

Introduction

In a world full of TiVos®, where viewers get a fiendish pleasure out of zapping commercials at every chance, it's not the same old game for Madison Avenue anymore. The fragmentation of mass media is forcing advertisers to chase an ever-diminishing slice of what once was a pretty simple mass market. The rules have now changed. A recent study showed that TiVo® users skip 95.7% of all fast food commercials. How does the average brand manager then reach his audience? And among the myriad of choices for advertising, how can you know that you are getting a decent ROI? How can you guarantee your target audience is listening?

These realities in 2007 are forcing everyone to "think outside the house". Fortunately, there is a way to reach your audience that is exploding today. It's called Dynamic Digital Signage and Scala is the recognized leader in the industry.

The good news is that deploying a digital signage network is no longer rocket science!

To take the mystery out of Digital Signage Networks this paper will address the question posed to Scala personnel almost everyday - **How Does Scala Work?**

About Scala, Inc.

Driving more than 300,000 screens worldwide, Scala is a leading global provider of digital signage and advertising management solutions. Scala is the world's first connected signage company, offering the leading platform for content creation, management and distribution in digital signage networks and the first unified platform for advertising management of both traditional and digital signage networks. The company's digital signage customers include Rabobank, IKEA, Burger King, T-Mobile, Virgin MegaStore, Warner Brothers, The Life Channel, Rikstoto, Repsol, NorgesGruppen and thousands more. Advertising management customers include CBS Outdoor, Clear Channel Outdoor and Magic Media, among others. Scala is headquartered near Philadelphia, USA, and has subsidiaries in Canada, The Netherlands, France, Norway and Japan, as well as more than 450 partners in more than 60 countries. More information is available at www.scala.com.

Overview

This paper will discuss the tools and technology available from the industry leading Scala software suite that delivers an end-to-end software solution for your focused message to reach your audience at the right place at the right time.

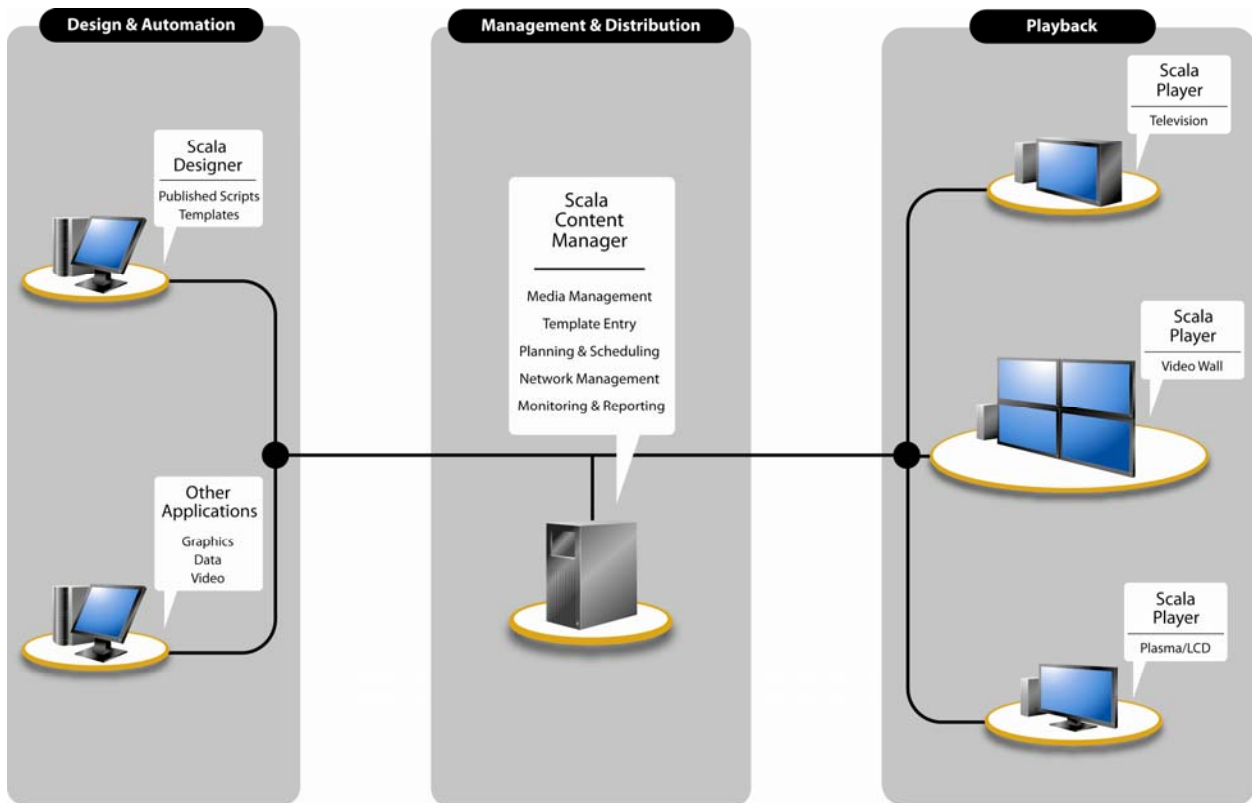


Chart 1: Scala Digital Signage Network Configuration

Scala's field proven Scala software suite consists of four components:

- **Scala Designer:** Scala Designer is a truly unique and diverse application that allows you to create stunning and imaginative multimedia productions - utilizing motion, color, graphics, text animation, sound design and special effects - while creatively highlighting the message you want to emphasize.

Although it can be used with still images, the real purpose of Designer is to create a rich environment of sounds and images that flow like a professional video effectively responding to outside input. In Designer you can even create templates for your network which can later be populated via a web-based form by anyone with an internet connected computer.

- **Scala Content Manager:** Scala Content Manager is a breakthrough in media broadcast distribution, scheduling and management. Utilizing an intuitive, Internet-based interface, Scala scripts and media are effectively organized, scheduled, delivered and updated. Additionally, networks and players are fully managed and monitored, thereby keeping media messages up and running with ease. Manage your digital signage content with plan-based content management, planning, and scheduling tools from any Internet connection in the world.

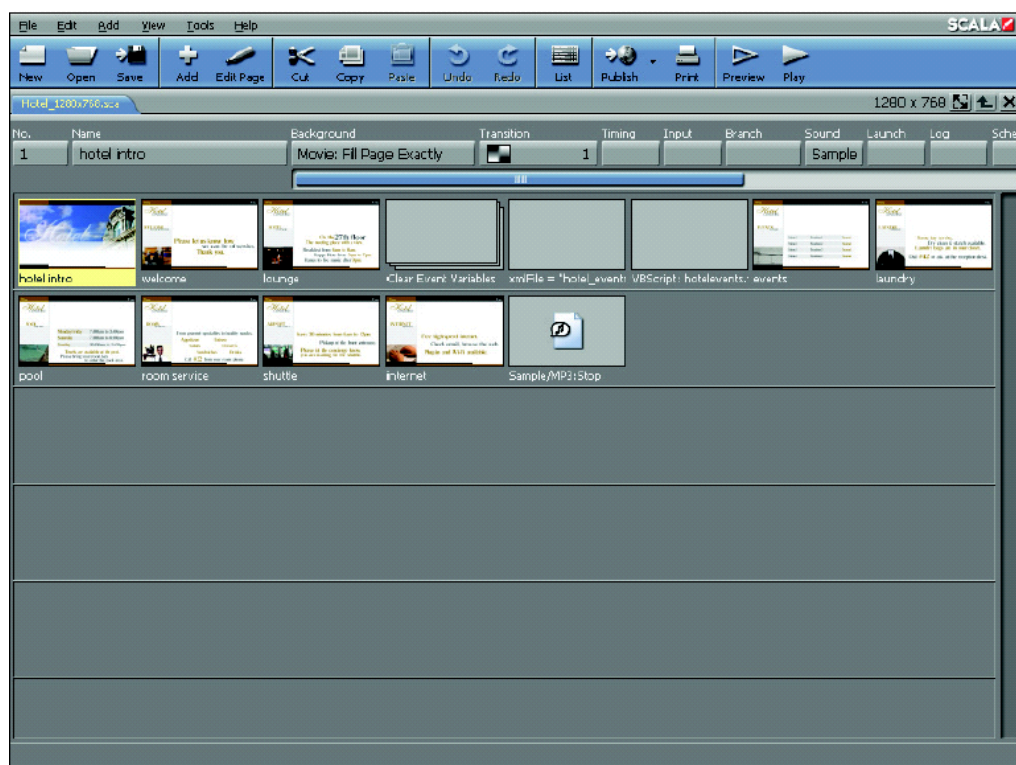
- **Scala Player:** Managed entirely through the Content Manager, Player provides stable reliable multimedia 24/7/365 playback for virtually any environment. Content can be fully dynamic and driven by data (e.g. POS databases) at remote playback locations.
- **Scala EX Modules:** Scala EX Modules are available for both Designer and Content Manager. EX Modules for Designer facilitate full control of components like TV Tuner Cards, external video switchers, weather stations, scanners, etc. EX Modules for Content Manager provide additional tools to enhance your digital signage network. For example, the Broadcast Server EX Module assists in the distribution of content from the Content Manager to the Player when traditional methods are not an option. Additional EX Modules include the Playback Audit EX Modules to report on the content played and the Template Composer EX Module, which allows anyone to enter text into a preset template from a web-based form. No Graphic Designer needed.

Due to the dynamic nature of playback, syndicated national news feeds (data feeds) are also possible. Other key features include verification of ad plays and open architecture.

Scala is able to assist clients in every phase of the deployment, operation and content creation management of their digital signage networks through its Services division.

Scala Designer

Scala Designer is the fastest, most cost-effective solution for creating truly dynamic content for digital signage. You can author professional media in an attention-grabbing environment for virtually any type of display by incorporating your existing media files into a Scala script. Designer gives you more creative control of your content with flexibility and real-time edits not offered by video production. While your Scala network does not require that your content come from Scala Designer, it is the best way to create rich, professional content that can be changed quickly and easily without sacrificing any attention-grabbing appeal.



Authoring

Scala Designer makes it possible for you to use your PC to create productions that use special effects—movement, color, graphics, animation, sound—to highlight text and illustrate the points you want to emphasize.

Although it can be used with still images, the real purpose of Scala Designer is to create dynamic productions—sequences of sounds and images that flow like a professional video and can respond to outside input.

Scala Designer enables you to do this with virtually any type of production, regardless of your background or level of experience. Whether you are an independent, one-person multimedia producer and need these facilities only occasionally, or have an entire department of media professionals with a daily roster of projects, you can use Scala Designer to make your work more lively and informative.

For tasks that range from designing product advertisements for digital signage that run continuously in storefronts, to creating engaging business presentations for corporate communications; from creating informational programming for hotels, universities, airports, or offices, to running a community information channel for a cable television supplier, Scala Designer is the ideal tool.

Scripts

In Scala Designer, your production is defined by a *script*. A script in Scala Designer is a file that specifies a series of *events* and their timing. The events in a script are the individual image files, sound files, text lines, and other items that appear in the final production. The events in a script contain all the settings and options that describe how and when things happen in the final production.

However, you don't have to work with a Scala Designer script the way a programmer works - through a series of text commands. You may write and edit the script entirely through the Scala graphical user interface, HumanTouch. HumanTouch shows you the script as one or more *pages* of information, each of which can be created or designed graphically and arranged in any order you choose.

Full Screen and Windowed Operation

Scala Designer is designed to be used both in a windowed operation while authoring, and as a full-screen previewer during playback.

In the windowed operation, you can resize the Scala Designer window as desired, using familiar drag-and-drop techniques to add graphics and other files to a script. The flexible user interface design adapts itself to different window sizes and shapes providing maximum versatility.

When playing back in full screen mode, Scala Designer allows you to specify screen resolution, color depth, and refresh rate for optimal multimedia performance and adaptability.

File Management

The Scala Designer File dialog gives you access to all the drives, folders and files normally available from your PC. It is designed to give you direct access to the files you need most as you work in Scala Designer.

In Scala Designer, the files used in a script may be background images, sound effects, animations or graphics such as clip-art images, drawings or symbols, even other scripts. Many files come with Scala Designer but you can use files from other sources, for example a library of clip art on a CD-ROM. As you expand the amount of work you do in Scala Designer, many files you use, such as script files, will be your own.

File Types

The most common file-type extensions used in Scala Designer are shown in the table below.

Extension	File Type
.SCA	Script
.SCB	Published script
.BTN	Predefined button or button preset
.BMP, .GIF, .JPG, .WMF, .PCX, .PNG, .TIF, etc.	Background, drawing, clip, or other graphic file
.WAV, .MP3	Sound sample (digital audio)
.MID	MIDI file
.GIF	Animation
.AVI, .MOV, .MPG	Movie (digital video)

Linked Content

The concept of linked content is significant for those creating scripts in an environment that includes publishing to a Scala Network.

Linked files are not a special type of file. Any type of content file—script, image, digital video, text, etc.—can be a linked file. A file becomes a link by being designated as such. Designating files as links is a task normally overseen by someone responsible for administrating the distribution of published scripts to Scala Players through Scala Content Manager.

The purpose of linked files is to allow the authoring of scripts that include content that needs to be updated from a source external to the Scala Designer publishing process. A linked file is one that, for authoring purposes, functions as a placeholder for a file of the same type that is periodically updated by a means outside of the script publishing process.

A script author uses linked files in exactly the same way as any other content file, and they behave in exactly the same way in playback. The only difference in the context of Scala Designer comes during the Publish to Scala Network process. The linked files are not transmitted as part of the script when Content Manager sends the script to its Players—only a reference to the file name is included in the script.

Customizing Scala Designer

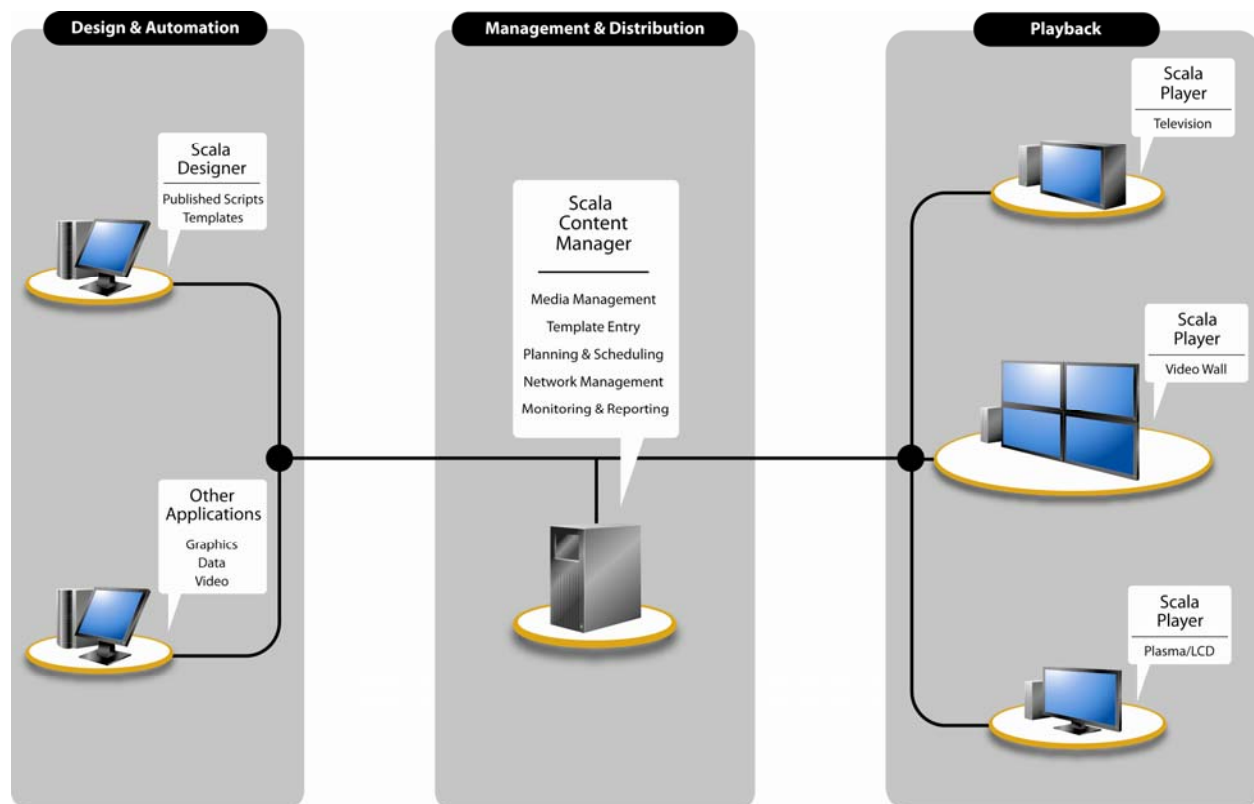
Scala Designer allows you to customize your working environment to suit your hardware setup and your personal preferences. You can adjust the appearance of the Scala Designer user interface, set options to improve performance, choose the time and date format for your national region, and configure Scala Designer to recognize new devices you have added to your system. Most of the options that control things that you can customize in Scala Designer are in the *Options* dialog that you reach from the *Tools* drop-down on the *Main* menu.

Scala Content Manager

Introduction

Managing your digital signage content can be challenging, but with the state-of-the-art content management, planning and scheduling tools included in Scala Content Manager, management and control of your network is both improved and simplified - reducing the resources required to control and maintain your network. New template support - plan-based content distribution, timetables, and playlists - keep you in control of your network from wherever you are in the world, from any internet-connected computer.

Scala Content Manager is a server-based application that schedules and manages the transmissions of multimedia content to hundreds, even thousands of digital signage displays from any internet-connected computer. Advertising, news, training or virtually any other visual communication can be easily distributed to Scala Players via any standard Windows-based network. Content created using Scala Designer, Template Composer, or industry standard applications can either be routed to the intended Scala Player automatically or per your plan.



System Requirements

The following chart defines the minimum requirements for Content Manager servers.

	1-10 InfoChannel Players that in total receive less than 100MB of content per hour	<50 InfoChannel Players that in total receive less than 500MB of content per hour	<200 InfoChannel Players that in total receive less than 2000 MB of content per hour	<2000 InfoChannel Players that in total receive less than 10 GB of content per hour
Recommended minimum storage	40GB*	RAID 1,5 80GB+ Each*	RAID 5, 10, 50 80GB+ Each*	RAID 5, 10, 50 80GB+ Each*
Recommended Operating Systems	Windows 2003 Server Web Edition; Windows 2003R2 Server; Windows 2000sp4 Server			Windows 2003R2 Advanced Server; Windows 2000sp4 Advanced Server
Minimum Processor Speed & Type	1xCPU: Intel P4E@2.8+ GHz/800MHz FSB, HT-enabled. [5xx or 6xx series] or AMD Athlon64-X2 3800+	1xCPU: Intel P4E@2.8+ GHz/800MHz FSB, HT-enabled. [5xx or 6xx series] or AMD Athlon64-X2 3800+	1x"Dual Core" Intel Pentium-D 8xx or 9xx-series or 2xCPU: Intel XEON @2.8+ GHz or 1x AMD Athlon64-X2 4200+ or 1x AMD Opteron 1xx/2xx	2xCPU: Intel XEON @2.8+ GHz, with large L2/L3 caches, HT-disabled or 2x AMD Opteron 2xx
Minimum RAM Size	512 MB	512 MB	1024MB	2048MB

Example Configurations

This section provides some configuration examples for different physical network/player configurations. These are the most common combinations of networks and players currently used by our customers.

Scala Designer and Scala Content Manager on the same computer, Scala Player(s) are located on separate computer(s):

- Scala Designer publishes directly to the *local* installation of Scala Content Manager using the "Content Manager Direct" option
- Scala Content Manager is configured to store the player plans in the web folder (Content Manager Direct option).
- Scala Player(s) retrieve their plans using the "Content Manager Direct" option.

Scala Designer, Scala Content Manager, and Scala Player are on separate computers:

- Scala Designer publishes directly to Scala Content Manager using the "Content Manager Direct" option
- Scala Content Manager is configured to store the player plans in the web folder (Content Manager Direct option).
- Scala Player(s) retrieve their plans using the "Content Manager Direct" option.

Within these basic configurations, you can use different configuration options. For example:

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- Instead of publishing from Scala Designer directly to Scala Content Manager, you could publish to a shared folder or FTP site (from which both Designer and Content Manager have access). You could then setup a Publish location in Content Manager that would reference that location. Content Manager would then poll the location for changes based on the interval that has been configured.
- Instead of Players retrieving the plan file directly from Content Manager, Content Manager could deliver the plan file directly to the player (using the Player Direct FTP option). To do this, in Content Manager change the delivery type to Player Direct FTP, and enter a password. Then on the player, change the delivery type to Player-Direct FTP and enter the same password you used in Content Manager. Note that the FTP password must match in both configurations!

Scala Content Manager Key Features

Templates - Data driven content templates will allow even your least design savvy employee to create great looking displays. Your design team can create templates in Scala Designer, using variable data fields that authorized users can later populate and preview through the all-new Scala Content Manager 5 interface. Now, creating new content, or an entire channel, is easier and faster than ever. This feature is sold separately. Please contact your Scala Certified Partner or Scala Channel Manager for more information on availability and pricing.

Plan-based Content Distribution - Based on your channel "plan/schedule" that is easily defined through the Scala Content Manager graphical interface, content is now automatically distributed to all designated "points of playback", saving you time and resources.

Timetables - Define one-time or recurring time slots that employ variable recurrence patterns and start/end dates. As you specify playlists for each time slot, you may automatically view it graphically in the new Scala Content Manager. With this new graphical, web based, scheduling interface, scheduling your content couldn't be easier.

Playlists- If your content is composed mostly of videos, flash, or static images -- you can create your playlists using the web-based interface in the new Scala Content Manager. Of course, Scala Designer still offers a significant and proven advantage for any digital signage deployment by allowing the creation of data-driven templates and other truly dynamic digital signage messaging in less time and at a lower cost; while allowing you to leverage your existing media assets.

Cutting Edge Content - Supports both passive and interactive digital signs or kiosks. New 3D rendering & playback engine for improved performance and visual quality. Auto Scale content to any resolution (independent of playlists/scripts). Flexible data integration & user customization using VBScript, JavaScript or Python

Multi-channel Support - Run two entirely separate channels from a single player, immediately reducing your hardware, OS licensing, and administration costs.

Multiple Independent Zones - Easily create multiple zones with each zone displaying independent content.

Player Control - Group Players by criteria (geography, demographics, etc.) Create & plan content "channels" & assign to one or more players or group of players.

Network Control - Network monitoring, including Scala Player "health" status, etc. Remote software updates. Central management of Scala Player and optional features licenses. New powerful browser-based interface for creating & managing Playlists

Better Compatibility - Scala Content Manager is compatible with proxies / ACNS and several database structures including: MySQL, PostgreSQL. Additional database support will ensue.

Database Backend - Choose the server and database that works best in your environment.

Smart Content Delivery - Content can be delivered over HTTP/HTTPS and firewall transversal is greatly improved, as are other perceived IT security issues. Terrestrial & Satellite (multicast) IP-based communication carriers are supported.

Maintenance Scheduling - Regular hardware maintenance can be added to the plan-based scheduler in the new Scala Content Manager. Once entered, maintenance requirements can be executed at specified times, with minimal disruption to your digital signage network.

Roles and Workflows - Role functionality allows users/groups to be assigned different access rights for improved security and workflow.

New User Interface - Navigate the Scala platform faster and easier with a more intuitive and friendly user interface. The new Scala user interface makes extensive use of context menus, rich web-interfaces with drag and drop features, and more.

Transmission Server Module - Server-side component that manages most communications between Scala Player and the central servers. It is installed as a service on the same system as Scala Content Manager, and runs in the background.

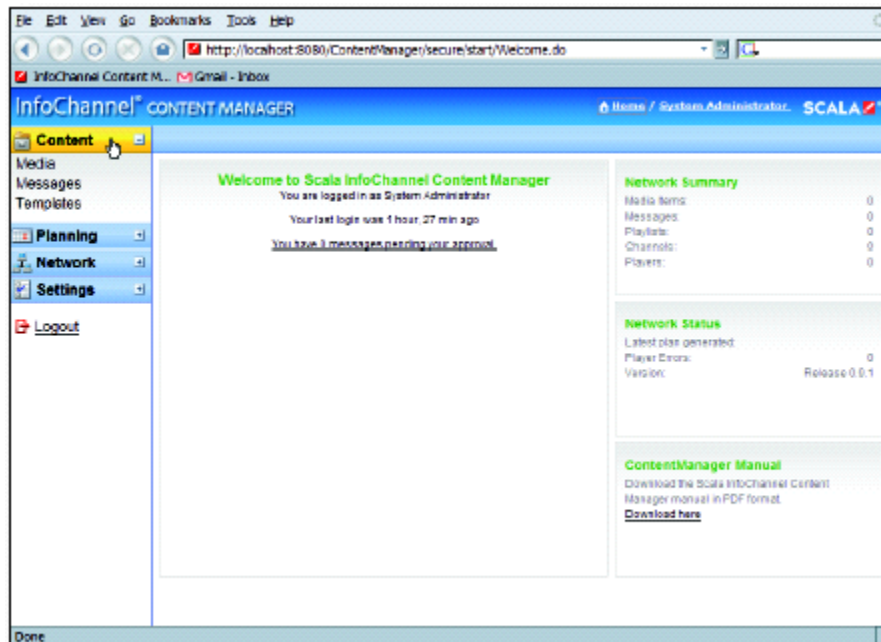
Server Support Module - Server-side support component which generates thumbnails for display within the Content Manager. It is installed as a service on the same system as Scala Content Manager, and runs in the background.

The Scala Content Manager User Interface

The design and layout of the interface is created to allow you to manage your project workflow in a streamlined process - working from top to bottom in the list of menu items. In the following sections we will explore some of the major items and follow the workflow process of setting up and generating a plan to a Player.

The Content Menu

The Content menu is where you will find your Published scripts and other media items. You may also add messages and upload templates through the panels located in this menu.



Media

The *Media* button opens the panel that reveals what media items you currently have in your library. When a large library is available, you can sort through the list by file name or simply the date it was modified.

Most of your media will be uploaded to your library via published scripts from Scala Designer. When you open Content Manager and view Media, you will see the Scala Scripts, video clips and images.

This will open the Scala Content Manager File Uploader. You can select any files you wish to upload. This action will open a Windows file dialog where you can easily navigate to the location on your hard drive and select the file(s) you wish to upload.

Searching

If you have an extensive library of accumulated media, channels and players, having the ability to search for something specific instead of scrolling through a list in hopes of finding what you are looking for, can be very helpful.

Scala Content Manager contains a search function in all of the major category panels for Media, Messages, Templates, Playlists and Players. You can use the *Search* criteria to define the kind of item you choose, or you may enter the search term in the space provided and click the arrow on the right to reveal the results in the list panel.

Media Categories

Categories are labels that can be created and assigned to media items, templates, messages and playlists. These labels may also be used to help organize and search for items that match your desired category. To create and assign categories, first select a media item to view its corresponding *Properties*. To further define your media organization, you may also create nested sub-categories.

Media Metadata

Metadata are tags that can contain specific values for each item. Media items as well as messages, channels and players may contain metadata that is used to control playback based on criteria (e.g.: metadata must equal a specified value) or match (two items must have matching values for each metadata tag).

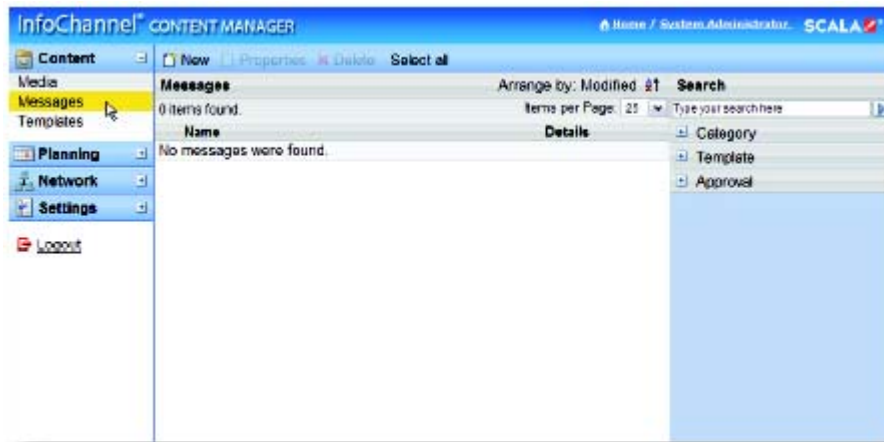
Metadata has many uses. Metadata on media and messages is used when making a smart playlist. Media with metadata matching your criteria will automatically be added to the playlist. For instance, you can add all media with the "xyz brand" so that any new ads will automatically appear in the playlist without having to add them manually.

Metadata can be on channels to put restrictions on which channels can be sent to which players. If you try to assign a channel to a player and their metadata does not match, you will receive a warning pop-up in Content Manager. This is used to prevent accidentally sending a channel with the wrong aspect ratio to a player.

Metadata on players may also be used in playlists. When making a playlist, you can add criteria to an item (media, message or sub-playlist) and the item will only play if it matches the player's metadata. You can have several different "language" metadata fields applied to scripts or media items in your playlist, and use that metadata to route the correct corresponding languages to the assigned players. And a programmer using VBScript, JavaScript or Python can access a player's metadata for database queries or to show the metadata on screen as a variable.

Templates and Messages

You can create and edit messages that can be added to the playlists. A message uses a template that is a Scala script made with Scala Designer, allowing the user to fill in text or replace images.

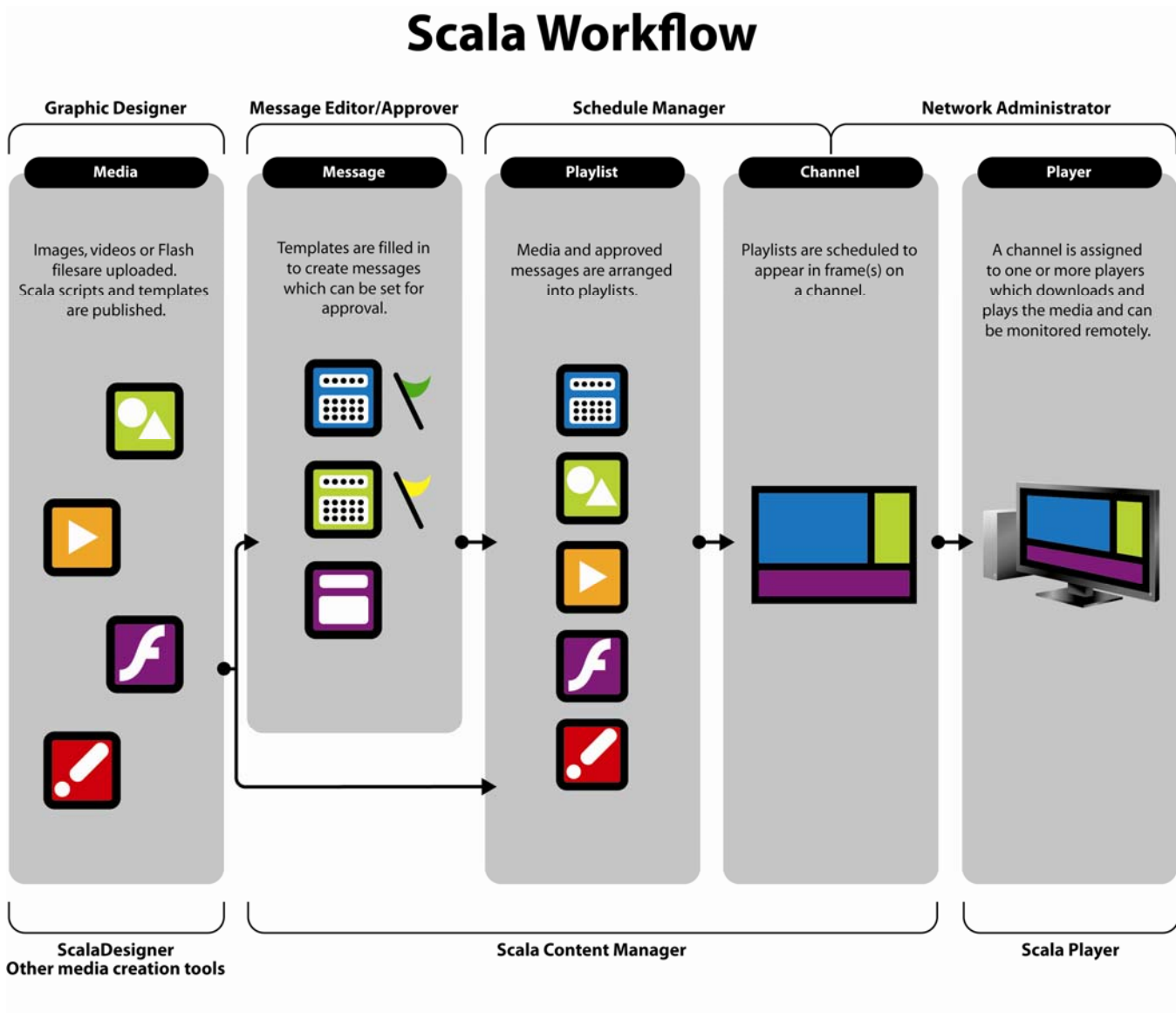


Messages have to be approved before they can appear on a player. If your user account does not have permission to approve messages, you can select the Request approval checkbox to request another user in order for it to be approved. Users with approval permission may view messages awaiting approval and accept or reject them as desired.

The Planning Menu

The Planning menu is where you will create, manage and schedule multiple playlists and channels to your players. Content Manager will distribute the Channel information as well as the Schedule, Playlists and Content to the Scala Players.

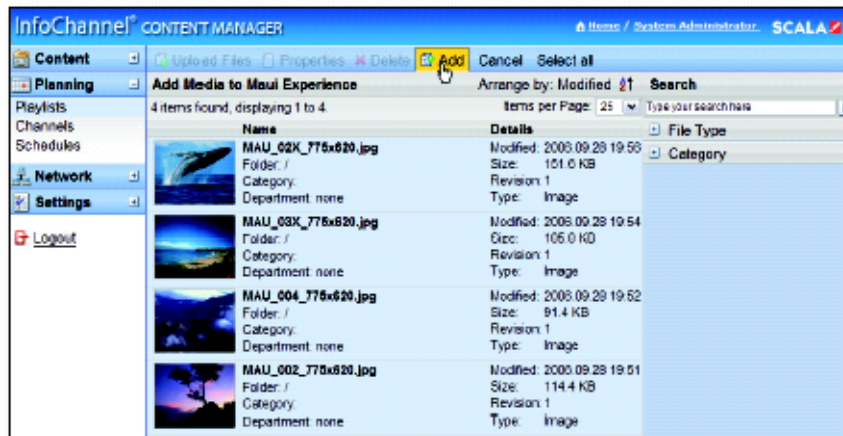
The simple content flow map shown below demonstrates how the process carries information from the Designer-published media to the Player.



The flow of media content through Scala Content Manager is a simple and intuitive process. Media (videos, images and Scala Scripts) are published from Scala Designer or selected inside Content Manager and sequenced in a Playlist. Once a Playlist is created, it is assigned and scheduled to a Frame in a Channel which then plays on a Scala Player, or series of Players.

Playlists

If you have several playlists in your library, you may list them in order by Name or Modified date using the *Arrange by:* button at the top of the panel.



Sub-Playlists

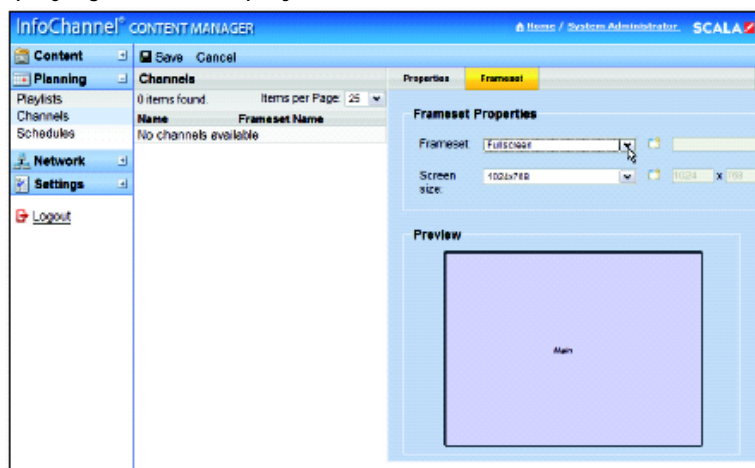
Sub-Playlists are nested inside of each other, so you can create several smaller playlists that can function independently, or grouped together inside a larger, master playlist. When a Playlist is open, you can add any other playlist in your library as a sub-playlist.

Smart Playlists

A Smart Playlist will allow you to set conditions that filter the desired media that will be added to the playlist. You may also specify transitions between those items; much as you would in a Scala Designer script. It is also possible to set the duration for each on-screen media item.

Channels

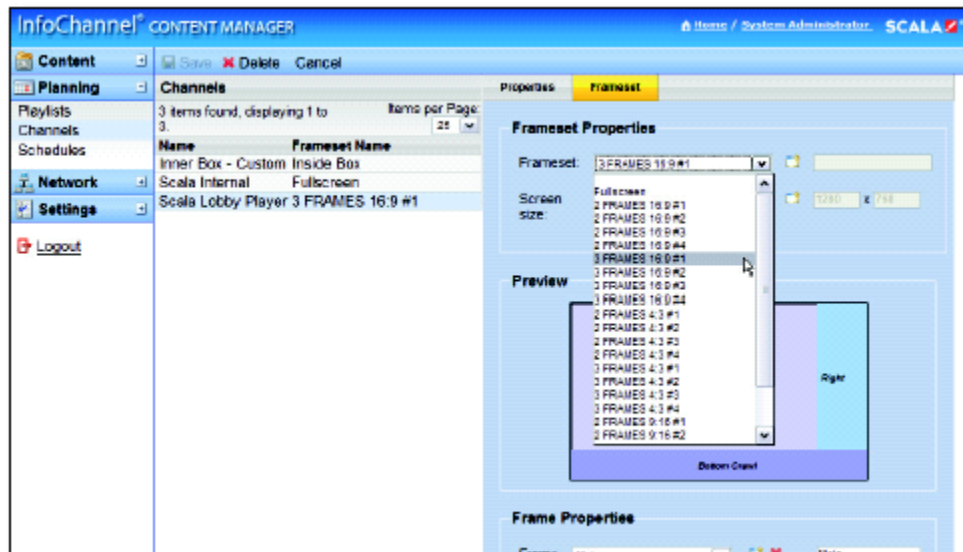
Creating a channel is required to send a playlist(s) to one or more players. Playlists contain the media and scripts, and the channel determines the schedule and screen layout in which the playlists will occur. Additionally, you can have more than one player and more than one channel. There are several preset options for display types, as well as "Framesets" that divide the screen into segments; each of these are capable of playing a different playlist.



Frameset Templates

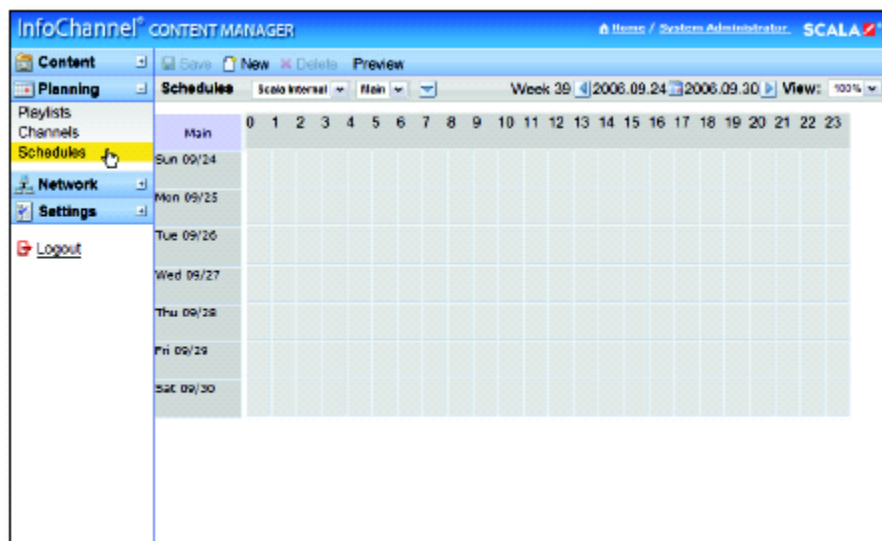
Scala Content Manager comes with several preset “Templates” for Channel Framesets. These are commonly used configurations that include a large selection of display sizes and resolutions.

The preset templates that are provided are a great starting point; however, we have also included several customizable options to complement your creativity.



Schedules

Schedules can be applied to each frame of a channel to define which playlist will play for a given time or date.



You can create a new schedule by click-dragging out a rectangular selection in the calendar grid, to cover the days and times of the playlist you wish to schedule.

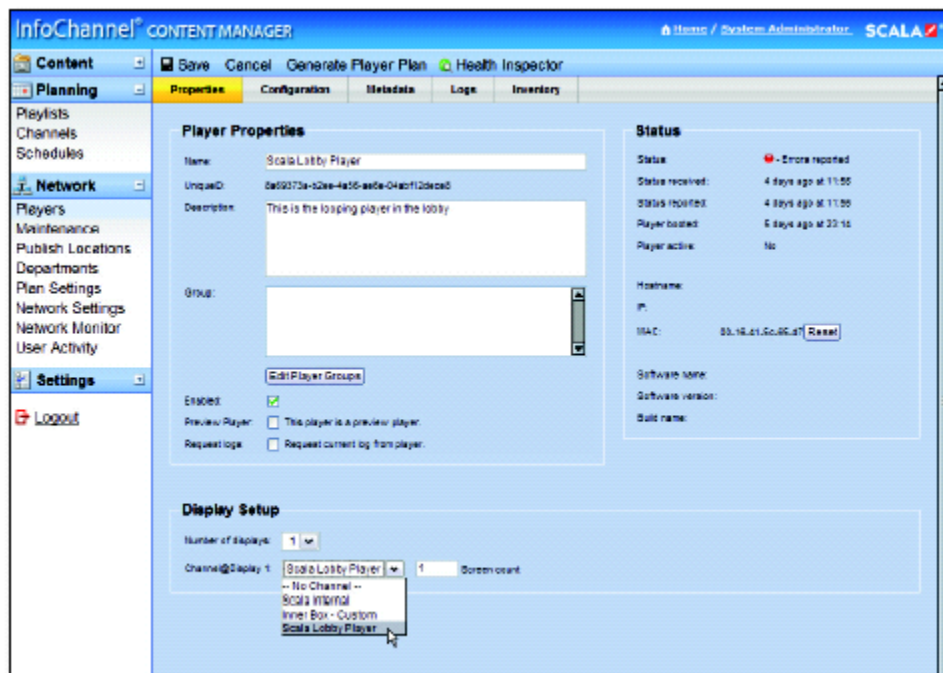
The Network Menu

The *Network* menu is where you will define the players where your playlists will be displayed. Additionally, this is where plans are generated (either manually or automatically) that will move the scheduled playlists and media to the player locations; as well as monitor the network activities and the health/status of the players on your network.



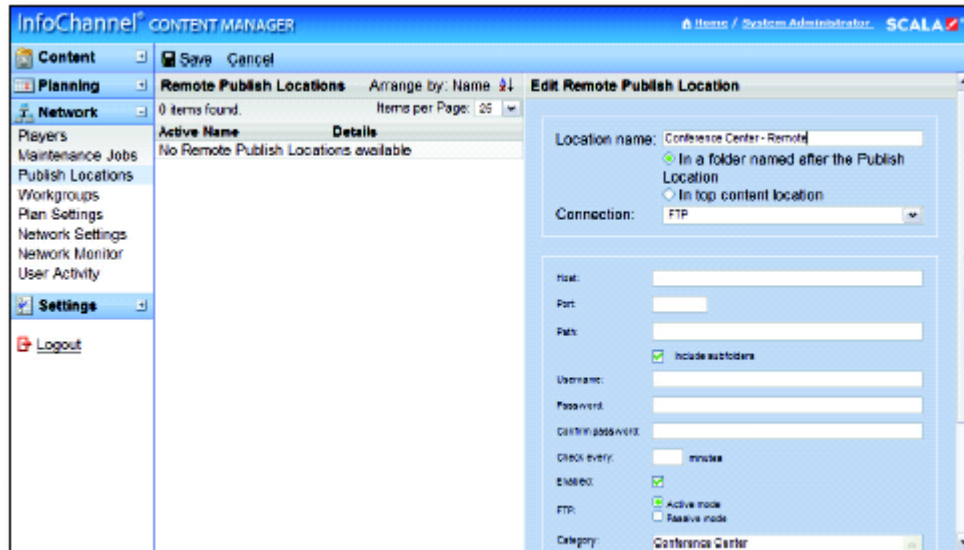
Players

Once you have created channels in Content Manager, you may then create Players to display them. When you create players in Content Manager, they must also be configured on the player computer's side to be able to communicate with the Content Manager.



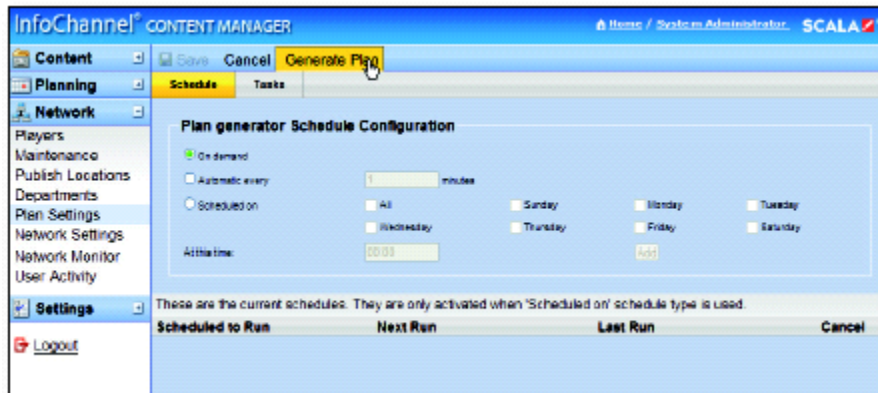
Publish Locations

Scala Content Manager provides you the ability to automatically ingest new content by creating a remote publish location.



Plan Settings/Generate Plan

To send your schedule to the player, you will need to generate a plan. The player will look for new plans to be generated on a predetermined schedule. The player will then download the appropriate media and script files it needs from the server. If media files have not been changed, but only a script change was needed, then the player will only download the new script file.



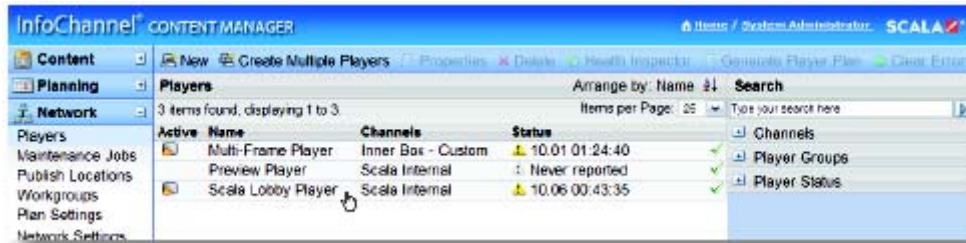
Network Monitoring, Maintenance and Settings

Creating channels and players, organizing and scheduling your media is only the beginning of what Scala Content Manager can do. You also have the unique ability to monitor your network, server and player(s). Additionally, Scala Content Manager provides extensive security and maintenance features.

Player Health

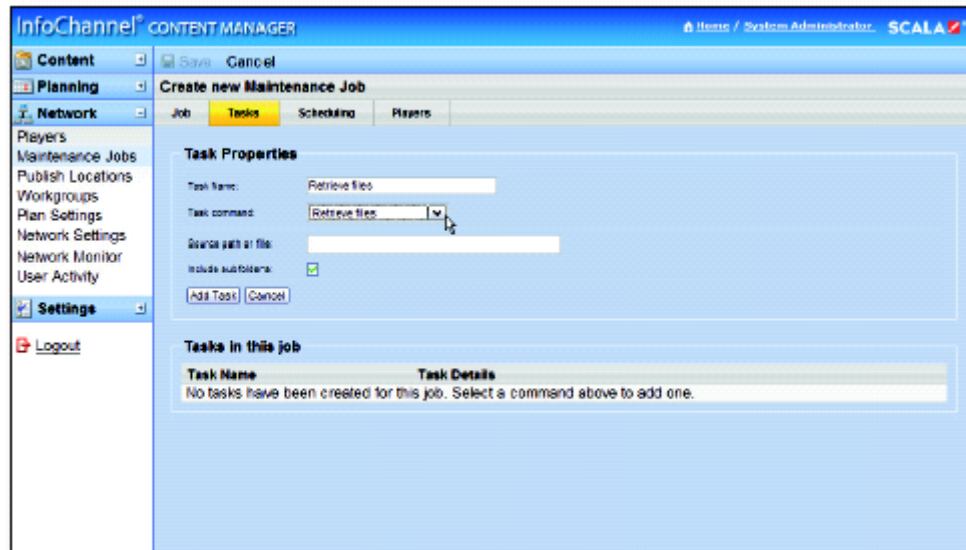
Once you have a Player configured and running a scheduled plan, you will be able to monitor the player's "health" and activity through Scala Content Manager. You can configure the Player to send a "heartbeat" at predetermined intervals so the system will recognize that it is still operating efficiently.

If the player does not send a heartbeat signal at a predetermined time, an optional email can be sent to one or more users. At this point, you have an option to create a new maintenance task, for instance, to reboot the player.



Maintenance Jobs

Scala Content Manager allows you to create, edit and delete Maintenance Jobs. Maintenance Jobs provide a way for you to schedule maintenance tasks that the player should perform at a given interval. Installing software updates, retrieving files, and rebooting the computer are just a few of the tasks that can be performed.



Updating Scala Player Software

Software updates are an important step in keeping your players healthy and ensuring any new features are readily supported.

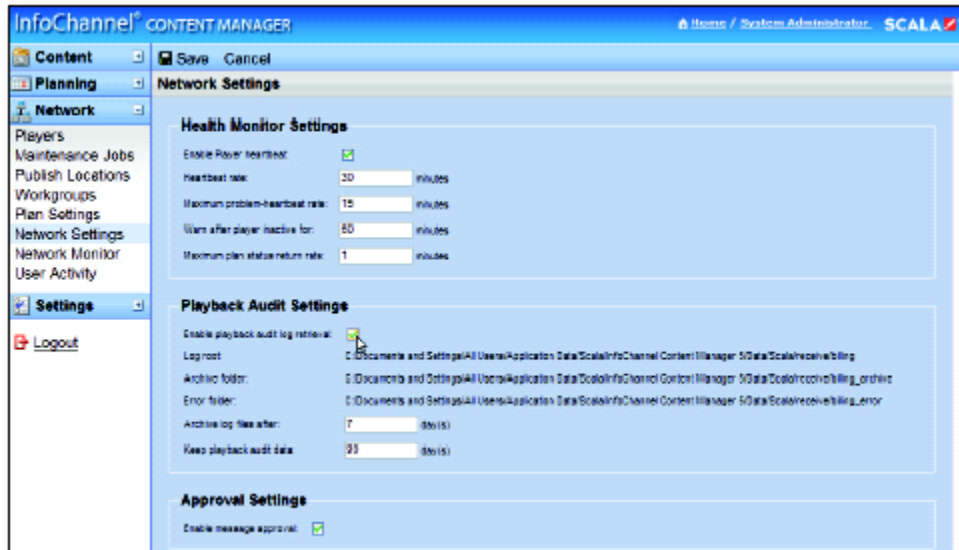
Workgroups

Scala Content Manager allows you to create, edit and delete Workgroups. Workgroups are a way of associating one or more users to a particular group. Workgroups can then be used for associating content and playlists to a specific group.

Sub-Workgroups are created in much the same way as Workgroups are created. Allowing Sub-Workgroups provides additional control of your network.

Playback Audit Settings

You can enable or disable playback audit log retrieval on your Scala Network. By checking the *Enable playback audit log retrieval* option, player(s) will automatically upload their playback audit logs everyday. If you uncheck the option, the playback audit logs will not be uploaded automatically.



SMTP Settings

The SMTP settings allow you to configure Content Manager to use a mail server to send you an email when a problem occurs.

Network Activity

The *Network Activity* tab gives you the ability to see exactly what your player(s) have been recently uploading and downloading. The list currently contains a maximum of fifty (50) entries.

There are four columns that show this information.

- *Icon* - This column reveals a visual representation of the action that has occurred. A few samples are: Checked Plan, Heartbeat, and New Plan
- *Player* - This column lists the player name as defined in the Network > Players list.
- *Time* - This column lists how recently the specific event occurred.
- *Message* - This column lists a text based message of the action that has occurred.

User Activity

Scala Content Manager logs when any user has logged into the web interface. It also logs any changes that may have occurred. Click on *Network > User Activity* to view the list. This list contains four columns:

- *Username* - The username of the person.
- *Type* - The type of action that was performed.
- *Object Reference Name/Identifier* - The object that was changed.
- *Time* - The time the action was performed.