DSS.
- 8 Install and configure the DSS site by running IGX\_Dynamic\_Site\_Server\_Setup.

#### 3.1 Installation Recommendations

Before you begin installing a CMS, it's a good idea to consider site configuration and file storage options. Thoughtful planning will help you maximize site performance and organize the CMS environment effectively.

Ingeniux recommends separating the CMS system and supporting files from the CMS site and log files. One way to separate the CMS system from the CMS site is to use two physical drives: a system drive and a site drive.

This configuration provides several advantages:

- Easy backup and restoration
- Limited impact of drive failures

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- Limited system drive capacity requirements
- Clearly delineated resource allocation
- Simplified troubleshooting

The system drive should contain:

- Windows system files
- IIS files excluding IIS log files (installed in the Windows directory)\*
- ASP.NET (installed in the Windows directory)
- CMS system files
- .NET Framework (installed in the WINDOWS\Microsoft.NET\Framework\v3.5 directory)
- MSXML 4 SP3 (installed in the Windows\system32 directory)
- Any additional supporting software

\* The associated \inetpub directory and its contents are not necessary for a CMS installation unless otherwise noted by the site developer.

The site drive (the drive on which the CMS site and log files will be installed) should contain:

- Site files
- Indexing catalogs
- Ingeniux log files
- IIS log files

Ingeniux also recommends that the servers running the CMS and DSS software:

- Run only the CMS/DSS applications and the services needed to support them.
- Perform no additional network services (for example, DNS, domain, or LDAP services).
- Host only Ingeniux CMS-managed websites. If additional websites are hosted on the same server, they should run under a separate website and Application Pool in IIS.

#### 3.2 Installing the CMS System

To install the CMS system, run the file IGXSetup, which can be downloaded from the Ingeniux Support site: <u>http://support.ingeniux.com/downloads</u>.



Read and agree to the license terms, and then enter your customer name and license key in the License Configuration dialog. (Ingeniux Support provides the product license key. Keys are typically valid for one year.) You can paste the key, with dashes, directly into the license key box.

| Ingeniux CMS 8.0 Setup                                       | _ 🗆 🗙  |
|--|--------|
| License Configuration  | X      |
|  |        |
| Enter your customer name as it was supplied in your license: |        |
| Ingeniux   |        |
| Enter your license key:                                      |        |
| JNMNKG-MGBFCM-GLEILE-OIJDBA                                  |        |
|  |        |
|  |        |
|  |        |
| © 2012 Ingeniux Corporation —                                |        |
| < Back Next >  | Cancel |

Enter a valid license key and click **Next**. The Choose Components dialog opens with a list of components to install.

| Ingeniux CMS 8.0 Setup  | : |  |  |
|---|---|--|--|
| Choose Components<br>Choose which features of Ingeniux CMS 8.0 you want to install.   |   |  |  |
| Check the components you want to install and uncheck the components you don't want to install. Click Next to continue.  |   |  |  |
| Select components to install: <ul> <li>Prerequisites</li> <li>Server</li> <li>Server</li> <li>Tools</li> <li>Sites</li> <li>Documentation</li> </ul> Position your mouse<br>over a component to<br>see its description. |   |  |  |
| Space required: 255.8MB   |   |  |  |
| © 2012 Ingeniux Corporation   |   |  |  |

For a standard installation, select all components: **Prerequisites**, **Server**, **Tools**, **Sites**, and **Documentation**. Then click **Next**. If your license key doesn't provide for a DSS installation, only the CMS component will be installed.

Next, the Setup wizard prompts you to choose the destination folder where the software will be installed.



Do not select the \Program Files directory. The space between the words can cause problems registering the DLLs.

The CMS system should be installed on the same drive as the Windows installation. The default installation folder is C:\Ingeniux\CMS80.

| Ingeniux CMS 8.0 Setup   |  |
|--|--|
| Choose Install Location  | <b>V</b>                                 |
| Choose the folder in which to install Ingeniux CMS 8.0.  |  |
| Setup will install Ingeniux CMS 8.0 in the following folder. To insta<br>click Browse and select another folder. Click Install to start the inst | III in a different folder,<br>tallation. |
| Destination Folder   | Browse                                   |
| Space required: 255.8MB<br>Space available: 126.5GB  |  |
| © 2012 Ingeniux Corporation  | Install Cancel                           |

Select a destination folder or leave the default location, and then click **Install**. The space required is an estimate only. Actual installations may vary.

You may be notified that Microsoft Sync Framework will be installed. If you are, click OK.

You'll be prompted for permission to stop both the web service (IIS) and the content indexer. Click **Yes** at both prompts.

If the Setup wizard detects a previous installation of the CMS, it will prompt you to keep the previous settings. Click **Yes** unless you are intentionally reconfiguring the existing installation.

An installation progress dialog appears. You can click **Show Details** to see what operations are being processed by the Setup wizard.

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| 🔣 Ingeniux CMS 8.0 Setup                                   |                     |
|--|---------------------|
| Installation Complete<br>Setup was completed successfully. | X                   |
| Completed  |                     |
| Show details   |                     |
|  |                     |
|  |                     |
|  |                     |
| © 2012 Ingeniux Corporation                                | < Bark Cines Cancel |
|  | Carles              |

When the installation is complete, click **Close**. This completes installation of the CMS system. Next you'll need to install the CMS and DSS sites.

#### 3.3 Installing a CMS Site

To install a CMS site, you need to run the Site Setup Wizard on the server that will host the site. The Site Setup Wizard creates an empty site, adds the site to IIS, and installs supporting files. To run the Wizard successfully, you have to be a user with administrative access to the server.

To start the site installation process, open the Tools folder of the CMS system directory (for example, C:\Ingeniux\CMS80\Tools) and double-click **IGX\_CMS\_Site\_Setup**.

The Site Setup Wizard opens.

| 🔣 Ingeniux CMS 8.0 Site Se | etup Wizard   |
|----------------------------|---|
|                            | Welcome to the Ingeniux CMS 8.0<br>Site Setup Wizard  |
|                            | This wizard creates and configures Ingeniux CMS sites.  |
|                            | This setup wizard will:   |
|                            | 1. Create an empty Ingeniux CMS site  |
|                            | 2. Add this site to IIS   |
|                            | 3. Set up CMS content search.   |
|                            | Please make sure that you already have Ingeniux CMS 8.0 installed on your machine before running this wizard. |
|                            | Next > Cancel   |

Click Next.



You can install the CMS site as either a website or in a virtual directory under an existing site.

| Ingeniux CMS 8.0 Site Setup Wizard              |   |        |
|---|---|--------|
| Please select how you want to install the       | e application.                            | X      |
|   |   |        |
| O Website: To set up a new site.                |   |        |
| C Virtual Directory: Will create the runtime si | ite as a virtual directory in an existing | site.  |
|   |   |        |
|   |   |        |
| © 2012 Ingeniux Corporation —————               |   |        |
|   | < Back Next >                             | Cancel |

Click either Website or Virtual Directory, and then click Next.

#### 3.3.1 Website

If you choose the Website option, the IIS Web Site Configuration dialog opens.

| 🔣 Ingeniux CMS 8.0 Site Setup Wizard  | _ 🗆 ×  |
|---|--------|
| IIS Web Site Configuration  | X      |
|   |        |
| Enter the IP Address. default = ""  |        |
| I<br>Enter the Port #. Default = 80   |        |
| 80<br>Enter the Host Name. e.g www.abc.com  |        |
| Enter the Dicelay Name. (This is the user friendly name you see in TS.)                 |        |
| Enter the Display Name. (This is the user mentuly name you see in 115.)                 |        |
| Select the physical location of the site. This location will contain all installed site |        |
| © 2012 Ingeniux Corporation   | Cancol |
| < Back Next >   | Cancel |

Enter website configuration values and click **Next**. The User and Group Configuration dialog opens.

#### 3.3.2 Virtual Directory

If you choose the Virtual Directory option, the Existing Web Site Selection dialog opens.

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| 🚺 Ingeniux CMS 8.0 Site Setup Wizard  | _ 🗆 ×    |
|---|----------|
| Existing Web Site Selection   | X        |
|   |          |
| Please select the web server instance you would like to install the application und | er.      |
| Default Web Site,1  | <u>-</u> |
|   | -        |
|   |          |
| © 2012 Intenti v Corneration  |          |
| Back Next >   | Cancel   |

To set up a virtual directory, you have to create an IIS website prior to running the Site Setup Wizard. Then you can select the IIS website as the instance under which to run the virtual site.

Click the website under which you want to create a virtual directory, and then click Next.

The Site Setup Wizard prompts you for the name and location of the new virtual site.

| 🔣 Ingeniux CMS 8.0 Site Setup Wizard   | _ 🗆 🗙  |
|--|--------|
| Choose the name and location of the new site.  | X      |
| Enter the name of the site. This name cannot include spaces or special characters:                           | -      |
| TestSite   |        |
| Select the physical location of the site. This location will contain an installed site C:\igxsites\CMS80Test | ]      |
|  |        |
|  |        |
| © 2012 Ingeniux Corporation  | Cancel |

If the location of the virtual site is a remote directory, the directory should be mapped, and the mapped drive should be used for the duration of the installation. Once the Site Setup Wizard has completed, the IIS website or virtual directory can be modified to use a UNC path (for example, \\computername\sharename).

Enter the name and location of the new virtual site, and then click **Next**.

The User and Group Configuration dialog opens.



#### 3.3.3 User and Group Configuration

After you configure the website or virtual directory, the User and Group Configuration dialog opens.

| Ingeniux CMS 8.0 Site Setup Wizard   |    |
|--|----|
| User and Group Configuration   | <  |
| Enter a NT domain and valid user name. This account information will be the<br>primary administrative user for Ingeniux CMS. You will be able to create additional<br>administrators after logging in. |    |
| NT Domain Administrator User ID  |    |
| DOMAIN Administrator   |    |
| Enter the default mail domain (user@mydomain.com) where users will receive their<br>workflow notifications.  |    |
| SMTP Domain  |    |
| mydomain.com   |    |
| © 2012 Teaching Correction   |    |
| Back Setup Cance   | el |

Here you can configure the primary administrator and the default mail domain for the CMS site. The administrator ID should extend to both the CMS server and the SMTP domain.

Type the NT Domain, Administrator User ID, and SMTP Domain. If you don't have the account info, or you expect it to change, leave the default values and reconfigure them later.

Click **Setup**. The installation process begins.

| Ingeniux CMS 8.0 Site Setup Wizar                        | d                |                |        |
|--|------------------|----------------|--------|
| Installing<br>Please wait while Ingeniux CMS 8.0 Site is | being installed. |                | X      |
| Extract: settings.xml 100%                               |                  |                |        |
| Show <u>d</u> etails                                     |                  |                |        |
|  |                  |                |        |
|  |                  |                |        |
|  |                  |                |        |
| 0) 2012 Ingeniux Concoration                             |                  |                |        |
| , , , , , , , , , , , , , , , , , , ,                    | < <u>B</u> ack   | <u>N</u> ext > | Cancel |

IIS will restart during the installation.



#### 3.3.4 Authentication Type

The final step in setting up a CMS site is configuring authentication.

You can use Active Directory to authenticate CMS users, or you can set up a different authentication method (for example, LDAP or a SQL database).

| (Choose Au                                   | uthentication Type  | _ 🗆 ×                  |
|--|---|------------------------|
| Version 6 su<br>database au<br>Active Direct | pports Active Directory, LDAI<br>thentication. This wizard only<br>ory configuration setup. | P, and SQL<br>supports |
| [  | Active Directory Wizard   |                        |
| LDAP, SQL<br>configured m                    | Database, or multiple sources<br>anually  | : must be              |
|  | Configure Manually  |                        |
|  |   |                        |

Click **Active Directory Wizard** to set up Active Directory authentication, or choose **Configure Manually** to set up an alternative method.

If you choose Configure Manually, generic versions of the following files will be copied to the site folder:

- Web.config
- local-appsettings.config
- local-connection-strings.config
- local-membership.config

These files need to be configured after the site installation is complete. For more on configuring authentication, see *Configuring Authentication with LDAP Servers*.



If you click **Active Directory Wizard**, you'll be prompted to configure an Active Directory connection.

| 🔣 Active Directory Configuration 📃 🗖 🗙                                   |
|--|
| Configure the Active Directory connection:                               |
| Domain Name (e.g. domain.com)  |
|  |
| Domain Controller Name (e.g. PDC-1 or IP address)                        |
|  |
| Search Base (e.g. dn=domain,dn=com)                                      |
| Connection Username (optional)   |
| Connection Password (optional)   |
|  |
| Not sure what to do? Click Use Defaults and<br>configure the site later. |
| Use Defaults   |

The following values can be configured:

- **Domain Name** The domain name to be added in front of a user name. The value entered here will be included before each user name at login, following the syntax domain\username.
- **Domain Controller** The Windows domain controller that the CMS site uses to authenticate users.
- Search Base The path to the domain's Active Directory service (for example, dc=domain, dc=com).
- **Connection Username [optional]** A user name for connecting to the domain controller to authenticate users.
- **Connection Password [optional]** A password for connecting to the domain controller to authenticate users.

Enter appropriate values and click **OK**, or, if you want to configure these values later, leave the text boxes empty and click **Use Defaults**.

When you're finished configuring authentication for the CMS site, click Finish.

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| 🔣 Ingeniux CMS 8.0 Site Se | etup Wizard  | _ 🗆 🗙  |
|----------------------------|--|--------|
|                            | Completing the Ingeniux CMS<br>Site Setup Wizard           | 8.0    |
|                            | Ingeniux CMS 8.0 Site has been installed on your computer. |        |
|                            | Click Finish to close this wizard.                         |        |
|                            |  |        |
|                            | < Back Finish  | Cancel |

#### 3.4 Configuring Authentication with LDAP Servers

To configure an LDAP directory to authenticate users, choose the Configure Manually option during the CMS site installation process (see *3.3.4 Authentication Type*). Then, after the Site Setup Wizard has completed, navigate to the site directory and locate the following files:

- local-connection-strings.config
- local-membership.config

Follow the steps below to configure the site for LDAP authentication:

- Open local-connection-strings.config in an editor. You'll see several commented-out <add> elements containing connection string examples. Delete these elements, including the comment brackets <!-- --> enclosing them.
- 2. Between the <connectionStrings></connectionStrings> tags, in place of the deleted elements, add the following script, with appropriate values in brackets:

```
<add name="IGXLDAPConnectionString"
connectionString="LDAP://[ServerPathToLDAPServer]/[LDAPSearchBase]" />
```

In the example above, ServerPathToLDAPServer represents the path to the LDAP server, (for example, oldap.university.edu), and LDAPSearchBase represents a directory path to the object containing the users, (for example, ou=users, dc=university, dc=edu).

The entire element should look something like this:

```
<add name="IGXLDAPConnectionString" connectionString="LDAP://
oldap.university.edu/ou=users,dc=university,dc=edu" />
```



- 3. Save the file.
- 4. Next, open local-membership.config in an editor.
- 5. Locate the commented-out <add> element that begins as follows:

```
<add name="IGXLDAPMembershipProvider" type="IGX.LDAPMembershipProvider"
```

This is a sample LDAP membership provider. Delete this sample and the comment enclosing it.

6. If no credentials are required to bind to the LDAP directory, add the following in place of the deleted sample element:

```
<add connectionStringName="IGXLDAPConnectionString"
connectionSecurity="anonymous"
ldapFilter="(objectClass=person)"
name="MyAnonLDAPMembershipProvider"
type="IGX.LDAPMembershipProvider" />
```

If an account is required to bind to the LDAP directory, add the following in place of the deleted sample element:

```
<add connectionStringName="IGXLDAPConnectionString"
bindUsername="[bindUserAccount]"
bindPassword="[BindPassword]" ldapFilter="(objectClass=person)"
ldapUserAttribute="uid"
name="MyLDAPMembershipProvider" type="IGX.LDAPMembershipProvider" />
```

Here [bindUserAccount] represents the actual LDAP user account and [BindPassword] represents the password for the LDAP user account used to bind to the LDAP directory.

- 7. Save the file and recycle IIS.
- 8. Connect to the site and confirm that user authentication is functioning.
- 9. Save copies of the following files in a different directory:
  - local-appsettings.config
  - local-connection-strings.config
  - local-membership.config
  - Web.config

After a site upgrade, you can copy these files into the site directory so that you don't have to reconfigure them.



#### 3.5 Installing a DSS Site

To install a DSS site, you will need to run the DSS Setup Wizard on the server that will host the DSS. The DSS Setup Wizard installs and deploys an instance of the DSS.

If the CMS system is installed with a license key that doesn't license a DSS, the DSS can't be installed.

To start the DSS installation process, open the Tools folder of the CMS system directory (for example, C:\Ingeniux\CMS80\Tools) and double-click **IGX\_Dynamic\_Site\_Server\_Setup**.

The DSS Setup Wizard opens.

| 🔣 Ingeniux C   | CMS Dyna      | mic Site Server Ins  | tance Setup Wizard \    | /8.0                      |           |        | <u> </u> |
|----------------|---------------|----------------------|-------------------------|---------------------------|-----------|--------|----------|
|                | lı            | ngeniux C            | MS Dynami               | ic Site Serve             | er Insta  | ance S | etup     |
| <u>Welcome</u> | Туре          | Instance Name        | Physical Location       | Content Locations         | Create    | Done   | _        |
| Welco          | ome to D      | ynamic Site Serv     | ver instance install    | er                        |           |        |          |
| This uti       | lity will ins | tall and deploy a Dy | namic Site Server Insta | ace Site or Virtual Direc | tory. 8.0 |        |          |
|                |               |                      |                         |                           |           |        |          |
|                |               |                      |                         |                           |           |        |          |
|                |               |                      |                         |                           |           |        |          |
|                |               |                      |                         |                           |           |        |          |
|                |               |                      |                         |                           |           |        |          |
|                |               |                      |                         |                           |           |        |          |
|                |               |                      |                         |                           | -         |        |          |
|                |               |                      |                         | Back Next                 |           | Ca     | ncel     |

Click **Next**. The Setup Wizard prompts you to install either a virtual directory or a site. By default, the virtual directory option is selected.



To set up a virtual directory, leave **Virtual Directory** selected, and select the IIS website under which you want to create the virtual directory. Websites have to be created in IIS in order to appear in the list.

#### Or

To install the DSS as its own site, select Site.

Click Next.

#### 3.5.1 Installing the DSS as a Virtual Directory

If you choose to set up the DSS site in a virtual directory, you'll be prompted to enter a name for the directory.



Type a name for the virtual directory you want to create. Then click **Next**.

#### 3.5.2 Installing the DSS as a Site

If you choose to set up the DSS as a site, you'll be prompted to enter a host name for the site.

| 🔇 Ingeniux CMS | Dynamic Sit      | e Server Instar | nce Setup Wizard  | V8.0         |            |          |        |
|----------------|------------------|-----------------|-------------------|--------------|------------|----------|--------|
|                | Inde             | niux CM         | S Dynam           | ic Site S    | erver Ir   | istance  | Setun  |
|                | inge             |                 | e bynan           |              |            | Iotanice | occup  |
| Welcome Ty     | /pe <u>Insta</u> | ince Name       | Physical Location | Content Loca | ations Cre | ate Done |        |
| Fill in the    | name of S        | ite you are al  | out to create.    | e.g. www.you | rsite.com) |          |        |
| www            | dss-site.com     | -               |                   |              |            |          | _      |
| 1              | loo pite.com     |                 |                   |              |            |          | _      |
| IP Add         | Iress:           |                 |                   |              |            |          |        |
| Port:          | 80               |                 |                   |              |            |          |        |
|                |                  |                 |                   |              |            |          |        |
|                |                  |                 |                   |              |            |          |        |
|                |                  |                 |                   |              |            |          |        |
|                |                  |                 |                   |              |            |          |        |
|                |                  |                 |                   |              |            |          |        |
|                |                  |                 |                   |              |            |          |        |
|                |                  |                 |                   |              |            |          |        |
|                |                  |                 |                   |              |            |          |        |
|                |                  |                 |                   |              |            |          |        |
|                |                  |                 |                   | 1 -          |            |          |        |
|                |                  |                 |                   | Back         | Next       | _        | Cancel |
|                |                  |                 |                   |              |            |          |        |



The host name represents the DNS value associated with the website. This value must be registered with the appropriate DNS server so that the host name is associated with the designated IP address. The host name should follow the syntax *www.hostname.com*.

By default, the IP address is set to a value of \*, which indicates the IP address of the local server. The port is set to 80.

Type a host name for the site, make any necessary changes to the IP address and port (in most cases you won't need to change these values), and click **Next**.

#### 3.5.3 Finishing the DSS Installation

For both a virtual directory and a site, you'll need to enter a physical location for the DSS instance.

| Ingeniux CMS Dynamic Site Server Instance Setup Wizard V8.0           | _ 🗆 ×     |
|---|-----------|
| Ingeniux CMS Dynamic Site Server Insta                                | nce Setup |
| Welcome Type Instance Name Physical Location Content Locations Create | Done      |
| Select the physical location of the Dynamic Site Server Instance      | Browse    |
|   |           |
|   |           |
|   |           |
|   |           |
|   |           |
|   |           |
|   |           |
|   |           |
|   |           |
| Back Next   | Cancel    |

The physical location is the path to the site on the disk (for example, C:\igxsites\DSS80). Click **Browse** and select a physical location for the site.

If you select **Deploy Source Code**, a sample ASP.NET MVC solution is deployed with the installation. For legacy installations using an XSLT runtime, and for installations deploying an existing MVC solution, this option should be cleared. Most installations fall into one of these two groups, so in most cases the Deploy Source Code option should not be selected.

However, if you plan to build a new MVC solution, you can deploy the source code and use that as the framework for your project.



The DSS supports XSLT transformations out of the box. To deploy a DSS that uses XSLT stylesheets instead of the MVC framework, leave **Deploy Source Code** unselected.

When you're finished configuring the physical location and the source code option, click Next.

The Setup Wizard prompts you to select a location for the CMS published content folder and a location for the Design-Time assets folder.

| Ingeniux CMS Dynamic Site Server Instance Setup Wizard V8.0                  | <u>_                                    </u> |
|--|--|
| Ingeniux CMS Dynamic Site Server Inst  | ance Setup                                   |
| Welcome Type Instance Name Physical Location Content Locations Create        | Done   |
| Select the location of Ingeniux CMS published content folder and design time | e asset folder.                              |
| Published Content:   | Browse                                       |
| Design-time Assets (optional):   | Browse                                       |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
| Back Next  | Cancel                                       |

The Published Content folder is the folder to which the CMS replicates content. The DSS then displays content from this folder on the live website.

To configure replication, log in to the CMS, open a publishing target, and configure values on the Replication tab. (For more on replication, see the Administrator Guide.)

The Design-Time Assets folder points to an assets folder on the DSS.

Use the **Browse** buttons to select a Published Content folder and (optionally) a Design-Time Assets folder. Then click **Next**.

The Setup Wizard creates a DSS instance.



The Setup Wizard displays a link to the new DSS site, but the site won't be populated with content until the first publish and replication from the CMS. To complete the DSS installation process, click **Finish**.

#### 3.6 Installing the ComExecute Component

The ComExecute component extends the standard functionality of the CMS. ComExecute can be used to perform database functions, send email, or digest content from web services via SOAP.

#### 3.6.1 Installing ComExecute

The ComExecute component is available from the Ingeniux Support site as a zip file. Typically, the component files will be installed at C:\Program Files\Ingeniux Corp\IGX ComExecute Component 8.0.The component files need to be installed on both the CMS and DSS servers to work properly.

#### 3.6.2 Upgrading ComExecute

If you use the Site Upgrade Wizard to upgrade to CMS 8.0, you will still need to upgrade the ComExecute component manually. To do so, go to the Ingeniux Support site and download and install the ComExecute component for CMS 8.0. If the ComExecute component is not upgraded, associated functions (e.g. sending email) won't work.

#### 3.7 Configuring HTTPS/SSL

The secure sockets layer (SSL) protocol provides encryption and authentication services for HTTP transactions. HTTP using SSL for data security is called HTTP Secure (HTTPS).

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The CMS supports three HTTPS/SSL configurations:

- No SSL; HTTP for login and the site
- SSL for login only; HTTP for the site
- SSL for the entire site

These three configurations are governed by three settings:

- requireSSL (in Web.config)
- loginUrl (in Web.config)
- redirectToHttpAboutLogin (in local-appsettings.config)

To enable one of the SSL configurations, use the appropriate combination of settings:

#### No SSL; HTTP for login and the site:

- requireSSL = false
- loginUrl = secured/login.aspx
- redirectToHttpAboutLogin = true

#### SSL for login only; HTTP for the rest of the site:

- requireSSL = true
- loginUrl = secured/seclogin.aspx
- redirectToHttpAboutLogin = true

#### SSL for the entire site:

- requireSSL = true
- loginUrl = secured/seclogin.aspx
- redirectToHttpAboutLogin = false

#### To enable HTTPS/SSL for a CMS site, complete the following steps:

- 1. Back up the Web.config and local-appsettings.config files before editing.
- 2. Enable SSL on the virtual directory or website in IIS that is associated with the CMS.



Note: This portion of the configuration is not related to the Ingeniux CMS and is standard IIS/server administration. Additional information on enabling SSL in IIS can be found on the Microsoft TechNet site at http://goo.gl/PNLN.

- 3. Configure the Web.config <forms> node for SSL:
  - a) Browse to the root directory of your site.
  - b) Open the Web.config file in a text editor.
  - c) Navigate to the <forms> node.

```
<authentication mode="Forms">
  <forms name="IGXAuth" path="/" loginUrl="secured/login.aspx"
    protection="All" timeout="30" slidingExpiration="true" >
```

4. Add the requireSSL="true" attribute to the <forms> node.

```
<authentication mode="Forms">

<forms name="IGXAuth" path="/" loginUrl="secured/login.aspx"

protection="All" timeout="30" slidingExpiration="true" requireSSL="true" >
```

5. Adjust the loginUrl="secured/login.aspx" attribute as needed:

```
<authentication mode="Forms">
<forms name="IGXAuth" path="/" loginUrl="secured/seclogin.aspx"
protection="All" timeout="30" slidingExpiration="true" requireSSL="true" >
```

6. Configure local-appsettings.config:

```
<appSettings >
   <add key="userdomain" value=""/>
        <!-- time out of temp images created by image manipulations -->
        <add key="tempImageTimeOut" value="30"/>
        <!-- settings for https only. If true, redirect to http, otherwise, stays https -->
        <add key="redirectToHttpAboutLogin" value="false"/>
   </appSettings>
```

If the redirectToHttpAboutLogin setting isn't present, you may need to add it. The default value for the node is <add key="redirectToHttpAboutLogin" value="true"/>.



## 4 CMS Site Verification

A CMS site can be set up as either a website or virtual directory in IIS. If the CMS is implemented as a website, the URL is the hostname of the website. If it's implemented as a virtual directory, the URL is the hostname/virtual directory name. The simplest installation method places the CMS site as a virtual directory underneath the Default website.

| IIS Configuration URL                   |                                   | DNS Configuration   |
|---|-----------------------------------|---|
| Default website                         | Hostname of server                | None: The server should already have a hostname registered on the internal network.                     |
| Virtual directory under default website | [Hostname]/virtual directory name | None: The server should already have a hostname registered on the internal network.                     |
| Website                                 | Hostname assigned to website      | A DNS entry needs to be created to map<br>the IP address of the NIC to the hostname<br>for the website. |
| Virtual directory under website         | [Hostname]/virtual directory name | A DNS entry needs to be created to map<br>the IP address of the NIC to the hostname<br>for the website. |

For most CMS implementations, you can use the Setup Wizard to install and configure a CMS site. If you need to perform a manual installation, or if you need to verify the configuration of a CMS site, use the following sections for reference.

#### 4.1 CMS Site Configuration (IIS 6.0)

This section describes CMS site configuration in a Windows Server 2003/IIS 6 environment.

#### 4.1.1 Creating an Application Pool

Ingeniux recommends using separate Application Pools for each site (whether an IIS website or a virtual directory) running on a CMS server. Using separate Application Pools limits the impact sites have on each other and allows easier identification of problem websites, as each Application Pool runs as a separate process.

Before you create a new Application Pool, make sure that an Application Pool hasn't already been created for your site. The Application Pool would be listed in the IIS Manager in the Application Pools folder.



| Distance Information Servic   | ces (IIS) Manager |         |        |          |
|-------------------------------|-------------------|---------|--------|----------|
|                               |                   | II      |        |          |
| internet Information Services | Description       | State   | Status | <b>_</b> |
| E SUPPORTTEST (local comp     | 🗼 anselm          | Running |        |          |
| 🕀 📁 Application Pools         | 🚯 anselmrt        | Running |        |          |
| 🕀 📁 Web Sites                 | aoa 🤃             | Running |        |          |
| 🕀 📁 Web Service Extension     | asps 🔅            | Running |        |          |
|                               | 🚓 augustana       | Running |        |          |
|                               | augustana2        | Running |        |          |
|                               | augustana3        | Running |        |          |
|                               | 🚯 bucknell        | Running |        |          |
|                               | byui              | Running |        |          |
|                               | de cac            | Running |        |          |
|                               | de cacRT          | Running |        |          |
|                               | 🚯 Cartella        | Running |        |          |
|                               | de case           | Running |        |          |
|                               | de casert         | Running |        |          |
|                               | 🚓 champlain       | Running |        |          |
|                               | 🚯 champlainrt     | Running |        |          |
|                               | de ciis           | Running |        |          |
|                               | 📢 🔂 ciisrt        | Stopped |        |          |
|                               | 🔥 cmich           | Running |        |          |
| A                             | cmsv6             | Running |        | +        |

If it hasn't been created, right-click the Application Pool in the IIS Manager and select **New** > **Application Pool**).

| Add New Application Pool     |                      |   |
|------------------------------|----------------------|---|
| Application pool ID: AppPoo  | i #1                 |   |
| Application pool settings    | new application pool |   |
| C Use existing application p | pool as template     |   |
| Application pool name:       | DefaultAppPool       | Ŧ |
| ОК                           | Cancel <u>H</u> elp  |   |

Enter an application Pool ID that corresponds to the CMS site, and select **Use default settings** for new application pool.

#### 4.1.2 Configuring the Application Pool

To maximize CMS site availability while maintaining site performance, Ingeniux recommends recycling an Application Pool daily.

Note: The Application Pool should not be configured to shut down idle processes, because some CMS processes (for example, large check-ins and publishes) may appear idle to the Application Pool. Enabling the shutdown of idle processes could prematurely stop an important CMS task.



Also, with regard to recycling the Application Pool, keep the following best practices in mind:

- The daily Application Pool recycle should occur during a time of little or no activity, because recycling an Application Pool during certain CMS processes could cause site corruption.
- Recycling the Application Pool of an IIS website containing a virtual directory hosting a CMS site could cause corruption. Ingeniux recommends preventing an Application Pool recycle in this context.

Ingeniux recommends the following standard Application Pool settings for a CMS site. These settings may need to be adjusted to meet the demands of a specific environment, especially with regard to server hardware, server performance, and site usage volume. Please use these settings as a starting point and modify them as needed.

To configure an Application Pool, right-click it under the IIS Application Pools folder and select **Properties**.

Use the following tabs/settings to configure the Application Pool:

**Recycle** – Set up a nightly recycle of the Application Pool.

| css Properties   | ? ×            |
|--|----------------|
| Recycling Performance Health Identity  |                |
| Recycle worker processes (in minutes):   | 120            |
| <ul> <li>Recycle worker process (number of requests):</li> <li>Recycle worker processes at the following times:</li> </ul> | 35000          |
| 01:15 Add  Remove  Edit  |                |
| Memory recycling<br>Recycle worker process after consuming too much memory:  |                |
| <ul> <li>Maximum virtual memory (in megabytes):</li> <li>Maximum used memory (in megabytes):</li> </ul>                    | ÷ 500<br>÷ 192 |
| OK Cancel Apply  | Help           |

Performance - Clear Shutdown idle worker processes ... .



| css Properties   |   | ? ×  |
|--|---|------|
| Recycling Performance Health   Identity  |   |      |
| Idle timeout<br>Shutdown worker processes after being idle for<br>(time in minutes): | × | 20   |
| Request queue limit  |   |      |
| Limit the kernel request queue (number of requests):                                 | ÷ | 4000 |
| Maximum <u>C</u> PU use (percentage):  |   | 100  |
| Action performed when CPU usage exceeds maximum CPU use:                             |   |      |
| No action  |   |      |
| Web garden<br>Maximum number of <u>w</u> orker processes:                            | • | 1    |
| OK Cancel Apply  |   | Help |

Health – Leave the settings on the Health tab at their defaults.

**Identity** – Confirm that the Identity tab is configured to use the Network Service account.

| ss Properties          |                     | ? >      |
|------------------------|---------------------|----------|
| Recycling Performan    | ice Health Identity |          |
| Application pool ide   | entity              |          |
| Select a security a    | Network Service     | 1        |
| © <u>⊂</u> onfigurable |                     |          |
| User name:             | IWAM_T03-2003SRV    | Browse   |
| Pass <u>w</u> ord:     | •••••               | ]        |
|                        |                     |          |
|                        |                     |          |
|                        |                     |          |
|                        |                     |          |
|                        |                     |          |
|                        |                     |          |
|                        | OK Cancel Ap        | ply Help |



#### 4.1.3 Configuring an IIS Website or Virtual Directory

After configuring the Application Pool for the CMS site, you'll need to configure the site itself in IIS. Locate the CMS site in the Web Sites section of the IIS Manager directory and right-click the site. Select **Properties** and configure the following tabs and settings.

**Home/Virtual Directory Tab** – This tab contains basic site information and will be labeled either "Virtual Directory" or "Home Directory" depending on your site configuration. For a CMS site, configure the following values and settings:

- Local Path Path to the CMS site files
- Permissions Check boxes selected for Read, Write, Log Visits, and Index this resource
- Application pool Application Pool for the site

| 80 Properties                |                                 | ?                  |
|------------------------------|---------------------------------|--------------------|
| HTTP Headers                 | Custom Errors                   | ASP.NET            |
| Virtual Directory            | Documents                       | Directory Security |
| The content for this reso    | ource should come from:         |                    |
| ΘA                           | directory located on this compu | uter               |
| C A                          | share located on another comp   | outer              |
| C A                          | redirection to a <u>U</u> RL    |                    |
|                              |                                 |                    |
| Local path:                  | igxsites\CMS80                  | Br <u>o</u> wse    |
| Scrip <u>t</u> source access | Log visits                      |                    |
| ✓ <u>R</u> ead               | Index this                      | resource           |
| I <u>W</u> rite              |                                 |                    |
|                              |                                 |                    |
| Application settings         |                                 |                    |
| Application name:            |                                 | Remove             |
| Starting point:              | ′<br>∠Default Web Site >\cms8   |                    |
| Starting points              |                                 | Configuration      |
| Execute permissions:         | Scripts and Executables         | ▼                  |
| Application pool:            | cms80                           | ▼ Unload           |
|                              | ,                               |                    |
|                              |                                 |                    |
|                              |                                 |                    |

• **Configuration** – Options for extension and wildcard mappings. To configure mappings, click **Configuration**. The **Application Configuration** dialog opens.



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| Application Configuration                            | ×               |
|--|-----------------|
| Mappings Options Debugging                           |                 |
|  |                 |
| M ⊆ache ISAPI extensions                             |                 |
| Application extensions                               |                 |
| Extens Executable Path Ve                            | rbs 🔺           |
| .vbproj C:\WINDOWS\Microsoft.NET\Framew GE           | T,HEA           |
| vsdisco C:\WINDOWS\Microsoft.NET\Framew GE           | T.HEA.          |
| .webinfo C:\WINDOWS\Microsoft.NET\Framew GE          | T,HEA.          |
| .xml C:\Ingeniux\CMS80\Server\igxcsapi8 All          | <b>_</b>    .   |
| •  |                 |
| Add Edit Remove                                      |                 |
| Wildcard application maps (order of implementation): |                 |
| C:\WINDOWS\Microsoft.NET\Framework\v2.0              | I <u>n</u> sert |
|  | Edit            |
|  | Remove          |
| Move Up Move Down                                    |                 |
| OK Cancel  | Help            |

The .xml extensions for a CMS site should be mapped to igxcsapi80.dll. (Note that the DSS mapping differs here.) Also, aspnet\_isapi.dll has to be implemented as a wildcard application map.

On the **Options** tab, **Enable Parent Paths** should be selected.

| Application Configuration      | × |
|--------------------------------|---|
| Mappings Options Debugging     | _ |
| Application configuration      |   |
| Enable session state           |   |
| Session timeout: 20 minutes    |   |
| Enable buffering               |   |
| Enable parent paths            |   |
| Default ASP language: VBScript |   |
| ASP script timeout:            |   |
| Enable Side by Side assemblies |   |
| Manifest <u>fi</u> le name:    |   |

**Documents** – This tab defines the default document IIS loads when the site is requested. This should be set to Default.asp for CMS servers.


| miro Properties                         |                             | ? ×                |
|---|-----------------------------|--------------------|
| HTTP Headers                            | Custom Errors               | ASP.NET            |
| Virtual Directory                       | Documents                   | Directory Security |
| Enable default gontent                  | page                        | Add                |
|   | Nove Up Moye Down           |                    |
| Enable document foote                   | r —                         |                    |
| Append an HTML forma<br>server returns. | tted footer to every docume | nt your Web        |
|   |                             | Browse,            |

**Directory Security** – This tab defines access to the site. Authentication and access control should be set to **Enable anonymous access**. This setting enables the CMS, in conjunction with ASP.NET, to provide authentication in place of local Windows security.

| Default Web Si   | te Properties  |                              | <u>? ×</u>     |  |  |
|--|--|------------------------------|----------------|--|--|
| Web Site<br>Documents  | Performance Directory Security   | ISAPI Filters                | Home Directory |  |  |
| Authentical  | tion and access control<br>Enable anonymous access ar<br>authentication methods for t  | nd edit the<br>his resource. | <u>E</u> dit   |  |  |
| IP address   | IP address and domain name restrictions<br>Grant or deny access to this resource using<br>IP addresses or Internet domain names. |                              |                |  |  |
| Secure communications Require secure communications and enable client certificates when this resource is accessed. |  |                              |                |  |  |
|  | ОК   | Cancel Ap;                   | ply Help       |  |  |

To enable anonymous access, on the Directory Security tab in the authentication and access control section, click **Edit** and select **Enable anonymous access** in the dialog that appears:



| A | uthentication Methods  | X |
|---|--|---|
|   | Use the following Windows user account for anonymous access: |   |
|   |  |   |

**ASP.NET** – Specifies the version of ASP.NET to use for the site. If only one version of ASP.NET is present, the ASP.NET tab is not available.

|                                 | Documents  | Directory | / Security |
|---------------------------------|--|-----------|------------|
| Microsoft<br>ASP.n.             | et   |           |            |
| ASP.NET version:                | 2.0.50727  |           | •          |
| Virtual path:<br>File location: | /design-time<br>D:\igxsites\design-time\web.config |           |            |
| File creation date:             | 6/21/2011 9:58:                                    | 53 AM     |            |
|                                 | 8/8/2011 12:44:                                    | 25 PM     |            |

**Note:** If two versions of ASP.NET are installed but the ASP.NET tab is not present, this may indicate an ASP.NET registration problem. The registration problem could prevent the CMS from functioning properly. In such a case, consult the Microsoft Support site for possible resolutions.

#### 4.1.4 Configuring Web Service Extensions

For a CMS site to run, the following Web Service Extensions have to be allowed:

- Active Server Pages
- ASP.NET
- IGXExtensions80
- Indexing Service
- Server Side Includes

These services should be present and enabled by default. If not, follow these steps to enable them:



- 1. In IIS Manager, find and open the Web Service Extensions folder.
- 2. In the right pane, select Active Server Pages and click Allow.
- 3. Repeat for Indexing Service, Server Side Includes, and ASP.NET if installed.



The Ingeniux DLLs for a CMS site also need to be added and allowed. To add the Ingeniux DLLs, follow these steps:

1. Click Add a New Web Service Extension. The New Web Service Extension dialog opens.

| New Web Service Extension   | ×              |  |  |
|---|----------------|--|--|
| Type the name of the new Web service extension, and specify the files that<br>must be enabled for the extension to run. |                |  |  |
| E <u>x</u> tension name:  |                |  |  |
|   |                |  |  |
| Required files:   |                |  |  |
|   | A <u>d</u> d   |  |  |
|   | <u>R</u> emove |  |  |
|   |                |  |  |
| ☐ <u>S</u> et extension status to Allowed   |                |  |  |
| OK Cancel   | Help           |  |  |

2. Enter the following under Extension Name:

IGXExtensions80

3. Select Set extension status to Allowed.



- 4. Click Add > Browse and select igxcsapi80.dll.
- 5. In the Web Service Extensions lists in the right pane of IIS Manager, double-click **IGXExtensions80** and click **Required Files**. The list of required files should ultimately include igxcsapi80.dll and igxxmlsvr80.dll.

To add a DLL:

1. In Web Service Extension Properties on the Required Files tab, click Add.

| Veb Service Extension Properties - IGXExtensions80       ? ×         General       Required Files         Jacobia       Compared Files   |                               |                |  |  |  |
|--|-------------------------------|----------------|--|--|--|
| In order for IGXExtensions80 to run on your IIS Web server, the following<br>files must be enabled. Disabling or removing a file might cause<br>IGXExtensions80 (or another Web service extension) to stop running<br>correctly. |                               |                |  |  |  |
| File Name  | Status                        | Add            |  |  |  |
| C:\Ingeniux\CMS80\Server\igx<br>C:\Ingeniux\CMS80\Server\igx<br>C:\Ingeniux\CMS80\Server\igx   | Allowed<br>Allowed<br>Allowed | <u>R</u> emove |  |  |  |
|  |                               | Allow          |  |  |  |
|  |                               | Prohibit       |  |  |  |
|  |                               |                |  |  |  |
|  |                               |                |  |  |  |
|  |                               |                |  |  |  |
| OK Car   | ncel <u>App</u>               | Help           |  |  |  |

- 2. Click **Browse** and select the DLL you want to add. Typically, these files are located in the Ingeniux\CMS75\Server directory.
- 3. Repeat the process for all the DLLs, and make sure that all of the appropriate DLLs and web service extensions are set to **Allow**.

#### 4.2 CMS Site Configuration (IIS 7.0)

This section describes CMS site configuration in a Windows Server 2008/IIS 7 environment.

#### 4.2.1 Creating an Application Pool

Ingeniux recommends using separate Application Pools for each site (whether an IIS website or a virtual directory) running on a CMS server. Using separate Application Pools limits the impact sites have on each other and allows easier identification of problem websites, as each Application Pool runs as a separate process.

Before you create a new Application Pool, make sure that an Application Pool hasn't already been created for your site. The Application Pool would be listed in the IIS Manager in the Application Pools page.



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| 🕒 🔘 🛛 🔊 🖉 🚱 🚱  | Application Pools  | 😰 🖂 😭   🚱 -   |
|----------------|--|---|
| File View Help |  |   |
| Connections    | Image: Processes of the server of the se | Actions<br>Actions<br>Add Application Pool<br>Set Application Pool<br>Defaults<br>Help<br>Online Help<br>htty<br>kcat<br>kcat<br>Nork<br>kcat |

If it hasn't been created, right-click the Application Pools node in IIS Manager and select **Add Application Pool**.

| Add Application Pool               | ? ×  |
|------------------------------------|------|
| Name:                              |      |
| AppPool #1                         |      |
| .NET Framework version:            |      |
| .NET Framework v2.0.50727          | -    |
| Managed pipeline mode:             |      |
| Classic                            |      |
| Start application pool immediately |      |
| ОК Са                              | ncel |

Enter an application Pool ID that corresponds to the CMS site, and, if necessary, select **Classic** as the managed pipeline mode. Leave the .NET Framework version set to 2.0.

#### 4.2.2 Configuring Web Service Extensions

To configure Web Service Extensions in IIS 7, select the server node in the IIS Manager directory tree. Then, in the main pane, select **ISAPI and CGI Restrictions**.





A list of DLLs is displayed. The list should include igxcsapi80.dll and igxxmlsvr80.dll. Verify that the IGX extensions are installed and set to **Allowed**.

To add a DLL (if necessary):

1. Click Add in the Actions pane.



- 2. Click the Browse (...) button.
- 3. Navigate to, and select, the desired file. Typically, these files are located in the C:\Ingeniux\CMS80\Server directory.
- 4. Select Allow extension path to execute, and then click Okay.
- 5. Repeat the process as needed for DLLs.
- 6. Once the igxcsapi80.dll and igxxmlsvr80.dll have been added, confirm that their restriction level is set to **Allowed**. To allow a file, select it, click **Edit**, and select **Allow** extension path to execute.



#### 4.2.3 Confirming Server Role Service

Under Windows Server 2008 and IIS 7, you may have to verify that the proper Role Services are installed. This verification step is new with IIS 7.

In Server Manager, navigate to the Role Service list and verify that the list matches the following screen shot:

| Role      | Service                                       | Status        |
|-----------|---|---------------|
| ۵         | Web Server                                    | Installed     |
| ۵         | Common HTTP Features                          | Installed     |
| ۵         | Static Content                                | Installed     |
| ۵         | Default Document                              | Installed     |
| ۵         | Directory Browsing                            | Installed     |
| ۵         | HTTP Errors                                   | Installed     |
| ۵         | HTTP Redirection                              | Installed     |
| <u>له</u> | Application Development                       | Installed     |
| <u>ه</u>  | ASP.NET                                       | Installed     |
| <u>له</u> | .NET Extensibility                            | Installed     |
| <u>له</u> | ASP   | Installed     |
| <u>له</u> | CGI   | Installed     |
| <u>له</u> | ISAPI Extensions                              | Installed     |
| ۵         | ISAPI Filters                                 | Installed     |
| ۵         | Server Side Includes                          | Installed     |
| ۵         | Health and Diagnostics                        | Installed     |
| ۵         | HTTP Logging                                  | Installed     |
| <u>له</u> | Logging Tools                                 | Installed     |
| <u>له</u> | Request Monitor                               | Installed     |
| <u>له</u> | Tracing                                       | Installed     |
| <u>له</u> | Custom Logging                                | Installed     |
| <u>له</u> | ODBC Logging                                  | Installed     |
| ۵         | Security                                      | Installed     |
| ۵         | Basic Authentication                          | Installed     |
| ۵         | Windows Authentication                        | Installed     |
| ۵         | Digest Authentication                         | Installed     |
| <u>ه</u>  | Client Certificate Mapping Authentication     | Installed     |
| <u>ه</u>  | IIS Client Certificate Mapping Authentication | Installed     |
| <u>ه</u>  | URL Authorization                             | Installed     |
| ۵         | Request Filtering                             | Installed     |
| ۵         | IP and Domain Restrictions                    | Installed     |
| ۵         | Performance                                   | Installed     |
| ۵         | Static Content Compression                    | Installed     |
| ۵         | Dynamic Content Compression                   | Installed     |
| ۵         | Management Tools                              | Installed     |
| ۵         | IIS Management Console                        | Installed     |
| ۵         | IIS Management Scripts and Tools              | Installed     |
| ۵         | Management Service                            | Installed     |
| ۵         | IIS 6 Management Compatibility                | Installed     |
| ۵         | IIS 6 Metabase Compatibility                  | Installed     |
| ۵         | IIS 6 WMI Compatibility                       | Installed     |
| ۵         | IIS 6 Scripting Tools                         | Installed     |
| ۵         | IIS 6 Management Console                      | Installed     |
|           | FTP Publishing Service                        | Not installed |
|           | FTP Server                                    | Not installed |
|           | FTP Management Console                        | Not installed |
|           |   |               |

#### 4.3 File Level Permissions

For the CMS to access the physical resources on the server, certain file level permissions have to be enabled for the \ingeniux and \igxsites directories. These permissions don't grant network access to these resources, but they enable the CMS to access these directories on behalf of users. The permissions are as follows:



| \ingeniux  |             |          |          |  |  |
|--|-------------|----------|----------|--|--|
| Account/Group Access Level CMS DSS                                     |             |          |          |  |  |
| IIS Application Pool Account <sup>1</sup>                              | Full Access | Required | Required |  |  |
| IUSR_[Computername] <sup>2</sup> Full Access     Required     Required |             |          |          |  |  |

| \temp                                     |             |          |          |  |  |
|---|-------------|----------|----------|--|--|
| Account/Group Access Level CMS DSS        |             |          |          |  |  |
| IIS Application Pool Account <sup>1</sup> | Full Access | Required | Required |  |  |
| IUSR_[Computername] <sup>2</sup>          | Full Access | Required | Required |  |  |

| \igxsites <sup>3</sup>                    |             |          |                              |  |  |
|---|-------------|----------|------------------------------|--|--|
| Account/Group Access Level CMS DSS        |             |          |                              |  |  |
| IIS Application Pool Account <sup>1</sup> | Full Access | Required | Required                     |  |  |
| IUSR_[Computername] <sup>2</sup>          | Full Access | Required | Depends on Site <sup>4</sup> |  |  |

| \%windir%\Microsoft.NET\Framework\v2.0.50727 |              |     |     |  |
|--|--------------|-----|-----|--|
| Account/Group                                | Access Level | CMS | DSS |  |



| IIS Application Pool<br>Account <sup>1</sup> | List Folder Contents, Read & Execute, Read, and Write | Required | Not Required |
|--|---|----------|--------------|
| IUSR_[Computername] <sup>2</sup>             | List Folder Contents, Read & Execute, Read, and Write | Required | Not Required |

Notes:

- 1. This account is configured in the **Properties** > **Identity** tab of the Application Pool used by the site. It defaults to [localmachine]\network service.
- 2. This account is used by the IIS Website to support anonymous access to site resources after a user has been validated via ASP.NET authentication.
- 3. If the log files, XML directory, and Index catalogs are in different directories, each account/group, with the appropriate access, will need to be added to each directory.
- 4. Permissions on the DSS server may vary depending on whether resources are password protected.

To add directory permissions for a user or user group, follow these steps:

- 1. Navigate to the parent directory or drive.
- 2. Right-click the directory and select **Properties**.
- 3. On the Security tab, click Add.

| <u></u>                            |                 |                |
|------------------------------------|-----------------|----------------|
| Group or user names:               |                 |                |
| 1 Internet Guest Account (TR       | AININGSERVER    | IUSR_TRAI.     |
| M NETWORK SERVICE                  |                 |                |
| Students (TRAININGSERVI            | ER\Students)    |                |
| SYSTEM                             |                 |                |
| 1 Users (TRAININGSERVER            | (Users)         |                |
|                                    |                 |                |
|                                    | A <u>d</u> d    | <u>R</u> emove |
| Permissions for Administrators     | Allow           | Denv           |
| - Full Control                     |                 |                |
| Modify                             | <b>V</b>        | 6              |
| Read & Execute                     | V               |                |
| List Folder Contents               | 4               |                |
| Read                               | <i>S</i>        |                |
| Write                              | ~               |                |
| Coorial Parminaiana                | —               |                |
| For special permissions or for adv | anced settings, | Advanced       |
| click Advanced.                    | 1               |                |

4. Enter the group or account name in the **Enter the object names to select** field. Use the following syntax:



domain\[user or group name]

#### Click OK.

| ?                   |
|---------------------|
|                     |
| <br>Object Types    |
|                     |
| Locations           |
|                     |
|                     |
| <u>C</u> heck Names |
| <u>C</u> heck Names |
|                     |

- 5. On the Permissions tab, select the access level (e.g. Full Access).
- 6. Repeat steps 1 through 6 to add additional accounts and/or user groups.
- 7. Next, click Advanced and select the Replace permissions check box.
- 8. Click **OK** and then **Yes** to the resulting dialog.

| Туре   | Administrators (T-1)A | Permission<br>Full Control | Inherited From | Apply To<br>This folder, subfolders |
|--|-----------------------|----------------------------|----------------|-------------------------------------|
| Allow  | CREATOR OWNER         | Full Control               | D:\igxsites\   | Subfolders and files only           |
| Allow  | Internet Guest Accou  | Full Control               | D:\igxsites\   | This folder, subfolders             |
| Allow  | NETWORK SERVICE       | Full Control               | D:\iaxsites\   | This folder, subfolders             |
| Allow  | SYSTEM                | Full Control               | D:\iaxsites\   | This folder, subfolders             |
| Allow  | Users (T-1\Users)     | Special                    | D:\iaxsites\   | This folder and subfol              |
| Allow  | Users (T-1\Users)     | Read & Execute             | D:\igxsites\   | This folder, subfolders             |
| Add         Edt         Bemove           Allow inheritable permissions from the parent to propagate to this object and all child objects. Include these with entries explicitly defined here.         Image: Comparison of the parent is comparent to propagate to the object and all child objects. Include these with entries explicitly defined here. |                       |                            |                |                                     |

## 4.4 Log File Configuration

Ingeniux Log Files – To configure the location of the Ingeniux log files, follow these steps:

 In the CMS Client, go to Administration > System Options > CMS > Design-Time Logging.

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| 🔅 Ingeniux CMS   | Welcome admin1   Sign Out   Language +   Help +   Go To 🔹 🍨   🕥 + 💿 +   |
|--|---|
| 🕾 Dashboard 📄 New 🔻 🔚 Save   🖻 Rename  ลิ Assi   | gn To 👻 🧟 Advance in Workflow 🔹   🗟 Spellcheck   🥝 Refresh 🛛 Preview 🛷 Publish Site   😵 Assets  |
| 🥺 Site Production 👻 🔍  | 🚯 System Options 👒  |
| Site Production Production Production Production Production Production Search Administration Production Value Production | Design-Time Logging<br>Enter the path and file nof ry our Design-Time log. Example: C:\tGXLogs\igxcsapi.log.<br>Log File Name: <u>clupsitestms80_demotuml.ligacsapi.log</u><br>Logging Level: <u>informational →</u><br>Don't log error caused by empty component during preview. |
| ۰ III ا  | Save  |

- 2. Enter the directory path and file name for the log. Then configure the logging level (for more on logging, see the *Administrator Guide*).
- 3. Click **Save** to confirm the settings.
- 4. Reset the Application Pool for the site.
- 5. To configure DSS Logging, go to Administration > System Options > Dynamic Site Server > Runtime Logging and repeat steps two through four with appropriate DSS settings.

**IIS Log Files** – To set the log file location, follow these steps:

1. In IIS Manager under the **Web Sites** folder, right-click the CMS site (or the site above the CMS virtual directory) and click **Properties**.



2. On the Web Site tab, click Properties.

| Default Web Site Prope  | erties ? 🗙   |
|---|--|
| Directory Security<br>Web Site Perfor                               | HTTP Headers Custom Errors ASP.NET<br>mance ISAPI Filters Home Directory Documents |
| Web site identification<br>Description:<br>IP address:<br>ICP port: | n Default Web Site (All Unassigned) Advanced                                       |
| Connections<br>Connection timeout                                   | 120 seconds<br>ep-Alives   |
| Active log format   | og File Format   |
|   | OK Cancel Apply Help   |

3. On the General tab, click **Browse** and select a log file directory.

| Logging Properties  | X |
|---|---|
| General Advanced  |   |
| New log schedule  |   |
| Use local time for file naming and rollover<br>Log file directory:<br>d:\iislogs\<br>Log file name: W3SVC1\exyymmdd.log |   |
| OK Cancel Apply Help  |   |

4. Reset IIS for the changes to take effect.

# 4.5 Site Registry Entry Verification

To verify or configure the Ingeniux CMS site registry settings, follow these steps:



1. Go to **Start > Run**, and run the following command:

regedit

2. In the Registry Editor, navigate to the registry key for your site. The path should look something like this:

HKEY\_LOCAL\_MACHINE\SOFTWARE\Wow6432Node\Ingeniux\CMS\8.0\Sites\

In this key, there should be a subkey corresponding to the CMS site name. Select this site subkey. If the site subkey is not present, skip to step 4.

3. The following value pairs should be listed:

```
catalog=[catalogName]
contentType=1
disableSearching=0
hostname=[HostNametoWebsite]
ipaddress=[IPofServer]
remotePassword=
remoteTimeout=30
remoteUserName=
sitename=[SiteNameValue]
sitepath=[SiteDirectoryPath]
```

Verify the following values:

**Hostname** – The domain name of the CMS site (for example, if the site URL is *http://www.designsite.gov/publisher*, the hostname is *www.designsite.gov*).

**Sitename** – The name of the virtual directory created for the CMS site. In the example above, the sitename is *publisher*. If the CMS is set up as a site (not as a virtual directory), leave [SiteNameValue] empty. Once you've verified registry values, skip to step 5.

4. To add registry values, copy and paste the text below to Notepad:

```
Windows Registry Editor Version 5.00
[HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Ingeniux\CMS\8.0\Sites\[SiteNa
me]] @=""
"catalog"="[CatalogName]"
"contentType"="1"
"disableSearching"="0"
"hostname"="[HostName]"
"ipaddress"="[IPAddressOfServer]"
"remotePassword"=""
"remoteUserName"=""
"sitename"="[SiteName]"
```



"sitepath"="[PathToXMLFolder]"

Replace the values between brackets [] with the appropriate information. You may also need to adjust the registry key path. For sitepath, use the following syntax:

```
[driveletter] \\ [SiteDirectory] \\XML
```

```
For example - D:\\igxsites\\cms80\\xml
```

- 5. Save the file as Site.reg. Then right-click the Site.reg file and select **Import** (or **Merge**). Click **Ok**.
- If any values were changed or added, verify that all users are logged off and no publishes or check-ins are in progress. Then restart IIS by going to Start > Run and running the following command:

IISreset

#### 4.6 Cleaning Up Publish Logs

To avoid clutter, Ingeniux recommends deleting old publish logs on a monthly basis.

To delete publish logs:

- 1. In the site directory, open the *pub* folder. The file path to the pub folder looks something like this: [Drive]\[SiteDirectory]\xml\pub.
- 2. Delete the publishLog files. The file names will look something like this: publishLog1-2011-06-14-16-04.xml.



# 5 DSS Site Verification

The DSS can be set up as either a website or a virtual directory in IIS. If the DSS is a website, the URL is the hostname of the site. If the DSS is a virtual directory, the URL is the hostname/virtual directory name.

| IIS Configuration                       | URL                               | DNS Configuration   |
|---|-----------------------------------|---|
| Default website                         | Hostname of server                | None: The server should already have a hostname registered on the internal network.                     |
| Virtual directory under default website | [Hostname]/virtual directory name | None: The server should already have a hostname registered on the internal network.                     |
| Website                                 | Hostname assigned to website      | A DNS entry needs to be created to map<br>the IP address of the NIC to the hostname<br>for the website. |
| Virtual directory under website         | [Hostname]/virtual directory name | A DNS entry needs to be created to map<br>the IP address of the NIC to the hostname<br>for the website. |

For most implementations, you can use the Setup Wizard to install and configure a DSS site. If you need to perform a manual installation, or if you need to verify the configuration of a CMS site, use the following sections for reference.

## 5.1 DSS Site Configuration (IIS 6.0)

This section describes DSS site configuration in a Windows Server 2003/IIS 6 environment.

#### 5.1.1 Creating an Application Pool

Ingeniux recommends using separate Application Pools for each site (whether an IIS website or a virtual directory) running on a DSS. Using separate Application Pools limits the impact each site has on the other(s) and provides for easier identification of problem websites, because each Application Pool runs as a separate process.

To create a new Application Pool, right-click the **Application Pools** folder in IIS Manager and select **New > Application Pool**.



| Thternet Information Service        | es (IIS) Manager |         |        |       |
|-------------------------------------|------------------|---------|--------|-------|
| 🗐 Eile Action View Window           | <u>H</u> elp     |         |        | _ B × |
|                                     | 😢 💷   💂   🕨 🔳    | II      |        |       |
| Internet Information Services       | Description      | State   | Status |       |
| SUPPORTTEST (local completion Pools | 抉 anselm         | Running |        |       |
|                                     | 🚓 anselmrt       | Running |        |       |
| 😟 📁 Web Sites                       | aoa 🤣            | Running |        |       |
| 🗄 📁 Web Service Extension           | 🚓 asps           | Running |        |       |
|                                     | 💑 augustana      | Running |        |       |
|                                     | 💑 augustana2     | Running |        |       |
|                                     | 💑 augustana 3    | Running |        |       |
|                                     | 🚓 bucknell       | Running |        |       |
|                                     | 🦣 byui           | Running |        |       |
|                                     | all cac          | Running |        |       |
|                                     | acRT 🕺           | Running |        |       |
|                                     | 🚓 Cartella       | Running |        |       |
|                                     | de case          | Running |        |       |
|                                     | asert            | Running |        |       |
|                                     | 🚓 champlain      | Running |        |       |
|                                     | 🚓 champlainrt    | Running |        |       |
|                                     | 🦣 ciis           | Running |        |       |
|                                     | n 😓 ciisrt       | Stopped |        |       |
|                                     | 🚓 cmich          | Running |        |       |
| A                                   | de cmsv6         | Running |        | +     |
|                                     | L (BA)           |         |        |       |

The Add New Application Pool dialog opens.

| pplication pool <u>I</u> D:        | ol #1                |  |
|------------------------------------|----------------------|--|
| Application pool settings          |                      |  |
| • Use <u>d</u> efault settings for | new application pool |  |
|                                    |                      |  |
| O Use existing application         | pool as template     |  |

Enter an Application Pool ID for the DSS site.

#### 5.1.2 **Configuring the Application Pool**

Ingeniux recommends certain Application Pool settings for DSS sites. These settings may need to be modified later if server demands or site usage change. Please use these settings as a starting point only.

To configure the Application Pool, right-click it under the IIS Application Pools folder and select **Properties**. Then configure as follows:

**Recycling** – Set up a nightly recycle of the Application Pool. To maximize DSS site availability while maintaining site performance, Ingeniux recommends recycling the Application Pool daily.

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| css Properties   | ? ×              |
|--|------------------|
| Recycling Performance Health Identity  |                  |
| Recycle worker processes (in minutes):<br>Recycle worker process (number of requests): | ≠ 120<br>≠ 35000 |
| Recycle worker processes at the following times:                                       |                  |
| 01:15 Add<br>Remove<br>Edit  |                  |
| Memory recycling   |                  |
| Recycle worker process after consuming too much memory:                                |                  |
| Maximum <u>v</u> irtual memory (in megabytes):   | 500              |
| Maximum used memory (in megabytes):  | × 192            |
|  |                  |
| OK Cancel Apply  | Help             |

**Performance** – Increase the **Request queue limit** to 4000. Additional web gardens should not be added if the DSS site relies on the maintenance of session state for any application hosted on the DSS site, since extra web gardens allow multiple sessions.



| css Properties   |          | ? ×      |
|--|----------|----------|
| Recycling Performance Health Identity  |          |          |
| Idle timeout<br>Shutdown worker processes after being idle for<br>(time in minutes): | i<br>T   | 20       |
| Request queue limit<br>Limit the kernel request queue (number of requests):          | •        | 4000     |
| Enable CPU monitoring  |          |          |
| Maximum ⊆PU use (percentage):  | *<br>*   | 100      |
| <u>R</u> efresh CPU usage numbers (in minutes):                                      | <u>л</u> | 5        |
| Action performed when CPU usage exceeds maximum CPU use:<br>No action                |          | <u>~</u> |
| Web garden<br>Maximum number of <u>w</u> orker processes:                            | ÷        | 1        |
| OK Cancel Apply  |          | Help     |

**Health** – Clear **Enable rapid fail protection** and increase the startup and shutdown timeout values to 300 seconds.

| css Properties   | ? >  |
|--|------|
| Recycling Performance Health Identity  |      |
| Enable pinging   |      |
| Ping worker process every (frequency in seconds):  | 30   |
| Enable rapid-fail protection   |      |
| Disable the application pool if there are a certain number of worker pro<br>failures within a specified time period. | cess |
| Eailures:  | - 5  |
| Time period (time in minutes):   | 5    |
| Startup time limit   |      |
| Worker process must startup within (time in seconds):  | 90   |
| Shutdown time limit  |      |
| Worker process must shutdown within (time in seconds):   | 90   |
| OK (Cancel) Apply  | Help |

**Identity** – Configure the Network Service account.



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| css Properties         | P Health Identity                         |
|------------------------|---|
| Application pool ide   | ntity<br>count for this application pool: |
| C <u>C</u> onfigurable |   |
| Pass <u>w</u> ord:     |   |
|                        |   |
|                        |   |
|                        |   |
|                        | OK Cancel Apply Help                      |

#### 5.1.3 Configuring an IIS Website or Virtual Directory

To view configuration information for a DSS site, right-click the site in IIS Manager and select **Properties**. The settings for the site are distributed among seven tabs. To configure a DSS site, you'll need to ensure that the appropriate settings are selected at the **Home/Virtual Directory** tab, the **Documents** tab, and the **Directory Security** tab.

**Home/Virtual Directory** – This tab contains basic site settings. The tab is labeled either "Home Directory" or "Virtual Directory" depending upon your configuration. The following settings should be configured:

- Local Path Specifies the path to the DSS files.
- **Permissions** Should be set to Read, Write, Log Visits, and Index this resource.
- Application Pool Specifies the application pool for the site.

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| in needeore 1  | Custom Errors   BITS Server Es  | ktension ASP.NE1   |
|--|---|--------------------|
| Virtual Directory  | Documents   | Directory Security |
| C  | source snouid come from:<br>A girectory located on this computer<br>A share located on another computer<br>A redirection to a URL |                    |
| Local path:  | D:\igxsites\run-time  | Browse             |
| Directory <u>b</u> rowsing<br>Application settings   |   |                    |
| Application name:  |   | - Demove           |
| Application name:  |   | Remove             |
| Application name:<br>Starting point:   | <default site="" web="">\run-ti</default>   | Remove             |
| Application name:<br>Starting point:<br>Execute permissions:   | <default site="" web="">\run-ti<br/>Scripts and Executables</default>   | Configuration      |
| Application na <u>m</u> e:<br>Starting point:<br>Execute <u>p</u> ermissions:<br>Applicatio <u>n</u> pool: | <default site="" web="">\run-ti<br/>Scripts and Executables</default>   | Configuration      |

• **Configuration** – Contains extension mappings as well as additional application settings. The .xml extensions should be mapped to igxxmlsvr80.dll. If they are not present, click **Add** in the **Mappings** tab.

| Extens                                   | Executable Path   | Verbs -   |
|--|---|---|
| .ad<br>.adprot<br>.asa<br>.asax<br>.ascx | C:\WINDOWS\Microsoft.NET\Framew<br>C:\WINDOWS\Microsoft.NET\Framew<br>C:\WINDOWS\system32\inetsrv\asp.dll<br>C:\WINDOWS\Microsoft.NET\Framew<br>C:\WINDOWS\Microsoft.NET\Framew | GET,HEA<br>GET,HEA<br>GET,HEA<br>GET,HEA<br>GET,HEA |
| A <u>d</u> d<br>Vildcard app             | Edit Remove   | Tocort  |
| C. (WINDO                                | A Synarosol (ALL ) Fallowork (V2.0  | Edit  |

Enter the path to the desired executable (DLL) or use the **Browse** button to locate the DLL on the disk. Add the related extension in the appropriate field and click **OK**.

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| Add/Edit Applicati                                  | on Extension Mapping                     | ×      |
|---|--|--------|
| E <u>x</u> ecutable:                                | C:\Ingeniux\CM580\Server\igxxmlsvr80.dll | Browse |
| <u>E</u> xtension:                                  | .xml                                     |        |
| Verbs<br>• <u>A</u> ll verbs<br>C <u>Li</u> mit to: |  |        |
| Script engine                                       | exists OK Cancel                         | Help   |

Enable Parent Paths should be selected in Configurations > Options.

| Application Configuration  |
|--|
| Mappings Options Debugging   |
| Application configuration          Image: Enable gession state         Image: Enable buffering         Image: Enable generic paths |
| Default ASP language: VBScript   |
| ASP script timeout:  |
| Enable Side by Side assemblies   |
| Manifest file name:  |
|  |
|  |
| OK Cancel Help   |

**Documents** – This tab defines the default document loaded by IIS when the site is requested. This should be set to the home page for the site, e.g. x127.xml.

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| Default Web Site F       | Properties   |                      | ? >            |
|--------------------------|--|----------------------|----------------|
| Web Site                 | Performance  | ISAPI Filters        | Home Directory |
| Documents                | Directory Security   | HTTP Headers         | Custom Errors  |
| Enable def               | ault <u>content page</u><br>ault.aspx<br>ault.htm<br>ault.asp<br>ex.htm<br>art.htm |                      | Add            |
| Enable do                | Move Up  | Mo <u>v</u> e Down   |                |
| Append an<br>server retu | HTML formatted footer to<br>Irns.  | o every document you | r Web          |
|                          |  | Br                   | owse           |
|                          |  |                      |                |
|                          |  |                      |                |
|                          |  |                      |                |
|                          | ОК   | Cancel App           | ly Help        |

**Directory Security** – Defines access to the site. Authentication and Access Control should be set to use Integrated Windows Authentication.

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| Default Web Site    | Properties   |                               |  | ? ×   |
|---------------------|--|-------------------------------|--|-------|
| Web Site            | Performance  | ISAPI Filters                 | Home Dire                                      | ctory |
| Authentication<br>a | and access control<br>nable anonymous access ar<br>uthentication methods for t                   | nd edit the his resource.     | ers Custom                                     |       |
| IP address and G    | l domain name restrictions -<br>rant or deny access to this<br>Paddresses or Internet dor        | resource using<br>nain names. | Edįt   |       |
| Secure commu        | nications<br>equire secure communicatic<br>nable client certificates whe<br>esource is accessed. | ons and<br>en this            | Server Certificate.<br>Yew Certificate<br>Edit |       |
|                     | ок   | Cancel                        | Apply  | Help  |

Confirm that Anonymous Access is granted to the site by clicking **Edit** in the "Authentication and access control" section of the **Directory Security** tab and selecting **Enable anonymous access**.

| lser name:   |  |                       |
|--|--|-----------------------|
|  | IUSR_SUPPORTTEST   | Browse                |
| assword:   | •••••  |                       |
|  |  |                       |
| uthenticated   | access   |                       |
| or the following or the following of the | ng authentication methods, user  | r name and passwo     |
| - anor   | iymous access is disabled, or  | a control lists       |
| - acce   | Windows authentication   | ss conterornises      |
|  | The additionation to be added to the second se |                       |
| Digest aut   | nentication for Windows domain   | servers               |
| Digest auth  | hentication for Windows domain<br>entication (password is sent in cl   | servers<br>ear text)  |
| Digest auth<br>Ba <u>s</u> ic auth<br>.NET Passp   | hentication for Windows domain<br>entication (password is sent in cl<br>port au <u>t</u> hentication   | servers<br>lear text) |
| Digest auth<br>Basic auth<br>.NET Passp  | entication for Windows domain<br>entication (password is sent in cl<br>port authentication   | servers<br>ear text)  |
| Digest auth  | nentication for Windows domain<br>entication (password is sent in cl   | servers<br>ear text)  |



#### 5.1.4 Configuring Web Service Extensions

The DSS web service extension settings for Windows 2003 mirror the CMS settings. For details, see 4.1.4.

#### 5.2 DSS Site Configuration (IIS 7.0)

This section describes DSS site configuration in a Windows Server 2008/IIS 7 environment.

#### 5.2.1 Creating an Application Pool

Ingeniux recommends using separate Application Pools for each site (whether an IIS website or virtual directory) running on a Dynamic Site Server (DSS). Using separate Application Pools limits the impact each site has on the other(s) and makes it easier to identify problem websites, as each Application Pool runs as a separate process.

To create a new Application Pool, right-click **Application Pools** in IIS Manager and select **Add Application Pool**.

| le ⊻iew <u>H</u> elp    |                          |             |                     |                       |                         |               |
|-------------------------|--------------------------|-------------|---------------------|-----------------------|-------------------------|---------------|
| nnections               | and the second           |             |                     |                       |                         |               |
|                         | Application              | on Pool     | S                   |                       |                         |               |
| Start Page              |                          |             |                     |                       |                         |               |
| TRAININGV7 (INGENTILIX) | This page lets you view  | and manage  | the list of applica | ition pools on the se | rver. Application pools | are associate |
| - Application Pools     | with worker processes, ( | contain one | or more applicatio  | ons, and provide isol | ation among different   | applications. |
| - K FTP Sites           | Filter:                  | - 8         | 🛛 🔄 👻 😽 Show        | All Group by: N       | lo Grouping             | -             |
| 🗄 🐻 Sites               | Name 🔺                   | Status      | .NET Frame          | Managed Pipeli        | Identity                | Applicatio    |
|                         | 1001                     | Started     | v2.0                | Classic               | NetworkService          | 0             |
|                         | absciex                  | Started     | v2.0                | Classic               | NetworkService          | 1             |
|                         | 🔊 asl                    | Stopped     | v2.0                | Classic               | NetworkService          | 1             |
|                         | ASP.NET v4.0             | Started     | v4.0                | Integrated            | NetworkService          | 0             |
|                         | ASP.NET v4.0 Cl          | Started     | v4.0                | Classic               | NetworkService          | 0             |
|                         | bomgar                   | Started     | v2.0                | Classic               | NetworkService          | 1             |
|                         | bowvalley                | Started     | v2.0                | Classic               | NetworkService          | 1             |
|                         | artella                  | Started     | v2.0                | Integrated            | NetworkService          | 1             |
|                         | Classic .NET App         | Started     | v2.0                | Classic               | NetworkService          | o             |
|                         | 🔊 cms1001                | Started     | v2.0                | Classic               | NetworkService          | 1             |
|                         | 🔐 cms10010               | Started     | v2.0                | Classic               | NetworkService          | 1             |
|                         | 🔊 cms10011               | Started     | v2.0                | Classic               | NetworkService          | 1             |
|                         | 🔊 cms1002                | Started     | v2.0                | Classic               | NetworkService          | 1             |
|                         | 🔊 cms1003                | Started     | v2.0                | Classic               | NetworkService          | 1             |
|                         | @cms1004                 | Started     | v2.0                | Classic               | NetworkService          | 1             |
|                         | A                        | Charles d   |                     | Channels .            | Riskinsolation dae      | 1             |
|                         |                          |             |                     |                       |                         |               |

The Add Application Pool dialog opens.



| a Application  | Pool          | ? |
|----------------|---------------|---|
| <u>N</u> ame:  |               |   |
| NET Framewor   | k version:    |   |
| NET Framewo    | rk v2.0.50727 |   |
| Managed pipeli | ne mode:      |   |
| Integrated     | -             |   |

Enter a name for the DSS Application Pool, set the .NET Framework to version 4.0, leave the managed pipeline mode set to **Integrated**, and click **OK**.

#### 5.2.2 Configuring the Application Pool

To configure the Application Pool, click **Application Pools** in IIS Manager, select the Application Pool for the DSS site, and click **Advanced Settings**.



The advanced settings for both 32-bit and 64-bit are the same, with the addition in 64-bit of **Enable 32-bit Applications** being set to True. The two windows below show the advanced settings for a DSS site:

| ٨d   | dvanced Settings            |                 |         |  |  |  |  |  |
|--|-----------------------------|-----------------|---------|--|--|--|--|--|
|  |                             |                 |         |  |  |  |  |  |
|  |                             | w4.0            |         |  |  |  |  |  |
|  | INET Framework version      | V4.U<br>Truo    |         |  |  |  |  |  |
|  | Enable 32-Bit Applications  | Integrated      |         |  |  |  |  |  |
|  | Managed Pipeline Mode       | Decon           |         |  |  |  |  |  |
|  | Name<br>Oueue Length        | 1000            |         |  |  |  |  |  |
|  | Queue Lengui                | 1000<br>Truo    |         |  |  |  |  |  |
|  |                             | Thue            |         |  |  |  |  |  |
|  | CPU                         | 0               |         |  |  |  |  |  |
|  | Limit<br>Lincit Antion      | U<br>No Action  |         |  |  |  |  |  |
|  | Limit Action                | NOACUON         |         |  |  |  |  |  |
|  | Limit Interval (minutes)    | 5               |         |  |  |  |  |  |
|  | Processor Affinity Enabled  | False           |         |  |  |  |  |  |
|  | Processor Amnity Mask       | 4294967295      |         |  |  |  |  |  |
|  | Process Model               | Natural Cardina |         |  |  |  |  |  |
|  |                             | NetworkService  |         |  |  |  |  |  |
|  | Idle Time-out (minutes)     | 20              |         |  |  |  |  |  |
|  | Load User Profile           | False           |         |  |  |  |  |  |
|  | Maximum Worker Processes    | 1               |         |  |  |  |  |  |
|  | Ping Enabled                | True            |         |  |  |  |  |  |
|  | Ping Maximum Response Tir   | 90              |         |  |  |  |  |  |
|  | Ping Period (seconds)       | 30              |         |  |  |  |  |  |
|  | Shutdown Time Limit (secon  | 90              |         |  |  |  |  |  |
|  | Startup Time Limit (seconds | 90              | <b></b> |  |  |  |  |  |
| Name<br>[name] The application pool name is the unique identifier for<br>the application pool. |                             |                 |         |  |  |  |  |  |
|  |                             | ОК              | Cancel  |  |  |  |  |  |

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| dvanced Settings |                               |                  |  |  |  |
|------------------|-------------------------------|------------------|--|--|--|
| -                | Ding Dariad (seconds)         | 30               |  |  |  |
|                  | Chutdown Time Limit (cocon    | <u>-</u>         |  |  |  |
|                  | Shutdown Time Limit (secon    | 90               |  |  |  |
|                  | Bracess Ornhaning             | 90               |  |  |  |
|                  | Frocess Orpnaning             | Eska             |  |  |  |
|                  | Enabled                       | False            |  |  |  |
|                  | Executable                    |                  |  |  |  |
| _                | Executable Parameters         |                  |  |  |  |
|                  | Rapid-Fail Protection         | 19thell evel     |  |  |  |
|                  | "Service Unavailable" Respor  | HttpLevel        |  |  |  |
|                  | Enabled                       | True             |  |  |  |
|                  | Failure Interval (minutes)    | 5                |  |  |  |
|                  | Maximum Failures              | 5                |  |  |  |
|                  | Shutdown Executable           |                  |  |  |  |
|                  | Shutdown Executable Param     |                  |  |  |  |
| Ξ                | Recycling                     |                  |  |  |  |
|                  | Disable Overlapped Recycle    | False            |  |  |  |
|                  | Disable Recycling for Configu | False            |  |  |  |
| +                | Generate Recycle Event Log    |                  |  |  |  |
|                  | Private Memory Limit (KB)     | 0                |  |  |  |
|                  | Regular Time Interval (minu   | 1740             |  |  |  |
|                  | Request Limit                 | 0                |  |  |  |
| +                | Specific Times                | TimeSpan[] Array |  |  |  |
|                  | Virtual Memory Limit (KB)     | 0                |  |  |  |

## 5.3 File Level Permissions

The DSS file level permissions mirror those of the CMS. For details on file level permissions, see 4.3.

## 5.4 Log File Configuration

The DSS log file configuration mirrors the CMS configuration. For details on log file configuration, see 4.4.

#### 5.5 Site Registry Entry Verification

The DSS registry values mirror CMS registry values. For details on site registry values, see 4.5.



# 6 Maintenance Guidelines

Ingeniux recommends conducting CMS server maintenance at regular intervals. The frequencies suggested below are for a standard implementation. Depending upon the environment, these tasks may need to be performed more or less frequently.

| Action   | Frequency               | Access<br>Requirements                              | Automation  | Impact to<br>Users   | Benefits  |
|--|-------------------------|---|---|--|---|
| Back up \xml<br>directory  | At least once a<br>week | File level access to<br>server for initial<br>setup | Depends on<br>backup<br>solution<br>Potential impact<br>to site<br>performance.<br>Should be<br>performed during<br>non-peak hours. |  | Provides a means to<br>recover from server/<br>application crashes<br>and/or other types of<br>catastrophic failures. |
| Empty recycle<br>bin   | Weekly                  | Administrator<br>access to the site                 | Manual Potential impact<br>process to site<br>performance.<br>Should be<br>performed during<br>non-peak hours.                      |  | Removes page<br>dependencies no<br>longer needed for<br>the site.   |
| Dependency<br>graph rebuild  | Weekly                  | Administrator<br>access to the site                 | ASP page<br>triggered via<br>scheduled task   | Potential impact<br>to site<br>performance.<br>Publishes will<br>queue up until a<br>full publish is<br>completed.<br>Should be<br>performed during<br>non-peak hours. | Maintains accurate<br>page dependencies;<br>purges dependencies<br>based on deprecated<br>pages, etc.                 |
| Archive<br>publishing logs<br>to a directory<br>other than the<br>publishing<br>target directory | Weekly                  | File level access to<br>server for initial<br>setup | Script triggered<br>via scheduled<br>task   | None   | Provides a record of previous publishes.  |
| Archive<br>igxcsapi.log<br>files   | Weekly                  | File level access to server for initial setup       | Script triggered<br>via scheduled<br>task   | None   | Decreases disk space<br>usage.  |
| Reset<br>Application<br>Pool   | Daily                   | File level access to server for initial setup       | IIS and<br>application<br>configuration   | Last publish<br>request may be<br>lost. Should be<br>performed during  | Frees memory used by the IIS application.   |

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|                                |        |   |   | non-peak hours.   |   |
|--------------------------------|--------|---|---|---|---|
| Archive/purge<br>IIS logs      | Weekly | File level access to server for initial setup       | Script triggered<br>via scheduled<br>task | None  | Decreases disk space<br>usage.                                |
| Rebuild Index<br>catalog(s)    | Weekly | File level access to server for initial setup       | Script triggered<br>via scheduled<br>task | CMS search<br>unavailable<br>during process.  | Decreases disk space<br>usage; refreshes<br>search catalogue. |
| System/swap<br>file defragment | Weekly | File level access to<br>server for initial<br>setup | Script triggered<br>via scheduled<br>task | Potential impact<br>to site<br>performance.<br>Requires two<br>server reboots to<br>complete. Should<br>be performed<br>during non-peak<br>hours. | Maintains system performance.                                 |

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## 6.1 CMS Site Maintenance Tasks

Before undertaking the system maintenance described in 6.2, it's a good idea to perform a few simple site maintenance tasks. Ingeniux recommends completing the following tasks in the order listed.

#### 6.1.1 Back Up the \xml Folder

**Description** – Prior to any maintenance work, the [site]\xml directory, excluding the \xml\backup and \xml\pub directories, should be backed up and archived in a safe location.

**Automation** – There are various avenues to schedule backups. Ingeniux does not recommend any particular method. However, the option selected should meet the specific requirements of the environment.

**Frequency** – The frequency of backups should be in keeping with the level of site activity. Large sites with frequent publishes and heavy maintenance demands benefit from more frequent backups.

**System Impact** – The system impact will vary depending upon the capabilities of the I/O device and the size of the site being backed up. This process should occur during a period of limited usage.

**User Access** – During a backup, users can still access the system. But it's better if users are logged out, for two reasons:

• Changes to content may not be reflected in the backup, depending on when a page is modified. And new pages may not be listed in the reference.xml file, depending on when the backup is started.



• The backup process may interfere with a user's ability to access a file.

**Publishing** – Publishes shouldn't be conducted during a backup, because file access issues may arise if the processes are run simultaneously.

#### 6.1.2 Empty the Recycle Bin

**Description** – Because the CMS can restore pages, pages that have been deleted to the recycle bin continue to impact dependency calculations. Having too many items in the recycle bin can negatively impact check-in and publishing times.

**Frequency** – In determining how frequently to empty the recycle bin, you should take into account two factors: 1) performance concerns, and 2) user expectations. If the recycle bin is emptied too frequently, users won't have time to restore deleted pages. If the recycle bin is not emptied on a regular basis, check-in and publishing times begin to increase.

Also, be aware that it takes longer to empty the recycle bin when there are a lot of files in it, and that emptying the recycle bin removes all files, no matter how long they've been there.

For a typical site, Ingeniux recommends emptying the recycle bin once a week. However, the specific needs of the users and the size of the site should dictate the frequency. It's a good idea to communicate the schedule to users, so that they know how long deleted pages will be available for restoration.

**System Impact** – The number of pages in the recycle bin determines the impact of emptying it. As the number of pages increases, the time needed to empty the recycle bin increases.

**User Access** – Depending on the number of pages in the recycle bin, publishes and check-in times can increase during this process. Removing a large number of pages may cause the application to appear unresponsive.

Publishing – Ingeniux recommends not publishing pages while the recycle bin is being emptied.

#### 6.1.3 Dependency Graph Rebuild

**Description** – A dependency graph is a database that tracks relationships between pages. Ingeniux recommends periodically rebuilding the dependency graph to ensure the accuracy and efficiency of page dependencies.

To rebuild a dependency graph:

- 1. Stop IIS.
- 2. Delete the depgraph\*.db file(s) in [site directory]\xml.
- 3. Restart IIS.
- 4. Conduct a full publish for each publishing target.

This process also removes XML page files for deleted pages.



**Frequency** – Ingeniux recommends rebuilding page dependencies once a week for a typical site. Large sites with a lot of user activity require more frequent dependency graph rebuilds.

**System Impact** – The CMS may not be available or may appear unresponsive during a dependency graph rebuild.

User Access – Ingeniux recommends that users not access the system during this process.

**Publishing** – Ingeniux recommends not conducting any incremental publishes after dependency graphs have been deleted or cleared, until a full publish has completed. Any incremental publishes submitted will be queued and won't start until after the full publish has completed.

#### 6.2 System Maintenance

In addition to application-specific tasks, a number of regular tasks need to be conducted to maintain an optimal CMS environment. The tasks below address parts of the server operating system that can impact performance if not regularly maintained.

#### 6.2.1 Archive Publishing Logs

**Description** – With each publish, the application generates an XML file that lists the files published and provides associated publishing performance data. These log files are located in the \xml\pub directory, and the Publish Monitor can display logs for a given publishing target.

Over time, log files can accumulate and impact the performance of the Publish Monitor. Ingeniux recommends periodically deleting these files or archiving them to another location.

**Frequency** – Ingeniux recommends archiving the publishing logs weekly under normal usage. With heavy site use, archive the logs more often.

**System Impact** – The system impact will vary depending on the capabilities of the I/O device and the number of publishing logs to be archived. Typically, archiving log files will not impact performance. Ingeniux recommends retaining publishing logs for two months, in case they are needed for troubleshooting or performance monitoring.

**User Access** – Archiving the publishing logs will only impact user access to the log files in the Publish Monitor.

Publishing – Archiving publishing logs will not impact publishing.

#### 6.2.2 Reset Application Pool

**Description** – IIS uses Application Pools to manage memory. Ingeniux recommends resetting the Application Pool associated with the Ingeniux site once a day. During the reset, the Ingeniux site will not be available. In addition, any Ingeniux process (for example, a publish or check-in) will abruptly end. In some cases, this may cause the program to lose track of a file or to corrupt the dependency graphs. As a result, the Application Pool should be reset during periods of light use.



Automation – Application Pool recycling can be automated in IIS.

Frequency – The Application Pool for the Ingeniux site should be reset daily.

**System Impact** – All IIS sites associated with the Application Pool are unavailable during the reset.

**User Access** – Because IIS sites associated with the Application Pool are unavailable during the reset, users should not attempt to access the CMS just before or during this process.

**Publishing** – Because IIS sites associated with the Application Pool are unavailable during the reset, users shouldn't try to publish content just before or during this process.

#### 6.2.3 Archive/Purge IIS Logs

When enabled to do so, IIS writes log files for requests processed. These log files take up space on the hard drive. Ingeniux recommends archiving these files, especially if they are written to the system drive.

**Frequency** – The frequency of IIS log archiving should be proportional to the size of the log files and the number of requests processed by IIS. Ingeniux recommends archiving the IIS logs weekly, in a typical installation. Archived IIS logs should be kept for two months for troubleshooting and performance monitoring.

**System Impact** – This process shouldn't significantly impact system performance, provided that the number and size of log files are typical.

User Access – User access will not be impacted by this process.

Publishing – Publishing will not be impacted by this process.

#### 6.2.4 System File Defragmentation

Over time, as files are moved and copied, they become fragmented (stored in non-contiguous sectors on the hard disk). Files take longer to access as they become more fragmented. As this fragmentation increases, system performance begins to degrade. A regular cycle of defragmentation (re-writing files on the hard disk so they're contiguous) is required to prevent the degradation of system performance.

The Windows Disk Defragmenter tool does not defragment the system paging file. This paging file is used by the operating system to augment a computer's physical memory. It's important to defragment this file as well. There are several utilities available that support defragmentation of the Windows Paging file. To download one of these utilities, PageDefrag, go to

http://technet.microsoft.com/en-us/sysinternals/bb897426

**Frequency** – Ingeniux recommends defragmenting the system once a week in a typical CMS environment, but the frequency should be based on system usage. Larger sites with heavy usage may need defragmentation more frequently; smaller sites with light usage may not need it as



often. The time needed to defragment a system is proportional to the amount of data and the degree of fragmentation. Frequent defragmenting will ensure short defragmentation times.

**System Impact** – The defragmentation process consumes significant system resources because the process affects every file. Defragmenting the Windows Paging file requires a system reboot. Ingeniux recommends preventing users from accessing the system during both processes.

User Access – Users should not access the CMS site while this process is being performed.

Publishing - No publish actions should be performed during this process.

#### 6.3 Maintenance Schedule Example

For this example, assume a medium-sized liberal arts college runs a large CMS site. This site contains over ten thousand pages. Over a hundred users log in, edit pages, and create content. They conduct numerous publishes between 7:00 A.M. and 6:00 P.M., Monday through Friday.

Also assume two people administer the site, a site administrator and a server administrator.

Both administrators work between 7:00 A.M. and 5:00 P.M., Monday through Friday. Both are available after hours as needed and during maintenance periods in the event of difficulties.

The table below shows a recommended schedule for maintenance tasks on this site. The administrators agree that most maintenance should occur on Thursday afternoons and Friday mornings, because these are periods of relatively limited user activity and maximum support availability. The IIS Application Pool will be recycled nightly.

| Operation                      | Frequency            | Start<br>Time | Estimated<br>Time to<br>Complete | Manual/Automated | Required<br>User/Automation |
|--------------------------------|----------------------|---------------|----------------------------------|------------------|-----------------------------|
| Back-Up \XML                   | Weekly/<br>Thursdays | 3:00 PM       | ~30 minutes                      | Manual           | Server Admin                |
| Empty Recycle<br>Bin           | Weekly/<br>Thursdays | 3:30 PM       | ~20 minutes                      | Manual           | Site Admin                  |
| Dependency<br>Graph Rebuild    | Weekly/<br>Fridays   | 1:00 AM       | ~40 minutes                      | Automated        | Scheduled Task              |
| Rebuild<br>Indexing<br>Catalog | Weekly/<br>Fridays   | 2:00 AM       | ~15 minutes                      | Automated        | Scheduled Task              |
| Defragment<br>System Drive     | Weekly/<br>Fridays   | 2:30 AM       | ~45 minutes                      | Automated        | Scheduled Task              |



| Defragment<br>Page File/<br>Server Reboot | Weekly/<br>Fridays | 3:30 AM | ~20 minutes | Automated | Scheduled Task |
|---|--------------------|---------|-------------|-----------|----------------|
| Application<br>Pool Reset                 | Daily              | 4:15 AM | ~3 minutes  | Automated | IIS Process    |

## 6.4 Site Optimization

The following are best practices for implementing a site in the Ingeniux CMS:

- Set start pages on all ancestor navigations. The start page marks the point in the site tree from which pages are pulled into a navigation. Pages up to, but not including, the start page are pulled into ancestor navigations. At a minimum, the start page should be set to the home page.
- As a general rule, avoid the use of subtree navigations.
- Use a Site Control to hold elements used by each page.
- To lessen the XML content load, use mode to display a single element in multiple ways.

For a system that employs a legacy XSLT runtime, the following best practices are also relevant:

- Optimize style sheets and coding practices to improve the processing of XSLT.
- Do not use // to indicate an XPath.
- Use <xsl:variable> whenever possible to represent commonly used XPaths.
- Use <xsl:apply-templates>.
- Limit the use of style sheets. For example, use one main style sheet (such as default.xsl) and include style sheets from there.

#### 6.5 Restoring a Site from a Backup

When replacing server hardware or recovering from a system failure, you may need to restore a CMS site from a backup. The \xml directory located under the site directory contains all critical files specific to a CMS site. To restore a CMS site from a back-up, follow these steps:

- 1. Review and implement the HTML upgrade strategy if appropriate.
- 2. Backup the localstyles.css file.
- 3. Run IGXSetup and install the CMS system. (If it is already installed and configured, skip this step.)
- 4. Run IGX\_CMS\_Site\_Setup and create a site.
- 5. Ensure that the permissions for the new \xml directory are configured.



- 6. Go to Start > Run, and run the following command: IISreset /stop
- 7. After the Command Window disappears, navigate to [sitedirectory]\xml for the new site.
- 8. Select Edit and choose Select All.
- 9. Select File and choose Delete to delete the contents of the \xml directory.
- 10. Copy the contents of the backed-up  $\mbox{xml}$  directory into the  $\mbox{xml}$  directory of the new site.
- 11. Once the file copy has completed, right-click the \xml directory, click **Properties**, and select the **Security** tab.
- 12. Select **Advanced** and verify that **Allow inheritable permissions**... is checked. Then check **Replace permission entries**... and click **OK**. This will ensure that the user has access to the directory.
- 13. Go to Start > Run, and type in the following command: IISreset /start.
- 14. Use section 7 of this manual to verify that the CMS is installed correctly.
- 15. Restore the backed up localstyles.css file.
- 16. Launch the CMS Client to verify access and to verify that the original site has been restored.



# 7 Installation Checklist

Once the full suite of CMS system components is installed and configured, it's a good idea to verify the success of the installation. This section provides a checklist of settings and components for the CMS and DSS. For more in depth configuration instructions, see sections 4 and 5.

The following checklists refer to a Windows Server 2003 environment. The verification process will be slightly different for Windows Server 2008.

## 7.1 CMS Installation Checklist

- 1. Verify that MSXML 4 SP3 is installed.
- 2. Verify that .NET Framework 3.5 is installed.
- 3. Verify that ASP.NET is installed.

Using the Computer Management tool, open Services and Applications > Internet Information Services (IIS) Manager > Web Sites:

- 1. Right-click the IIS Website or Default Web Site and go to **Properties** > **Documents**. Verify that a valid default document exists.
- 2. Go to **Directory Security** and verify that anonymous access is enabled.
- 3. Verify the following for the Virtual Directory or Home Directory tab:
  - a. Read and Write permissions are selected.
  - b. Execute permissions is set to Scripts only.
  - c. The Application Pool is valid for Windows Server 2003 (for Windows Server 2008, the Application Pool pipeline mode must be set to Classic).
  - d. The .xml extensions are mapped to igxcsapi80.dll in **Configuration**.
  - e. The option to **Verify that file exists** is unchecked for the .xml extension (you can check this by double-clicking the mapping in **Configuration** > **Mappings**).
  - f. The file path \windows\Microsoft.NET\Framework\v2.0.50727\aspnet\_isapi.dll is mapped under Wildcard application maps.
  - g. The option to Verify that file exists is unchecked for aspnet\_isapi.dll.
  - h. In Configuration > Options, the option to Enable parent paths is selected.
- 4. In the **ASP.NET** tab (if present), verify that the ASP.NET version is set to 2.0.50727. This tab will be present only if there are multiple versions of .NET on the system.
- 5. Verify that the appropriate file-level permissions are set on the \xml directory and all files and subdirectories contained in the \xml directory.
- 6. Verify that the appropriate file-level permissions are set on the \server directory and all files and subdirectories contained in the \server directory.
- 7. Verify that the appropriate web extensions including ASP.NET have been allowed.
- 8. Verify that the Ingeniux DLLs have been added as web service extensions and set to **Allowed**.

#### 7.2 DSS Installation Checklist

- 1. Verify that MSXML 4 SP2 is installed.
- 2. Verify that .NET Framework 4.0 is installed.


- 3. Using the Computer Management tool, open Services and Applications > Internet Information Services (IIS) Manager > Web Sites.
- 4. Right-click the IIS Website or Default Web Site and go to **Properties** > **Documents**. Verify that a valid default document exists.
- 5. Go to **Directory Security** > **Edit** and verify that Enable anonymous access is selected.
- 6. Verify the following for the **Virtual Directory** or **Home Directory** tab:
  - a. Read permission only is selected.
  - b. The Execute permissions setting is set to Scripts only.
  - c. The Application Pool is valid for Windows Server 2003 (for Windows Server 2008, the Application Pool pipeline mode must be set to Integrated).
  - d. The .xml extensions are mapped to igxcsapi80.dll in **Configuration**.
  - e. The option to **Verify that file exists** is unchecked for the .xml extension (you can check this by double-clicking the mapping in **Configuration** > **Mappings**).
  - f. If structured URLs are enabled and configured to use the .htm and/or .html extensions, verify that these extensions are mapped to igxxmlsvr80.dll and that the option to **Verify that file exists** is unchecked for these extension mappings.
  - g. The option to Enable Parent Paths is selected in **Configuration > Options**.
- 7. Verify that the appropriate file-level permissions are set on the \[site] directory and all of its subdirectories.
- 8. Verify that the appropriate file-level permissions are set on the \server directory and all of its subdirectories.
- 9. Verify that the appropriate web extensions have been allowed.
- 10. Verify that the Ingeniux DLLs have been added as web service extensions and set to **Allowed**.

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# 8 Upgrades

Ingeniux regularly releases new versions of the CMS system. To deploy an updated version of the CMS, you will need to install the software and then upgrade sites.

To upgrade a CMS site, run IGX\_CMS\_Site\_Upgrade.

Before upgrading a functional site, you may want to make a copy of the site and work through the upgrade process on that copy. Once issues of authentication, authorization, and familiarization with the new features have been resolved, the new CMS site can be deployed.

The following steps outline the general process for upgrading to CMS 8.0 and may not apply to the specific requirements of all CMS configurations. Ingeniux recommends contacting Support for assistance with outlining a specific upgrade strategy.

Ingeniux also recommends backing up the following files before performing an upgrade on a working site:

- /xml directory
- local-appsettings.config
- local-connection-strings.config
- local-membership.config
- Web.config

#### 8.1 Upgrading from CMS 4.2

To upgrade a CMS 4.2 implementation, follow these steps:

- 1. Review and implement the HTML upgrade strategy.
- 2. Copy the contents of the \xml directory to a safe location (i.e. to a directory that is backed up).
- 3. Run IGXSetup to install the Ingeniux 8.0 DLLs on the CMS server.
- 4. Run IGX\_CMS\_Site\_Upgrade, which is located in \cms80\Tools, to upgrade the site on the CMS.
- 5. Go to **Start** > **Run**, and type the following:

IISRESET /Stop

6. Navigate to the \XML directory and delete the following file(s):

DepgraphX.db

where  $\boldsymbol{x}$  represents some number.

7. Go to **Start** > **Run**, and enter the following:



IISRESET /Restart

- 8. Turn off any replication of content to the Run-Time site.
- 9. Launch the CMS client and conduct a full publish on all publishing targets.
- 10. Run IGXSetup to install the CMS system software on the DSS.
- 11. Run IGX\_Dynamic\_Site\_Server\_Setup and configure the DSS site (the new replication process needs to be configured in the CMS Client).

#### 8.2 Upgrading from CMS 5.x

The upgrade process attempts to transfer toolbar settings from toolbar\_sets.xml to tinymceconfig.xml. Uploaded file extension types and Pretty Print options configured in config\_igx.asp will not be migrated, as the new editor does not support these options.

To upgrade from CMS 5.x, follow these steps:

- 1. Review and implement the HTML upgrade strategy.
- 2. Backup the localstyles.css file.
- 3. Copy the contents of the \xml directory to a safe location (i.e. to a directory that is backed up).
- 4. Run IGXSetup to install the CMS system on the CMS.
- 5. Run IGX\_CMS\_Site\_Upgrade, located in \cms80\Tools, to upgrade the CMS site.
- 6. Restore the localstyles.css file.
- 7. Go to **Start** > **Run**, and type in the following:

IISRESET /Stop

8. Navigate to the \xml directory and delete the following file(s):

DepgraphX.db

where x represents some number.

9. Go to **Start** > **Run**, and enter the following:

IISRESET /Restart

- 10. Turn off any replication of content to the Run-Time site.
- 11. Launch the CMS client and conduct a full publish to all publishing targets.
- 12. Run IGXSetup to install the CMS system software on the DSS server.
- 13. Run IGX\_Dynamic\_Site\_Server\_Setup and configure the DSS site (the new replication process needs to be configured in the CMS client).

#### 8.3 Upgrading to CMS 8.0

The IGX\_CMS\_Site\_Upgrade utility upgrades a CMS site to the current version of the application. In addition, IGX\_CMS\_Site\_Upgrade configures the site to use the ASP.NET authentication mechanism.



This utility must be run on the host server by a user with administrative access to the Windows server. This user must also have administrative privileges for the remote directory if a remote directory is the target of the upgrade.

Note: If the existing site is located on a remote directory, a mapped drive should be used for the upgrade. Once the utility has completed, the IIS website or virtual directory can be modified to use a UNC path (for example, \\[computername]\sharename).

To begin the upgrade process, go to [drive:]\Ingeniux\CMS80\Tools and double-click **IGX\_CMS\_Site\_Upgrade**. The Site Upgrade Wizard opens.



Click Next. The Wizard prompts you to enter the location of the site you want to upgrade.

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| 🔣 Ingeniux CMS Site Upgrade Wizard  | _ 🗆 ×  |
|---|--------|
| Please select the folder where your current site resides below  | X      |
| Please select the location of the site you wish to upgrade.<br>This should be the root of the site, not the xml folder. |        |
|   |        |
| @ 2012 Ingeniux Corporation   |        |
| < Back Next >   | Cancel |

Click the ellipsis button (...) and select the site to be upgraded. Then click **OK** > **Next**.

The Wizard asks you whether to back up the site.

| 🔣 Ingeniux CMS Site Upg | grade Wiza 🗙 |
|-------------------------|--------------|
| Backup current site?    |              |
| Yes                     | No           |

To back up the site, click **Yes** and select a backup directory. Then click **Upgrade**. To upgrade without a backup, click **No**.

The upgrade process begins. If the Wizard asks to stop and restart IIS, click Yes.

During the upgrade, a dialog asks if you want to update the bin folder for the preview site. In most cases, Ingeniux recommends performing the update.

| Preview S | ite Binaries Update  | × |
|-----------|--|---|
| <u> </u>  | Do you want to update the "bin" folder for Preview Site?<br>If Preview Site uses MVC views instead of XSLT, please make sure to<br>rebuild its project, or preview may stop working.<br>Click on "Yes" to update the binaries, "No" to skip updates.<br>Make sure to copy in the latest binaries from "server/.netruntime"<br>folder in the Ingeniux CMS installation folder, if you choose not to<br>update binaries now. |   |
|           | Yes No   |   |



To update the bin folder, click **Yes**. For an XSLT site, no further action is necessary. For an MVC site, you will also need to recompile the preview site and redeploy the DSS site.

When the upgrade process is complete, click **Finish**.

#### 8.4 Upgrading to DSS 8.0

To upgrade a classic Runtime site, go to [drive:]\Ingeniux\CMS80\Tools and run IGX\_Dynamic\_Site\_Server\_Setup. The setup wizard opens.

| X Ingeniux Dynamic Site Server Instance Setup Wizard V8.0                                      |       |
|--|-------|
| Ingeniux Dynamic Site Server Instance Setup Version  | 8.0   |
| Welcome Choose Instance Instance Name Physical Location Content Locations Create Done          |       |
| Welcome to Dynamic Site Server Instance Installer  |       |
| This utility will install and deploy a Dynamic Site Server Instance Site or Virtual Directory. |       |
| Please choose the type of installation:  |       |
| Create a new instance  |       |
| Upgrade an existing classic runtime instance   |       |
| Upgrade an existing Dynamic Site Server instance   |       |
|  |       |
|  |       |
|  |       |
|  |       |
|  |       |
| Back Next C  | ancel |

Select Upgrade an existing classic runtime instance and click Next.

| 🔣 Ingeniux I | Dynamic Site Server Ins | stance Setup Wizaı | 'd V8.0           |                   |            | <u>_ 0 ×</u> |
|--------------|-------------------------|--------------------|-------------------|-------------------|------------|--------------|
|              | Ingeniu                 | x Dynamic          | : Site Serve      | er Instance S     | Setup Ver  | sion 8.0     |
| Welcome      | Choose Instance         | Instance Name      | Physical Location | Content Locations | Create Don | e            |
| Selec        | t classic runtime ins   | tance to upgrade   | e                 |                   |            |              |
|              | Default Web Site/clas   | ssic_runtime       |                   |                   |            |              |
|              |                         |                    |                   |                   |            |              |
|              |                         |                    |                   |                   |            |              |
|              |                         |                    |                   |                   |            |              |
|              |                         |                    |                   |                   |            |              |
|              |                         |                    |                   |                   |            |              |
|              |                         |                    |                   |                   |            |              |
|              |                         |                    |                   |                   |            |              |
|              |                         |                    |                   | Back              | ext        | Cancel       |



Select a site to upgrade and click **Next**.

| 🔣 Ingeniux | Dynamic Site Server I     | nstance Setup Wiza | rd V8.0           |                   |        |         | _ 🗆 🗙  |
|------------|---------------------------|--------------------|-------------------|-------------------|--------|---------|--------|
|            | Ingeniu                   | ıx Dynamio         | : Site Serve      | er Instance       | Setup  | Version | 8.0    |
| Welcome    | Choose Instance           | Instance Name      | Physical Location | Content Locations | Create | Done    | _      |
| The f      | following classic ru      | ntime instance wil | l be upgraded:    |                   |        |         |        |
|            | Default Web Site/classion | c_runtime          |                   |                   |        |         |        |
|            |                           |                    |                   |                   |        |         |        |
|            |                           |                    |                   |                   |        |         |        |
|            |                           |                    |                   |                   |        |         |        |
|            |                           |                    |                   |                   |        |         |        |
|            |                           |                    |                   |                   |        |         |        |
|            |                           |                    |                   |                   |        |         |        |
|            |                           |                    |                   |                   |        |         |        |
|            |                           |                    |                   |                   |        |         |        |
|            |                           |                    |                   | Back              | Vext   | (       | Cancel |

To confirm the runtime instance to be upgraded, click **Next**.

| 🔣 Ingeniux Dynamic Site Ser | ver Instance Setup Wiz | ard V8.0              |                   |        | <u>_                                    </u> |
|-----------------------------|------------------------|-----------------------|-------------------|--------|--|
| Inge                        | niux Dynami            | ic Site Serve         | r Instance        | Setup  | Version 8.0                                  |
| Welcome Choose Instan       | ce Instance Name       | Physical Location     | Content Locations | Create | Done   |
| Select the physical         | location of the Dynar  | nic Site Server Insta | nce               |        |  |
|                             |                        |                       |                   |        | Browse                                       |
| Deploy Source (             | Code                   |                       |                   |        |  |
|                             |                        |                       |                   |        |  |
|                             |                        |                       |                   |        |  |
|                             |                        |                       |                   |        |  |
|                             |                        |                       |                   |        |  |
|                             |                        |                       |                   |        |  |
|                             |                        |                       |                   |        |  |
|                             |                        |                       |                   |        |  |
|                             |                        |                       | Back              | ext    | Cancel                                       |

Click **Browse** and select a location for the DSS instance that will replace the classic Runtime instance. If you want to deploy the sample MVC solution included with the DSS, enable **Deploy Source Code**. Click **Next**.

| INGENIUX         |                                    |                             | 185102                       |             |
|------------------|------------------------------------|-----------------------------|------------------------------|-------------|
|                  | CMS 8.0 Installati                 | on Guide                    |                              |             |
| <b>Ingeniu</b> x | c Dynamic Site Server Instance Set | up Wizard V8.0              |                              |             |
|                  | Ingeniux Dyn                       | amic Site Serve             | r Instance Setup             | Version 8.0 |
| Welcome          | Choose Instance Instance N         | lame Physical Location      | Content Locations Create     | Done        |
| Sele             | ct the location of Ingeniux CM     | S published content folder  | and design time asset folder |             |
|                  | Published Content:                 | C:\igxsites\Classic_Runtime |                              | Browse      |
|                  | CMS Assets (optional):             |                             |                              | Browse      |
|                  |                                    |                             |                              |             |
|                  |                                    |                             |                              |             |
|                  |                                    |                             |                              |             |
|                  |                                    |                             |                              |             |
|                  |                                    |                             |                              |             |
|                  |                                    |                             |                              |             |
|                  |                                    |                             |                              |             |
|                  |                                    |                             |                              |             |
|                  |                                    |                             | Back Next                    | Cancel      |

Select a published content folder (typically, this will be the location to which the CMS replicates published content) and, optionally, a separate store of CMS assets to be used by the DSS. Click **Next**.

The setup wizard creates a new DSS instance.

-----



# 9 Glossary of Terms

| Application Pool         | An area in system memory used by IIS to run one or more IIS applications.  |
|--------------------------|--|
| Application Pool Account | A Windows account assigned to an application whose credentials are used by IIS to access system resources.   |
| Archive                  | A store of CMS pages in a Microsoft SQL database.  |
| ASP.NET MVC              | A Microsoft development technology for building dynamic web applications. MVC stands for<br>"Model View Controller" – an application architecture on which the DSS is built.   |
| Authentication           | The process whereby a user's credentials are confirmed – specifically that the user exists and that the user's password is valid. In the Ingeniux environment, this validation is provided by another application such as a Windows Domain Controller or an OpenLDAP server. |
| Authorization            | The process whereby the CMS determines what privileges a given authenticated user possesses.   |
| Categorization           | An association between a taxonomical term and a particular node.   |
| Check-in                 | The process of submitting changes to the CMS prior to publishing a page.   |
| Check-out                | The process of requesting permission to make changes to a page.  |
| Child                    | A page existing one level below the current page in the site tree.   |
| Child Navigation         | A mechanism for pulling content from nodes below the current page.   |
| CMS                      | Hosts the CMS site, where content creators build, manage, and publish content (formerly called the Design-Time server).  |
| CMS Client               | Used to build, manage, and publish content on the Design-Time server.  |
| Components               | Content designed to be used in multiple pages of the site. Content contained in a component cannot be transformed until the component is pulled into a page.   |
| Content Store            | XML pages that make up the site.   |
| CSS                      | Cascading Style Sheets. A simple style sheet language used to manage the presentation of content for a browser. This language is used in conjunction with HTML to render XML for a requesting browser.   |
| Dependencies             | The connections between pages.   |

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| Dependency graph     | A database specific to the publishing target that contains the list of dependencies for each page.   |
|----------------------|--|
| DSS                  | Dynamic Site Server. A public-facing website that serves content published by the CMS. (Beginning with CMS 8.0, the DSS replaces the Run-Time server.)   |
| Full Publish         | Publishes all checked-in pages marked for publish for a given publishing target; deletes the contents of the publishing target before publishing.  |
| Incremental Publish  | Publishes selected pages to a publishing target.   |
| Navigation           | A mechanism for pulling in content from site nodes based on the site hierarchy.  |
| Page Creation Rules  | Automate the creation of new pages and components and specify where in the site tree a new page or component is created. Page creation rules are used in conjunction with workflow to simplify the creation and management of content. |
| Page Template/Schema | An XML page used as a template for creating new pages. A template specifies the structure of a page, including element types and their attributes.   |
| Pages                | XML files that contain site content or components. Pages are identified by unique xIDs.  |
| Parent               | A page existing one level above the current page in the site tree.   |
| Permissions          | The functions a given user group is able to perform (e.g. see the site tree, delete pages, create pages, etc.).  |
| Publish              | The processing of a page by the CMS, readying it for replication to the DSS.   |
| Publishing Target    | A sub-directory of the [site]\xml\pub directory to which pages are published. The pub target is specified during an incremental or full publish.   |
| Read Only Access     | Allows a specified group the ability to view the node (and the nodes inheriting this permission).  |
| Recycle Bin          | Holds deleted pages. Pages can be restored if the recycle bin has not been emptied.  |
| Replication          | The process of copying published pages from the CMS to the DSS.  |
| Schemas              | Templates from which CMS users can create and manage pages or components.  |
| Site Map             | The logical tree structure (hierarchy) for the Ingeniux site or site(s); maintained by the reference.xml file, which exists over the flat file structure in the \xml directory.  |
| Site Tree            | A logical representation of pages organized using ancestors, siblings, and children.   |



| Start Page      | An attribute of an ancestor navigation element which indicates the highest level node of the tree; navigation stops one page below the page specified.                   |
|-----------------|--|
| Structured URLs | Provide a mapping from xIDs to friendly, text-based URLs.  |
| Stylesheet      | A separate XSLT file used to format an XML document.   |
| Taxonomy        | A hierarchical naming convention used to create navigation based on category/node associations.  |
| Workflow        | An automated mechanism for moving content through the CMS. A workflow process is defined by a sequence of workstates that a page must move through as work is completed. |
| Workstate       | The location of a given page within a workflow.  |
| XML             | Extensible Markup Language. A mark-up language using tags to structure content. An XML document does not contain any formatting information.                             |
| XML Processor   | An application used to transform XML and style sheets into complete documents, usually to be consumed by an Internet browser.  |
| XSLT            | Extensible stylesheet language. A stylesheet language used to format an XML document.  |