The Oxygen Media Platform

User Manual

Published: 2009-08-12

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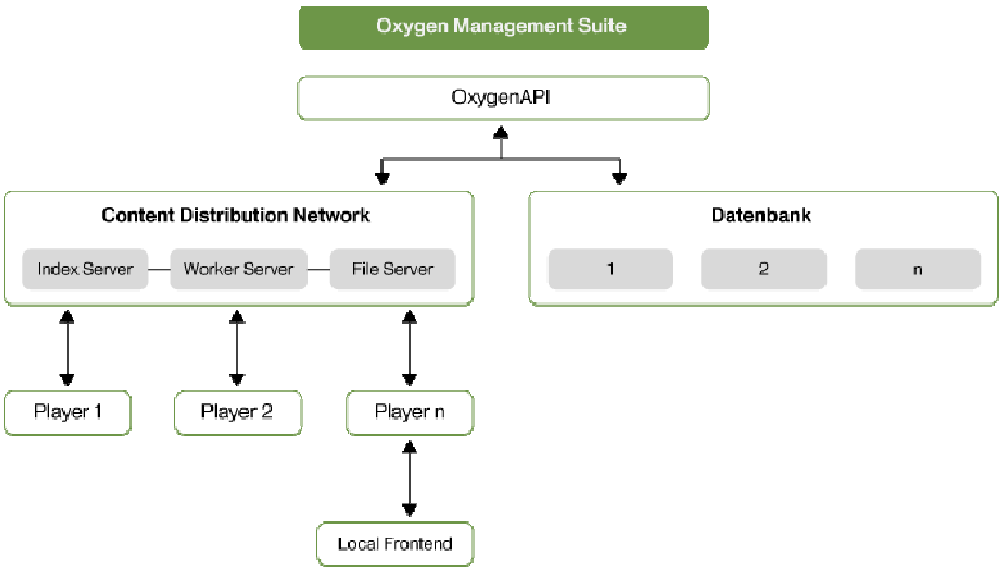
Overview

System Architecture

General System Design and Interaction of Components



Oxygen Management Suite

Via the Oxygen Management Suite (OMS) the user administers any number of players. An encrypted connection can be established via SSL. In the OMS the user can e.g. add, remove and configure users, teams, categories and multimedia content. The user's content is uploaded to the OMS server via Port 80 (WebDAV) or via an upload form (applicable for files < 100MB).

Oxygen API

Further applications or frontend extensions can be created based on the OxygenAPI. This layer guarantees flexible access to the system and independence from the respective graphic user interface. This API not only allows to administer databases but also the Content Distribution Network as well. The API can also be accessed via web services (SOAP).

Content Distribution Network

The Content Distribution Network (CDN) consists of any number of index, worker and file servers. The CDN is responsible for the distribution of all content so that the players can carry out performant content updates at any time. In this process the individual servers connect to the

databases. The server’s mode of operation and the update process are described in the following chapter.

Database

The databases constitute the whole model of the system. Any number of databases can be addressed to via the OxygenAPI so that they can thereby synchronize with each other as well. Thus a cluster system can be applied to assure performant access to the data and to spread the load during access. At least one database must be available.

Players

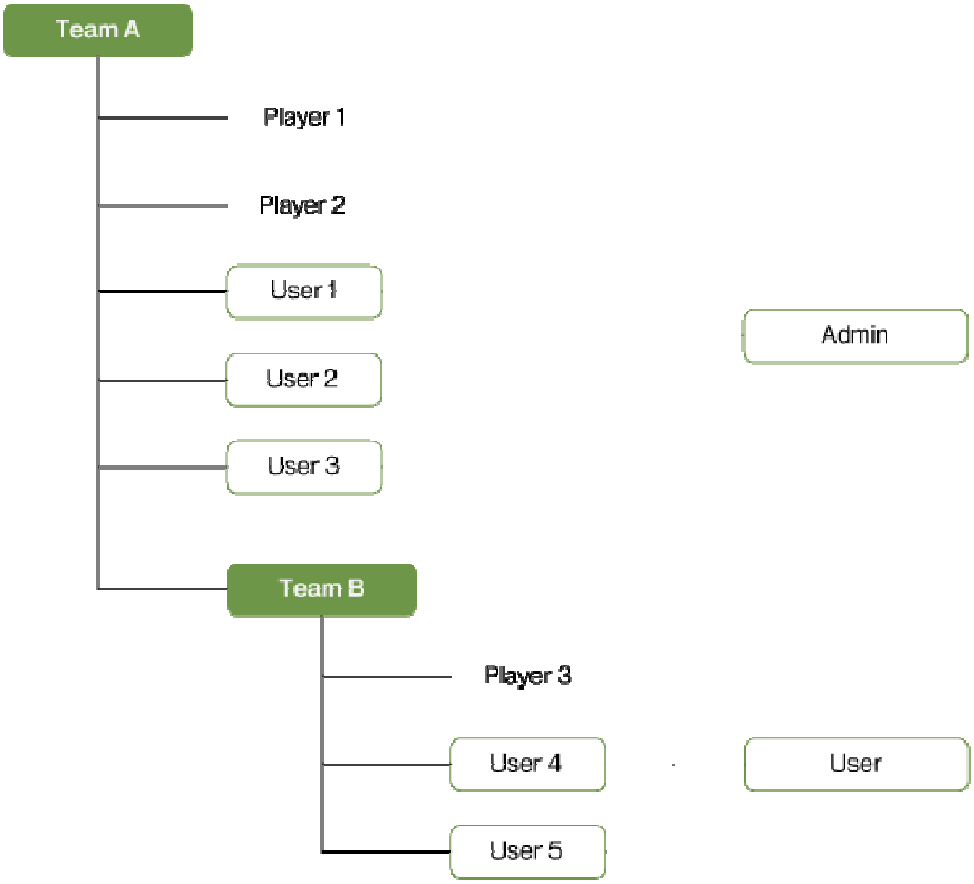
The players connect to the CDN to update the available content of a system. Optionally an individual local frontend can be created for each player that allows to configure the player’s settings separately on-site.

Transfer Matrix Method

Once a player detects that a specific content item must be updated or has to be made available it will connect to an index server in the CDN first that will determine which worker server is currently available and can process the request. The worker server will then create a list of content and the associated performant file servers. Pursuant to this list the player can download the required data. The individual transmissions can also be carried out encryptedly. The number of servers is scalable so that they can also be set up in several data processing centers.

Rights Management

The Oxygen system's rights management consists of the following elements:



Team

A workgroup ("team") can contain further teams. Players and users are defined in a team.

Player

A player plays multimedia content and is assigned to a specific team.

User

Any number of users can be added to a team. These users have access to players within the team and to subordinate players.

Security Groups

To simplify user administration users are integrated into security groups such as user or administrator. Groups can be defined as desired with appropriate rights.

Rights Management for Categories and Multimedia Content

For each created category and for each available content specific rights can be set. It is definable whether they can be configured locally only or via the Management Suite. The visibility of a category or a content item can be adjusted as well so that e.g. a category is not visible to users. The Management Suite has the right to deprive local users of the administration. Like in a file system specific rights for a category or content item can be assigned to security groups and users. An example: User Y can read and edit category Y but may not delete category Y.

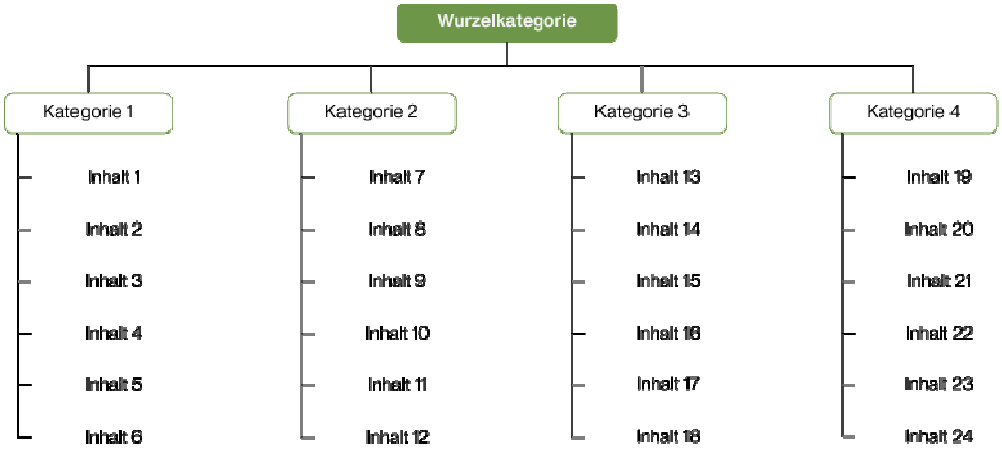
Playout Organization

Category

A category groups different content items so that they can be combined to e.g. a genre. Based on this category the complete content is visited during the scheduling process.

Multimedia Content

Content items cannot contain further categories or content items. They are leaf elements within the visualized tree. That means that a content item can only be placed in the root category or in further categories. Besides the essential information about the content presentation it contains properties that are considered during planning. Any number of content items can be added to a category tree so that it may result in e.g. the following tree:



Timer Events

Timer events are defined by the user. There are two options to set a timer event:

- Exact Start
- Regular Start

A timed content item with exact start will be played at the exact time. The playing time of the content item that is played at that time will be shortened as the case may be. A timed content item with regular start is not necessarily played at the predefined time. The content item that is played at that time will be fully played at first.

It is also possible to time content items repeatedly at a specific time or after a specific period. These periodic timers can be defined by the user using the mentioned start options.

Scheduling

The following scheduling options are available:

- **Random scheduling** within a category considers the priorities assigned to the categories and content items. A higher priority makes it more probable that a content item is played.
- The **sequential scheduler** allows to play categories and content items in an ascending or descending order. Once every element has been played it will start over.
- The **user-defined scheduler** allows to play categories and content items pursuant to an order defined by the user. Once the last element of this playlist has been played it will start over.

First Steps

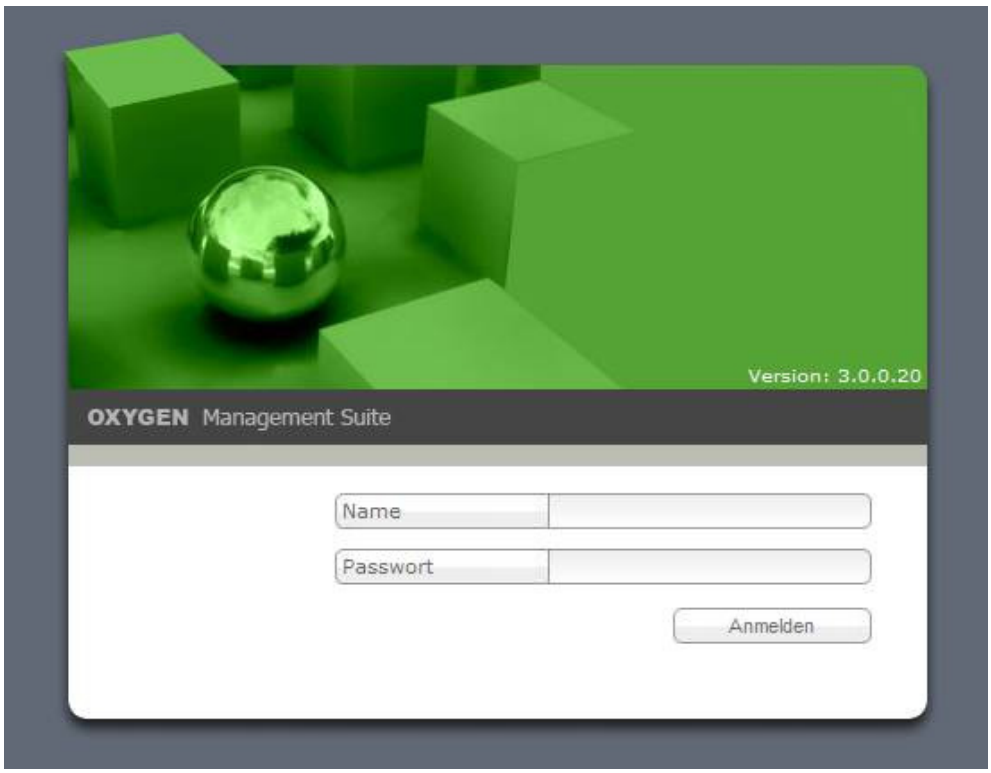
The Oxygen Media Platform is fully operable via web browser. It is compatible with the following browsers: Microsoft Internet Explorer, Mozilla Firefox, Apple Safari und Opera.

ATTENTION: Our support team provides assistance for the latest version of Microsoft Internet Explorer only.

Login

Our support team or your reseller has e-mailed you your access data. (URL, user name and password). Type the following URL into the address bar of your web browser (e.g. Microsoft Internet Explorer): http://login.oxygenmediaplatform.com and press **Enter**. Now you are on the Oxygen Management Suite login page.

Fill in your user name and your password and confirm the login by clicking the **Login** button. You are now logged in and have access rights to the Oxygen Management Suite according to your status.



Before Starting

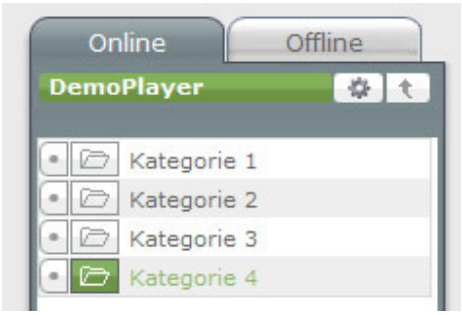
Before you start off with your own digital signage network we recommend to read the following whitepaper:

http://www.42mediagroup.com/Basics.18.0.html

Footage Section

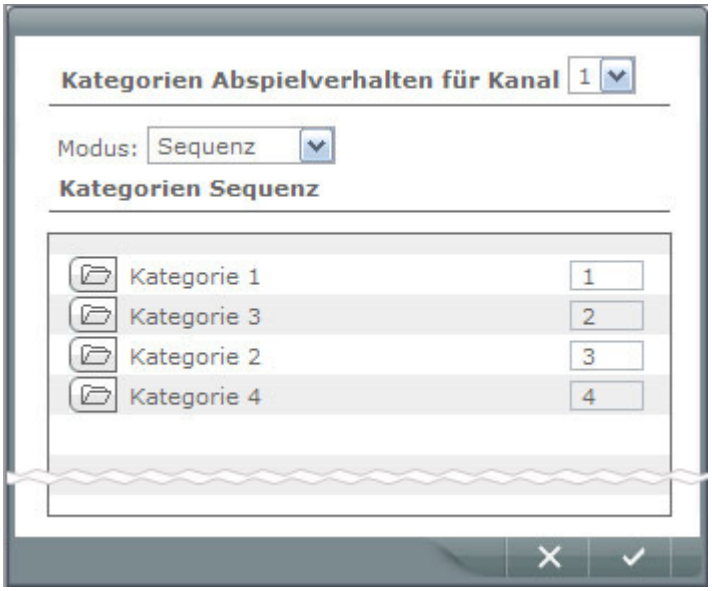
In the footage section you can upload and administer content and manage its output.

On the left side of your screen you will see a list of the created categories. Categories are folders in which content items are grouped to assign a common behavior to these items. The assignment also helps you to search for specific files.



Playout Options

The category behavior can be adjusted via the gearwheel symbol to the left of the "**Up**" button.



The behavior can be defined separately for each of the four channels. The following options are available:

- **Descending**
  - Plays the player's categories from Z to A.
- **Ascending**
  - Plays the player's categories from A to Z.
- **Sequence**
  - Plays the player's categories pursuant to a predefined numerical order.
- **Shuffle**
  - Plays the player's categories in shuffle mode.

To create a new category click the **Add** button down to the right of the category list. Specify a name for the category and click the check mark. Now your new category will appear in the list and can be administered.

If you want to upload content to your newly created category select the category with a mouse-click and then click on the **Add** button down to the right in the main window.

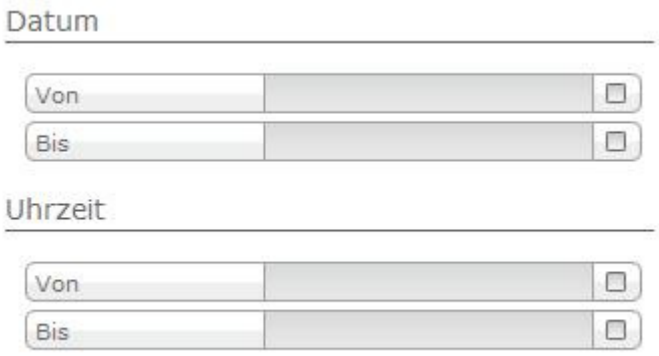
Now choose an upload option. Once the upload process is completed the uploaded content item will appear in the main window and can be administered.

Category Behavior

The **Behavior** tab allows to define a playback behavior for a whole category:

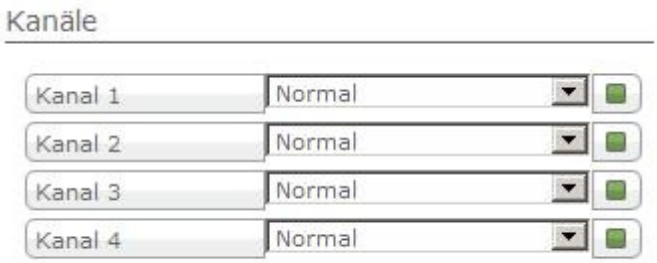
Timing

Define a specific time span to the minute and determine on which days of the week the content item from the chosen category shall be played and on which days it shall not be considered.



Channels

Here you can define on which channels – i.e. in which window sections – the content item from the chosen category shall be played during split screen operation. Furthermore you can define with which priority the item shall be played.



Playout Options

Here you can define the category length. If you enter a value of e.g. 5 five content items will be played in a row when this category is selected.

The **Timeout** function defines (in minutes) how long the category will no longer be considered after it has been played. Determining a value of e.g. 120 the category will be locked for 2 hours after it has been played.

The **Playout Order** defines the order in which the content within the category is played: **Shuffle** for random playout

and **Ascending**/**Descending** for a playout pursuant to the order.

If **Continuous Playout** is activated the playout will be continued from that point where the category has been left. Example: If a category has a length of 1 and continuous playout and descending order are activated the first footage item will be played at first. Then the player will jump to another category. When the player returns to the first category the second footage item will be played.

Rights Management
Here you can define who may administer the category. If you choose **Server** as the **Owner** the category can only be changed via the Management Suite. If you set the property to **Local** changes can be made via the local frontend as well.

The **Visibility** determines whether the category shall be visible or invisible in the local frontend. Choose **User or higher** to make the category visible in the local frontend.

Confirm changes by clicking the check mark down to the right.

Content Behavior

The **Footage** tab gives you an overview of the content within the individual categories. Here you can check the behavior of individual or several files and adjust it, if desired.

Next to the file name the following properties are displayed:

Active
Determines whether the file shall be considered in the playout.

Duration

Shows the file's length.
IMPORTANT: If you set the duration of a content item to 00:00:00 it will be played nonstop. So please be aware to always set a length for your content.

Play Audio

Determine whether the file shall be played with or without sound.

Channel ID

Define whether your channel logo shall be displayed while the file is being played or not.

Priority

Here you can set a priority for the file, i.e. how often it shall be considered when the category is being played.

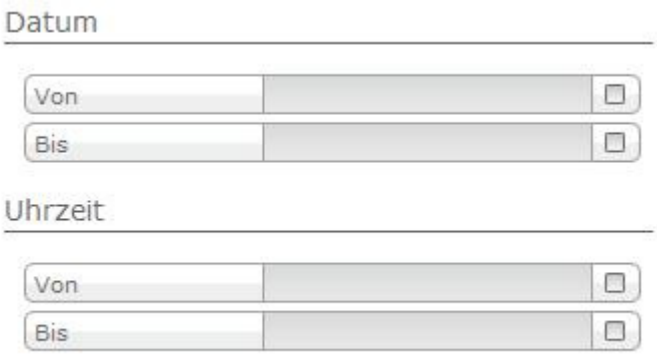
Info Button

The info button provides information on whether and when a timer event is defined for a content item.

To set the exact behavior of one or several files please mark the corresponding checkbox(es) on the left side. Afterwards click the **Edit** symbol below. Thus you can assign a common behavior to several files within one category at the same time.

Timing

Determine on which days the file shall be played resp. on which days it shall not be played. Furthermore you can define the exact time span in which the file shall be played.



Playout Options

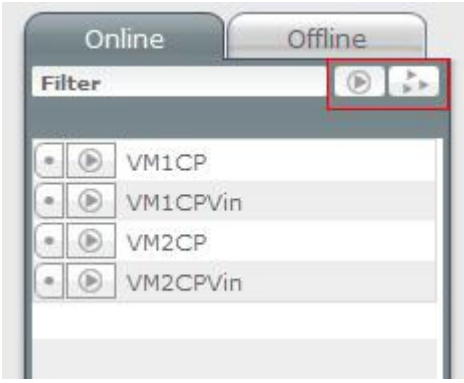
Define whether the file(s) shall be played with or without sound / channel ID / overlay text and on which channel with which priority.

Rights Management

Here you can define whether content items may be administered via the local frontend. Set the owner to **Local** and the visibility to **User or higher** to achieve that.

Players / Player Groups

You have the opportunity to switch between individual players and whole player groups by clicking the arrow button.



Clicking the corresponding button allows to switch between **players** and **player groups**. The screenshot above shows four players, for example.

And here you can see four players groups:

Timer Section

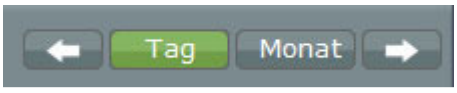
The timer allows to assign fixed playout times to your content. Plan your program in real-time!

You want to play specific content items, templates, media or advertising media at an exact time? The following steps help you to create timer events for specific content.

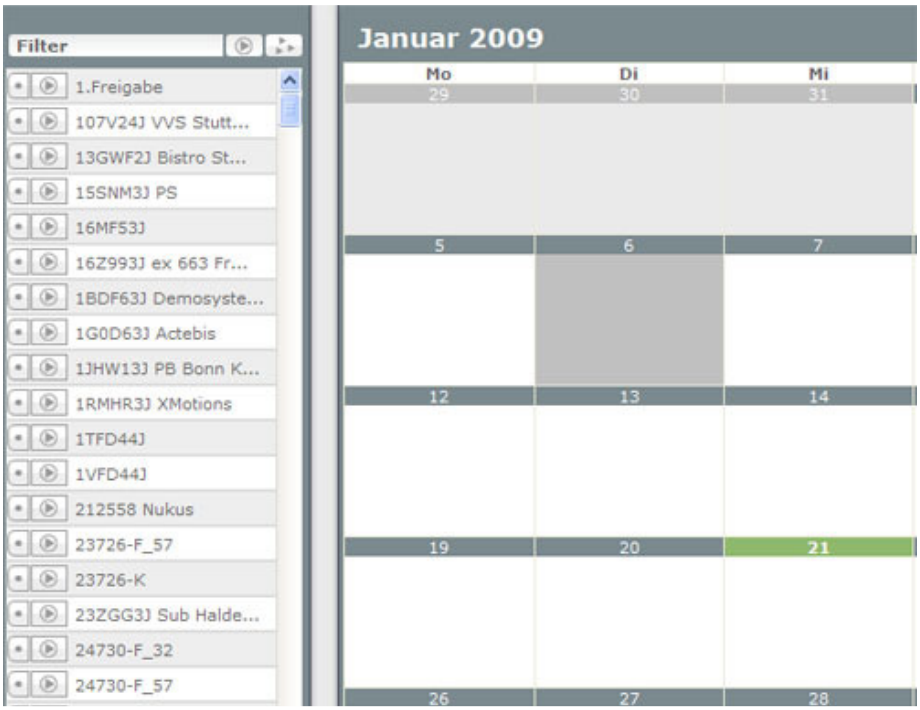
Creating a Timer Event

Click the **Timer** button in the horizontal navigation bar. On the left side of your screen you will see an overview of your players or player groups. Choose the player or player group that you want to create a timer event for.

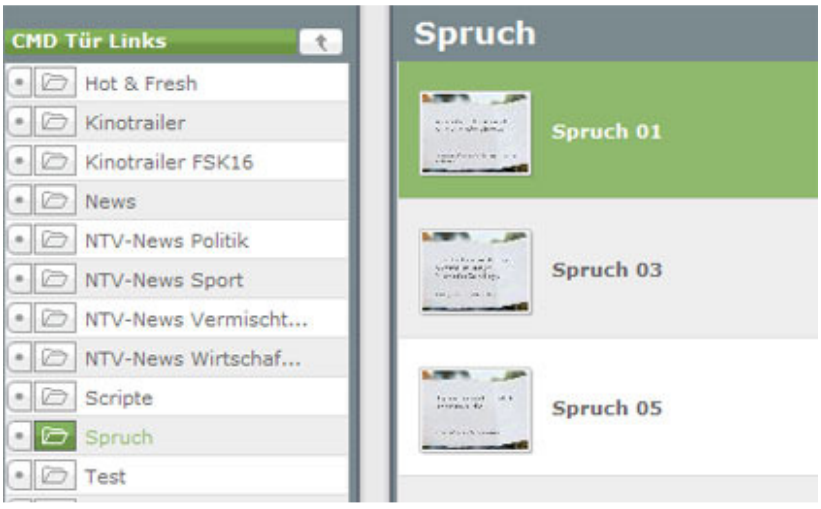
The current day is always highlighted in the calendaric month overview on the right side. The **Day** and **Month** buttons allow to switch between day and month view. By means of the arrow buttons you can switch between the different months.



Click on the day that you want to create a timer event for in the month overview or click the **Add** button down to the right. A click on the desired day will take you to the day overview. Double-click the desired hour interval or click the **Add** button.



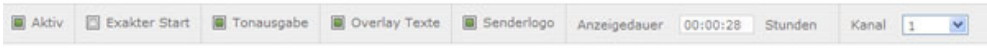
Now you can select the content item from your footage section that you want to set a timer event for. All content items from the different categories are displayed in a user-friendly way by means of thumbnails. The scroll bar top right allows to define how many content items shall be displayed on one page.
Click the desired content item to create a timer event for it. The user interface for timer events will be opened.



In the **Options** menu you can define whether your timer event shall be **active**, i.e. whether it shall be considered at

all, whether it shall be played with **Exact Start**, whether the content item shall be played with sound and whether an overlay and/or station logo shall be displayed. If you activate **Exact Start** the content item will be played exactly at the time you have defined as the start time. The current program will then be interrupted. If you do not activate **Exact Start** the current content item will be fully played before the scheduled content item will start.

Furthermore you can define on which channel the content item shall be played. For images and flash movies a display duration can be determined.



Periodic Timer Events

The option **One-time** allows to create single timer events, the option **Periodic** allows to create repeating events. Choose in which frequency you event shall be repeated: monthly, weekly, daily, hourly or custom.

At first you define the time span in which the timer event shall be executed at all. Thereupon you choose the desired calendar days, days of the week, hours or minutes your timer event shall be set for by click. In case of monthly or weekly repeating events it is required to define the desired start time, in case of daily or hourly repeating events is is required to define the hours, minutes and seconds of the start time.

In this example a timer event is set to play a content item daily at 2:45 a.m., 10:45 a.m. and at 1:45 p.m..

You can also define intervals, e.g. for a content item that shall be played every 30 minutes during one day.

The **Custom** button allows to create very complex periodic timer events.

Save your timer event by clicking the check mark symbol.

Thereupon you will be asked whether you want to create another event for this content item or whether you want to create another timer event for this player or player group.

In the month overview you will see thumbnails of the created timer events. When moving the cursor over the thumbnails you will get more information about the respective events. By means of the **Thumbflow** function you can scroll through the different thumbnails if you have defined more than three timer events for one day.

One-time events are marked with a grey frame, periodic events have an orange frame.

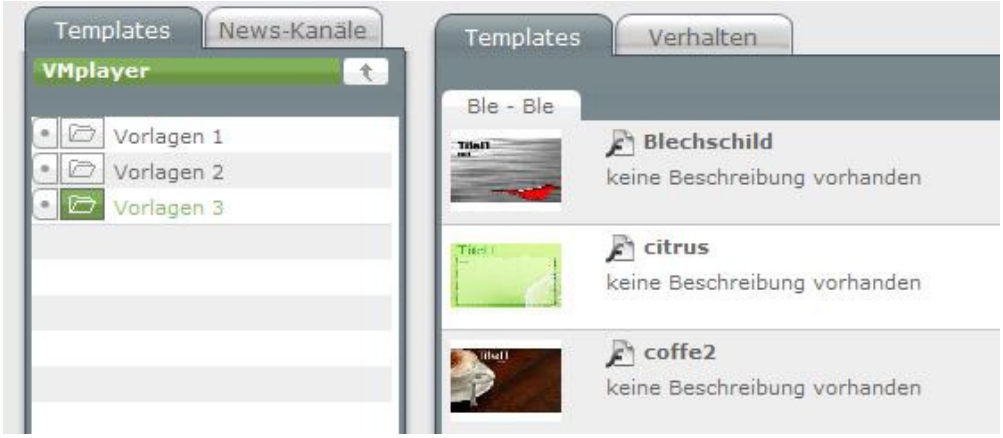
The timer events created for every hour are displayed in the daily overview as well. By means of the **Thumbstrip** function you can browse horizontally through the thumbnails if you have created numerous events.

To edit or remove a timer event click the desired element in the day overview. Then you can edit and save it again or you can remove it by clicking the **Delete** button. You can also remove timer events in the day overview. Hold down the Ctrl-key (in other browsers than the Internet Explorer the Shift-key) and click the element to be deleted. The event and all serial elements of this event will be marked and can be removed by clicking the **Delete** button.

Texteditor Section

By means of predesigned templates you can create advertising and information clips very quickly and easily. Promote you offers professionally with templates provided by us – in your own corporate design with your own channel logo. Simply fill in your texts in the texteditor. Then save the completed template in the desired category to take it over into the current program.
Templates can be created easily by means of Adobe Flash. The whitepaper „The Oxygen Media Platform – Template Creation" documents this procedure in detail.

Click the **Texteditor** button on the horizontal navigation bar. On the screen you will now see the categories containing the respective templates on the left side. Click the desired category to open a template list in the main window. The templates will be displayed as thumbnails. Click a thumbnail to open the desired template in the editor.



Creating a Clip

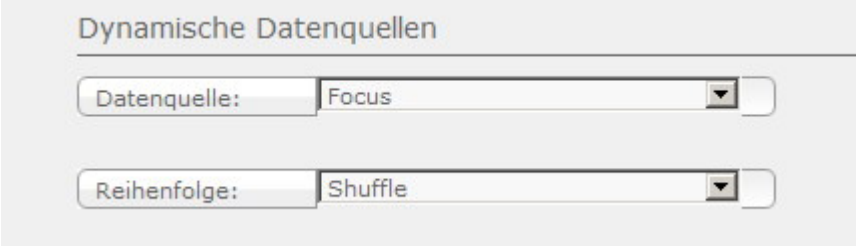
Static Content

When you have clicked a template thumbnail the template will appear on the left side. The template to be edited contains placeholders for your text. At first you select the draft element (Title1, Text or Image) that you want to edit from the drop-down menu below **Add content**. In the texteditor below you can now fill in your desired text and edit it like in Microsoft Word.

Dynamic Content

At first you select the draft element that you want to edit from the drop-down menu below **Add content**. Then activate the **Dynamic** checkbox.

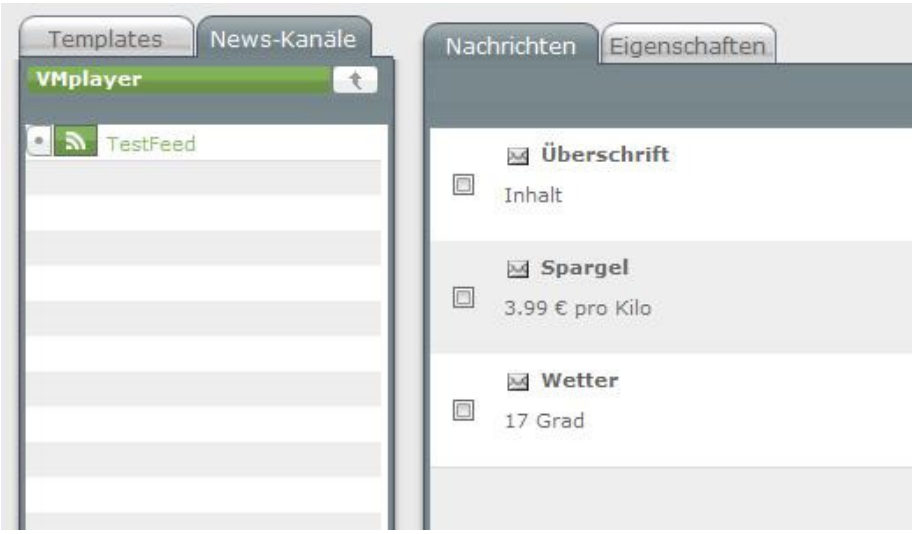
On the left side below the template you can now choose from different dynamic data sources.



Dynamic data sources are information from specific subject areas that are regurlarly updated via internet. If you have selected a dynamic data source you can choose between **Title** and **Text** on the right side of the texteditor below **Add content**, **Dynamic** – depending on which element you want to display in the field that you have chosen before.
To see a preview click **Update**. If you are satisfied with the preview click the check mark to save the data in your desired category under your desired file name.

News Feeds

By clicking the **News Feeds** tab you can select the player or player group that you want to create a news feed for. Click **Add** and give the news feed a distinct name. Click the news feed that you want to add messages to. If you want to write the messages that will appear in the channel yourself click the **Add** button below in the right section. Your message may contain title and content. Clicking the check mark will save your message to the news feed. You can add any number of messages to your news feed.



Your news feed can also be fed in from a so-called "RSS feed" on the internet. Create a news feed and click the **Properties** tab. Fill in a short description of the content and the URL to the desired RSS feed after having unlocked the function by clicking the check box. Then save your changes by clicking the check mark.

The import of RSS feeds is subject to a 15-minute-update-cycle so it can take up to 15 minutes until the feed messages will appear.

Statistics Section

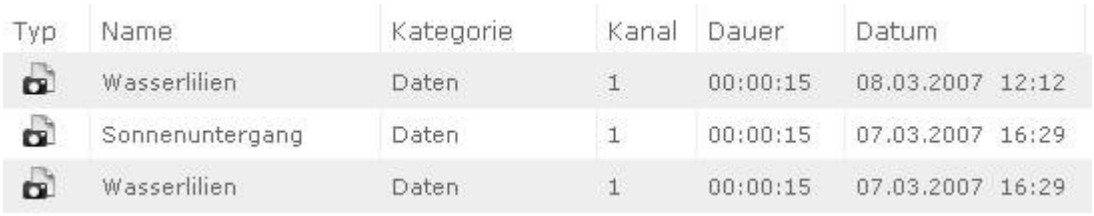
In the **Statistics** section all data concerning the content playout is collected. The statistics offer you all information about your player's (or players') current playout behavior.

General

Within **Statistics**/**General** you will get an overview of how much content of which kind is stored on the respective player.

Playlist

The **Playlist** gives you a detailed list of all content played within the last 7 days.



Typ	Name	Kategorie	Kanal	Dauer	Datum
	Wasserlilien	Daten	1	00:00:15	08.03.2007 12:12
	Sonnenuntergang	Daten	1	00:00:15	07.03.2007 16:29
	Wasserlilien	Daten	1	00:00:15	07.03.2007 16:29

You can specify a time span to get a playlist for this exact time span only.

You can export the list to Microsoft Excel or delete it.

Toplist

Check the **Toplist** to find out which content was played most frequently during the last 7 days.

New Content

Within the the section **New Content** you will find out which new content has been added to the player's footage.

Admin Section

In the **Admin** section you can administer users, teams, players and all other system objects. You can add new teams and users, administer the users' rights, integrate players into player groups and adjust the messaging channels according to your wishes.

Teams / Users

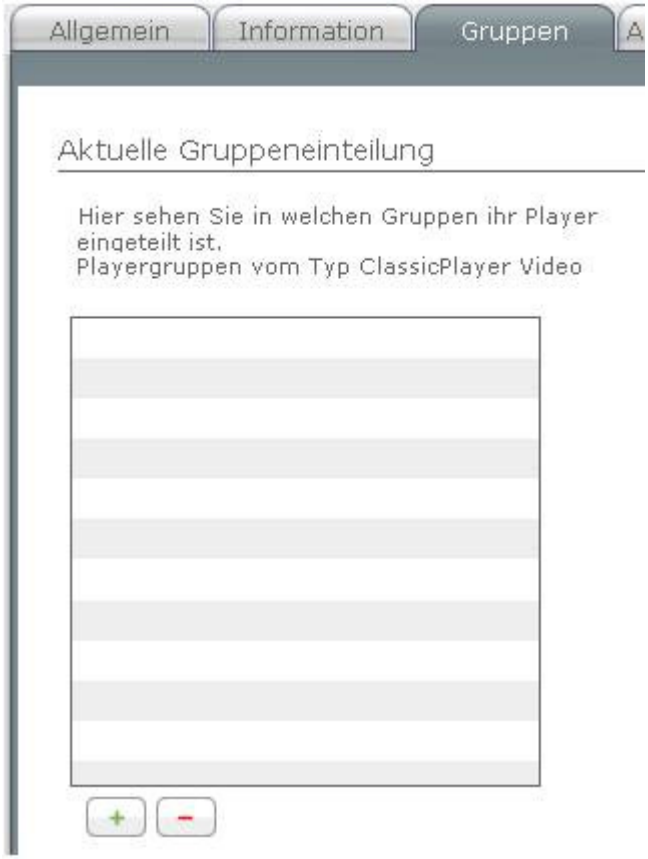
The section in the middle of the screen contains a list of teams, users and players. **Users** are marked with a silhouette symbol, **players** have a play symbol. **Teams** combine both symbols (silhouette and play).

To create a team or user click the **Add** button in the list section. The software will ask you what you are about to create. After entering a name and a password as the case may be you have to save your changes by clicking the check mark.

If you click a player in the middle section you will get some information about the player on the right side. The **General** tab allows to fill in all information about the player itself and its location.

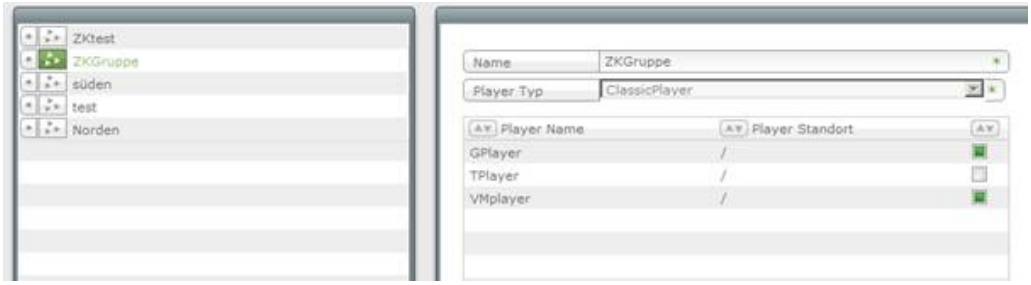
Information provides more details about the player. Here you can define the interval used for updates. By default the update interval is set to 15 minutes, i.e. all changes will be carried out not later than 15 minutes locally on the player. The player connects to the Management Suite every 15 minutes to check for updates. If so the updates will be carried out. In case new content has been added the player will begin to download this content. Depending on the content size and the bandwidth that may take some time so that the updating process may possibly take longer than 15 minutes.

In the **Groups** section players can be integrated into one or several player groups. Mark the check boxes of the groups that you want to add the player to and save by clicking the check mark down to the right.



In the **Administration** you can reboot the system remotely or shut it down. It is also possible to restart the playout only. Be aware that any changes will take effect after the update interval so by default after 15 minutes at the latest.

Player Groups

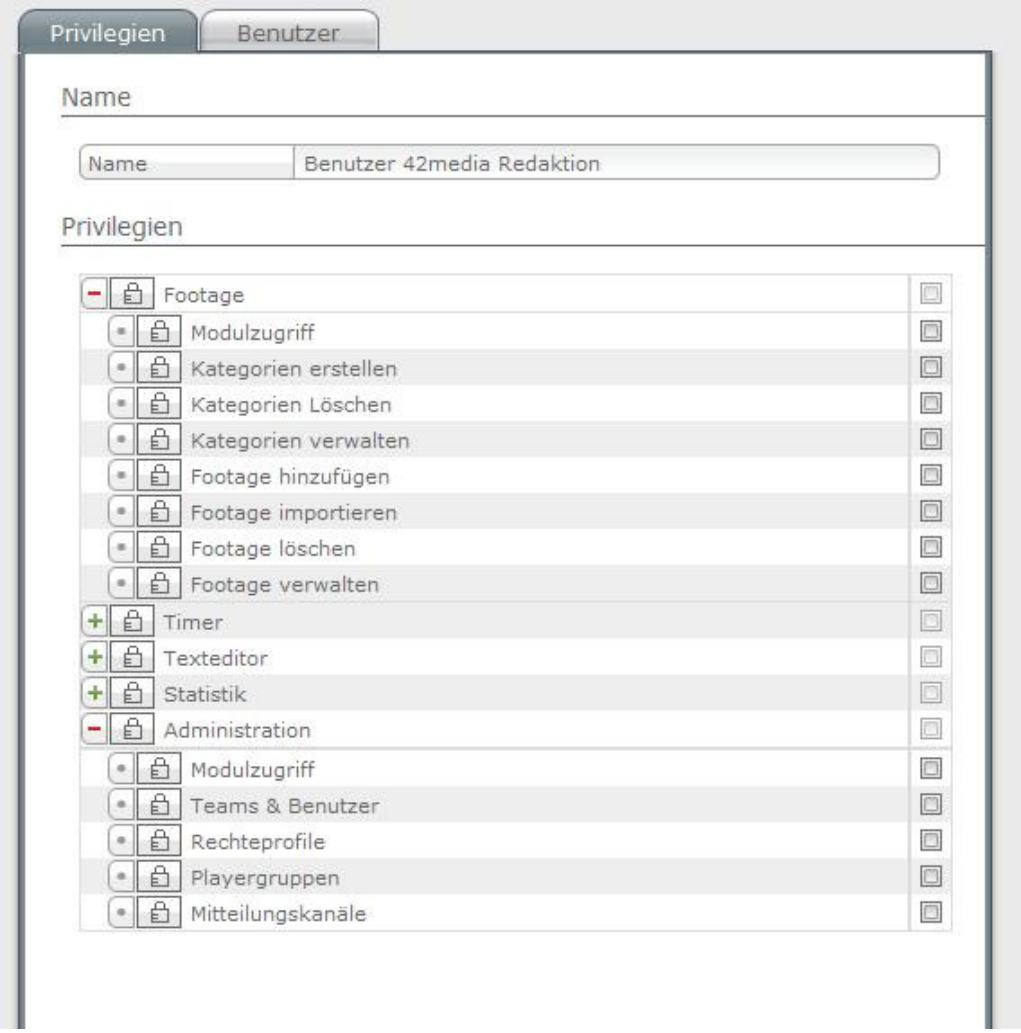


To administer any number of players easily and quickly you can create **Player Groups**. To create a group click the **Add** button. Give your group a name and select the player type. Be aware that only players of the same type can be integrated into a group.
Below player name and player type you will find a list of players of the selected type. Now you can mark the players that you want to integrate into the group by clicking the check box to the right of the player. When you have marked all desired players click the check mark down to the right.

A player group can be deleted by checking the respective group and then clicking the recycle bin button.

Security Profiles

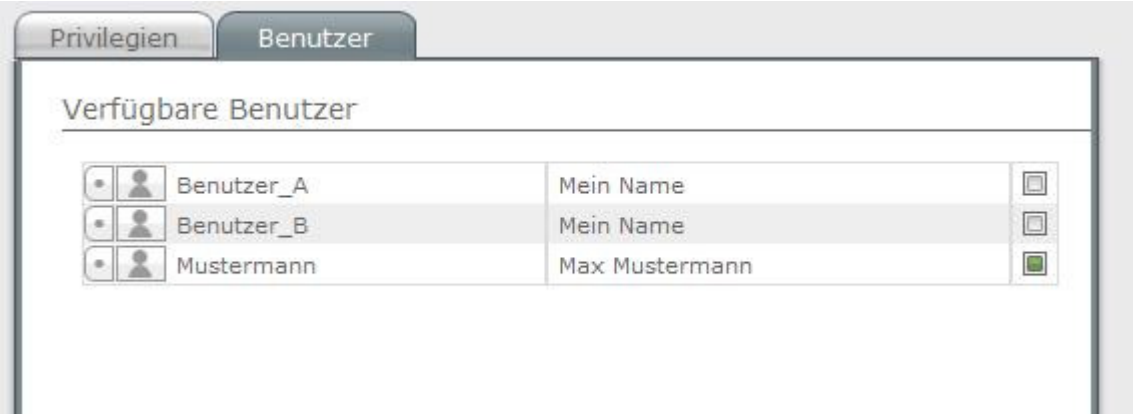
Here you can create different profiles to adjust the functional range for each user according to the requirements. You can either choose one of our predefined profiles or create your own. To create your own profile click the **Add** button and give your profile an accurate name. When you have chosen a profile click its name. (Be aware that profiles marked in *italics* cannot be changed.)



Now you can take a look at the privileges assigned to the selected security profile. If you have created a new profile you will be able to assign all rights that are required for the Oxygen Management Suite administration by yourself. Click the "+" next to the different sections to expand the rights list for this specific section and to lock resp. unlock functions.

It is required to always activate **Access Module** when a user shall be assigned more rights within this section. (It does not make sense to create a profile that allows users to add categories within the footage section without granting the respective module access.)

Assign all rights your new profile shall contain and then click the **Users** tab.



Define which users this profile shall be assigned to by marking the check box next to the user name. When you have selected one or several users save the profile by clicking the check mark. Your security profile has been created, completed and assigned to users. One user can be assigned to any number of security profiles. Adding all profiles up will reflect the user's actual privileges.

Supported Content Types

The Oxygen Media Platform supports a multitude of different content formats, depending on the applied player, its version and the hardware. Your reseller will provide you with more information about the file types your player supports.

In the following some codecs will be presented with tested and recommended settings. If you have more questions please contact your reseller or our support.

Content Creation – General Advices

Adjusting your Content to TV Displays

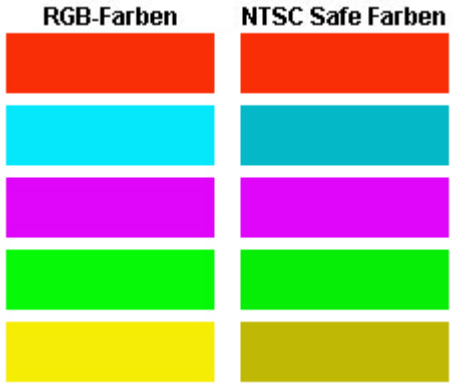
Be aware that resolution and clarity of a TV display are much lower than of a computer monitor. Since TV screens are designed for moving images static content may appear blurred oder flickering.

To adjust computer content to a TV screen you need more expert knowledge. Here are some useful hints:

- You should test the application on both TV and computer screen to make sure that your graphics are displayed in best possible quality.
- Texts and images should be created in a size adapted to the lower clarity and resolution of the TV screen.
- Adjust your graphics relatively to the screen resolution and avoid fixed image widths.
- All lines, borders and texts should be at least 2 pixels wide since the interlaced scanning involves limitations. Finer details may blur on the TV screen.
- Use a TV-safe palette because e.g. bright colors may over-saturate on such screens or may bleed across scan lines.
- Since designers do not place relevant elements near the outside edges of the TV screen title and action safe areas are of no importance.

Colors Suitable for TV Screens

Within Adobe Photoshop and other graphical software you will often find a filter that scans images for colors and brightness not suitable for TV screens and that will reduce these settings to an appropriate level. On the left side of the following illustration there are colors that are too bright to be displayed on most TV screens. On the right these colors have been adjusted using the Photoshop filter:



To apply this filter in Adobe Photoshop select "Videos → NTSC colors" from the filter menu. Only a few of the available RGB colors are too bright to be displayed on TV screens so that not many colors will be changed by this filter.

If you have assigned your colors in HTML, Flash or WPF the TV suitability can be tested by making a screen shot of the page and then applying the Photoshop filter. If colors have been changed too much you can set them to appropriate values.

Pure white and pure black are often displayed poorly on TV screens. Replace white with RGB(240,240,240) and black with RGB(16,16,16).

Screen Resolution

A graceful scaling of your HTML, Flash or WPF application is required since it shall be displayed on both TV and computer screen. The pages should be optimized for a resolution of 1024 x 768 pixels. Use the zoom function in the Cascading Style Sheets file (.css) to automatically adjust the sizes of all elements to TV screen's lower resolution (700 x 525 for NTSC, 720 x 567 for PAL).

Test your application on both display types and test various resolutions for your computer monitor. The resolutions are often scaled to a consistent ratio of 4:3 (e.g. 1024 x 768, 1280 x 960). Oxygen also supports some narrower resolutions such as 16:9 or 5:4. When scaling for these resolutions, extra space is added at the bottom or right to fit the new proportion. To prevent tiling of your background image, you can use cascading style sheets to fill the extra space with a flat color that complements your design, by using the following syntax:

BODY {BACKGROUND: url(images/myBackgroundImage.gif);] background-repeat: repeat-x; background-color: #bbbbbb}

Color Scheme

Choose a color scheme suited to your corporate design.

Texts and Fonts

To make your texts readable from greater distances you should select an adequate font type, size and color.

Serif fonts enhance the readability in print media but are hard to read on displays. Use sans-serif fonts instead such as Arial or Trebuchet. If you must use a serif font (e.g. for a logo) size it to at least 25 points. Your fonts shall be sized to at least 20 points, especially in critical elements such as buttons or links.

Larger text blocks are hard to read from greater distances. Thus you should rather use shorter texts. Some useful hints:

- Use lists of short phrases instead of paragraphs.
- Split larger text blocks to additional pages.
- Edit your texts and remove irrelevant information.

Use an adequate contrast between text and background color. You can create contrast by using light and dark values.

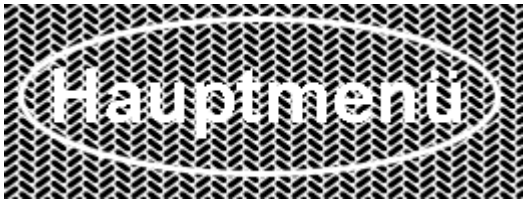
In the following illustrations you will find examples of good contrast:

Here is an example of poor contrast:

Different hues do not create adequate contrasts so do not use colors of similar value.

Creating contrast by different hues may add up to such poor results:

Do not use background patterns behind your texts. The following illustration shows the bad readability of a text placed over a pattern:



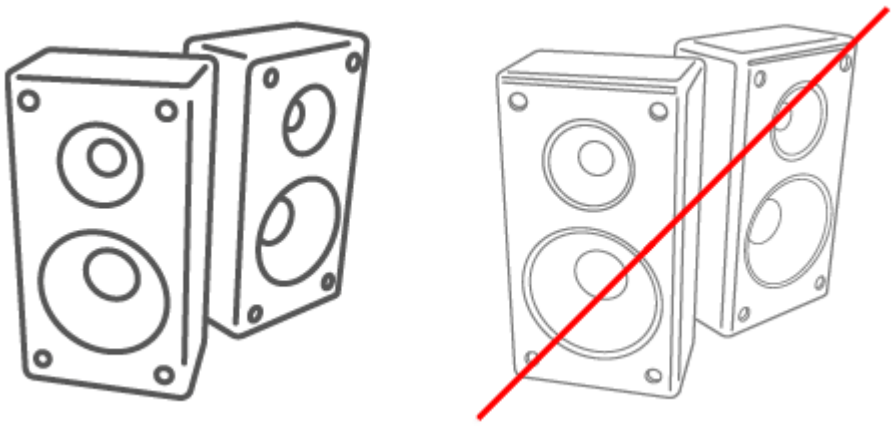
Images
HTML-, Flash- or WPF-based content requires compatible image file formats such as GIF or JPEG.

Image quality and file size are most important. Since GIF- and JPEG-files are compressed some information of the original file and thus image quality is lost. Lossless file formats typically provide a higher image quality but are usually larger.

If you need a high download speed use JPEG or GIF images. JPEG files are best for photos while GIF files are suitable for graphics with large areas of color like diagrams, charts, figures and graphs. If you are unsure of what file format to choose save your image in both formats and compare file size and quality.

Graphics must be large enough to be visible from a greater distance. Avoid small details. Borders and lines should be at least 2 pixel wide.

In the following illustration the left image has an appropriate detail and pixel width while the right one does not:



You should test your graphics on the TV and computer monitor by viewing them from various distances up to 15 feet.

Buttons

Oxygen uses a standard design for buttons for the following elements:

- Links (within you HTML application)
- Option buttons
- Check boxes
- Sorting controls
- Controls setting the view

Create a specific consistent design for all buttons within your application. Thus your users will identify their functions quickly.

Buttons shall be regocnizable as such and should be clearly separated from their surroundings. Button texts should be sized to at least 20 points and use a sans-serif font. The button text should explain the button's function. Functions such as "Save settings" or "Send" will be easier to understand than e.g. "OK".

Drop-down menus are difficult to use with touchscreens and thus should be avoided. Use clearly visible button menus instead in which each button is assigned to one specific option or use UpDown-Controls (spin boxes).

Buttons selected by the user should be highlighted by e.g. changing the button background color through a brighter border (width: at least 4 pixels). This highlighting function should be consistent throughout the application and should complement the design colors. Such highlights render your application dynamic since highlights appear to create movements while the user navigates through the page.

Navigation

Navigating in HTML, Flash or WPF applications is very different from normal web-browsing. In Oxygen applications users are not only able to navigate between pages or screens but also between different selectable elements within a page. A touchscreen is used to navigate, to select an element and to trigger the element's function. Furthermore one item on the screen always has the focus.

Page Layouts

Use simple and clean layouts with a consistent design by aligning your elements to a grid. Remove decorative elements that might distract from the relevant operating functions. Readability is always more important than design.

Animations

Your users will expect animated content in your HTML application, especially in entertainment applications. Animations will increase excitement and the visual user experience. In HTML applications Oxygen supports the Internet Explorer's dynamic animation capabilities but these are limited. Do not rely on HTML and JScript when creating extensive animations and always check that your animations

are displayed smoothly and that they do not slow your application’s performance.

Your animations shall enhance the user experience and should not distract from relevant content. Animate the page focus. Use animations to enhance transitions between different static content or to enrich audio content.

Animate such elements only that the user is supposed to focus. Content the user requests should be played at once. The user should not have to wait until an animation is done playing. When using animations the motion should stop after a short time to enable the user to take in the content. The animation should resume only after further user input.

Windows Media Video (WMV)

General Encoding Settings

Basis of all video encoding settings is the Windows Media Codec 9. Since LC and plasma displays do not use interlaced scanning a progressive output (without field order), i.e. full screens as well as the usage of square pixels are recommended.

In case of an varying number of fps in the source material it should be taken over to prevent optical jerking.

For all WMV-output standards a stereo audio output using the Windows Media Audio Codec 9.2 at 192kbps (constant bitrate), a sample rate of 44.1kHz and a sample size of 16Bit is recommended.

Generally Supported WMV Codecs

- Windows Media Audio 9
- Windows Media Audio 9 Voice
- Windows Media Video 7, 8, and 9
- Windows Media Video 9 Screen
- Microsoft MPEG-4 Versions 1, 2, and 3
- ISO MPEG-4 Versions 1 and 1.1

Examples

The WMV 9 codec is used with an audio setting of 192kbps, 44khz stereo.

Regular SD-Material

Resolution 720x404 with square pixels (aspect ratio 16:9), 25 frames per second and a data rate of 4000kbit/s.

Small HD-Material (720p)

Resolution 1280x720 with square pixels, 25 frames per second (in case of video clips or animations including video content) resp. 50 frames per second (in case of animations) and a data rate of 7000kbit/s.

Large HD-Material (1080p)

Resolution 1920x1080 with square pixels, 25 frames per second (in case of video clips or animations including video content) resp. 50 frames per second (in case of animations) and a data rate of 10000kbit/s.

DivX (AVI, DIVX)

The DivX codec created by the company DivX Inc. is known for being capable of compressing large video files efficiently at good quality. It is popular on the internet and on file sharing platforms and is thus supported for compatibility reasons **but it is not recommended to apply this codec in productive use.**

Indeo (AVI)

Indeo is an out of date codec often found on the internet. **It is not recommended to apply it in productive use.**

MPEG2/4 (MPG, MPEG)

General Encoding Settings

Basis of all video encoding settings is the MainConcept MPEG Video Codec. Since LC and plasma displays do not use interlaced scanning a progressive output (without field order), i.e. full screens as well as the usage of square pixels are recommended. In the GOP settings (group of pictures) the M-frames should be set to 3 and the N-frames should be set to 15. In most cases these settings are default.

For all MPEG-2 output standards a stereo audio output using the MainConcept MPEG Audio Codec and the MPEG-1 Audio Layer 2 Standard is recommended at a constant bitrate of

192kbps, a sample rate of 192kbps and a sample size of 16 Bit.

Examples

Progressive Scan (full screens). The Elencard MainConcept MPEG2 codec is applied with an audio setting of 192kbps, 44khz stereo.

Regular SD-Material

Resolution 720x405 with square pixels (aspect ratio 16:9), 25 frames per second and a data rate of 7000kbit/s.

Apple QuickTime (MOV, QT)

Allgemeine Encoding Einstellungen

Basis of the video encoding settings is the H.264 codec. The output is exclusively progressive without field order and with square pixels.
In case of a varying number of fps in the source material it should be taken over to prevent optical jerking.

Examples

The H.264 codec is applied with an audio setting of 192kbps, 44khz stereo.

Regular SD-Material

Resolution 720x404 with square pixels (aspect ratio 16:9), 25 frames per second and a data rate of 4000kbit/s.

Small HD-Material (720p)

Resolution 1280x720 with square pixels, 25 frames per second and a data rate of 10000kbit/s.

Large HD-Material (1080p)

Resolution 1920x1080 with square pixels, 25 frames per second and a data rate of 15000kbit/s.

Adobe Flash (SWF)

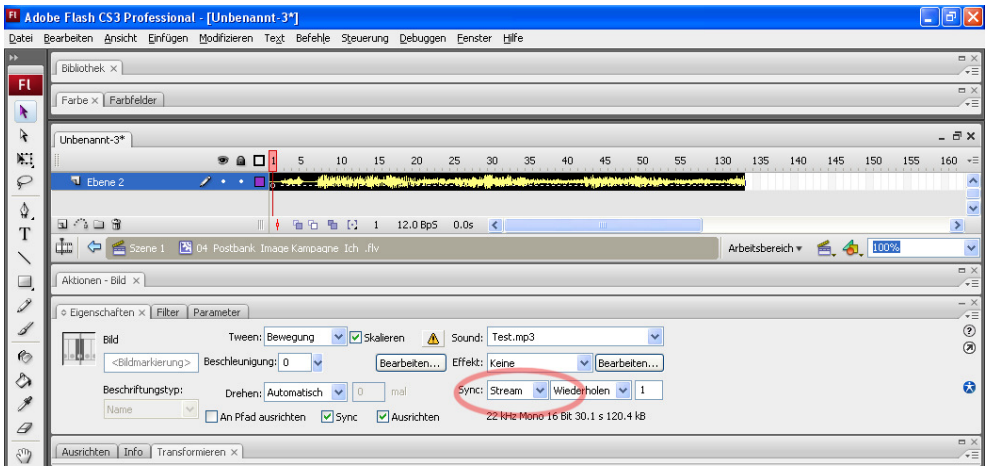
General

The Adobe Flash support within the Oxygen Media Platform is realized by means of the original Adobe Flash Active X Controls. Flash provides extensive options to create dynamic content such as weather forecasts or similar applications. It

has got a broad user basis and a multitude of technical literature is available that will help you take the first steps.

Be aware that Flash has been created for websites. Thus there are some limitations for the use in the field of digital signage. Flash content (SWF) should be created in a way that it prevents specific errors and reacts to them. If e.g. a required data feed is not available or outdated the Flash file can play a predefined standard animation, if desired. You should test that before taking the Flash content into your playlist.

Digital signage and internet are totally different. Since Flash has originally been created for web browsers frames within an animation are displayed imprecisely. In case of digital signage the timing must be exact though since the animation is otherwise stopped.



To make sure that the output timing is exact you have to put a sound track under your Flash file and set the synchronization of the Flash movie from the default setting **Event** to **Stream**. If no sound track is available you can create an empty audio file by means of the Windows Audio Recorder. For this purpose deactivate the microphone on your PC.

Note the following:

- Intensive use of ActionScript (full CPU load) may cause a player crash
- User input (via keyboard or mouse) is suppressed
- Unlike Flash in the browser the default background color for flash movies is black. This setting can be overwritten by your flash movie, if desired

Websites

General

Website and HTML rendering support within the Oxygen Media Platform is realized by means of the Microsoft Internet Explorer. With HTML, CSS, JavaScript etc. websites provide extensive options to create dynamic content such as weather forecasts or similar applications. There is a broad user basis and a multitude of technical literature is available that will help you take the first steps.

Please note that HTML, CSS, JavaScript etc. have originally been created for websites. Thus there are some limitations for the use in the field of digital signage.

- The Oxygen player hides possible horizontal and vertical scrollbars.
- Unlike desktop browsers the default background color for websites is black. This setting can be overwritten by your flash movie, if desired.
- The Oxygen player aims to display websites not before they are fully loaded. Potentially asynchronous JavaScript operations cannot be considered.
- Pop-ups are suppressed
- ActiveX Control installations are suppressed
- Intensive use of ActionScript (full CPU load) may cause a player crash
- User input (via keyboard or mouse) is suppressed
- The player supports XBAP websites
- Windows Media Player and Adobe Flash Browser Control are supported

Websites can be opened as links or can be imported as offline web containers.

Creating a WebContainer

Create a web/XBAP page named index.html, index.htm or index.xbap. Zip this file and possible other required data such as images, CSS files etc. and change the file extension from *.zip to *.Webcontainer. Now you can simply import this file.

Live Video

If your player is upgraded with the "LiveIn" option you can administer composite and s-video sources incl. sound like normal content files.

Scripts

By means of scripts devices can be automatized. A device is a display connected via VGA/DVI/HDMI or RS232 or a controllable crossbar connected via RS232, for example. Scripts are handled like footage but they are triggered by timer events only and will not be considered by the normal scheduler. Scripts are a specific language declaratively written via XML. Therefore you should be familiar with the creation of XML files.

Monitor Power Script

By means of the monitor power script displays connected via VGA/DVI/HDMI can be easily switched on and off.

An example:

```
<monitorpowerscript xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:noNamespaceSchemaLocation="mps.xsd">

  <!--status is one of the following: {"on", "off", "standby"}-->
  <set status="on"/>

</monitorpowerscript>
```

This script allows to control the power status of a display connected via VGA/DVI/HDMI.

Station Power Script

By means of the station power script timer events for rebooting resp. shutting down an Oxygen Station can be defined.

An example:

```
<stationpowerscript xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:noNamespaceSchemaLocation="sps.xsd">

  <!--status is one of the following: {"reboot", "shutdown"}-->
  <set status=" reboot "/>
```

</stationpowerscript>

ATTENTION: Station power scripts are executed 30 minutes after booting up a station to make sure that at least one update process could be carried out.

RS232 Scripts

Many manufacturers provide their displays or crossbars tailored for corporate clients with an RS-232-interface (also known as COM port). Depending on the manufacturer and the device model and type the basic functions such as brightness and sound level can be modified or the different input signals can be switched remotely.

Xml Scheme

To get syntax support while creating RS232 scripts the xml scheme can be embedded with the following link:

http://www.oxygenmediaplatform.com/schemas/RS232Script.xsd

Elements

RS232Script Element

```
<RS232Script>
...
</RS232Script>
```

The xml root element must be named `RS232Script` so that the service indentifies the script as an RS232 script.

Config Element

```
<Config ExecuteMethod="onetime" />
```

Mother Element: RS232Script

Attribute	Predefined Values	Type	Application
`ExecuteMethod`	`onetime` `always`	`xs:string`	`required`

In the `onetime` mode the execution is finished after the completion of all commands, in the `always` mode the execution is continued to e.g. keep opened COM ports active.

Only one `always` script can be executed at a time. If a second `always` script is started the currently running script will be overwritten.

Connections Element

```
<Connections>
    <Connection … />
    <Connection … />
    <Connection … />
</Connections>
```

Mother Element: RS232Script

In the `Connections` element connections (see `Connection` element) are defined.

Connection Element

```
<Connection Name="Con1" PortName="COM1"
       BaudRate="9600" DataBits="4" FlowControl="None" Parity="None"
       StopBits="Two" Timeout="2000" />
```

Mother Element: Connections

Attribute	Predefined Values	Type	Application
Name		xs:string	required
PortName		xs:string	required
BaudRate	75 110 134 150 300 600 1200 1800 2400 4800 7200 9600 14400 19200 38400 57600 115200 128000	xs:integer	required
DataBits	4 5 6 7 8	xs:integer	required
FlowControl	None RequestToSend RequestToSendXOnXOff XOnXOff"	xs:string	required

Parity	Even Mark None Odd Space	xs:string	required
StopBits	None One OnePointFive Two	xs:string	required
Timeout		xs:integer	required

In addition to the required port settings Connection elements contain Name and PortName. Name stands for the reference name of the connection and PortName (e.g. COM1) for the respective port.

In case of latency problems the Timeout attribute indicates the maximum holding time in milliseconds until the communication with the port is aborted.

Use Element

```
<Use Connection="Con1" LogFileName="Display">
    <Log ...
    <Wait ...
    <Command ...
</Use>
```

Mother Element: RS232Script

Attribute	Predefined Values	Type	Application
Connection		xs:string	required
LogFileName		xs:string	optional

The Connection attribute must contain the name of a connection defined within the Connections element. All commands within the Use element use the connection defined within Connection.

If log files shall be saved independently from the general script log a separate log file can be defined with LogFileName. It is important that the value contains the name of the desired log file only - without the file extension.

Further settings can be defined in the log4net.config.xml of the Oxygen DC Services. The logger DeviceControlService.RS232Script.UserDefined and appender RS232ScriptUserDefinedAppender are applied for that.

Possible child elements:

- Log (see Log element)

- Wait (see `Wait` element)
- Command (see `Command` element)

Any order and number of elements is possible.

Log Element

```
<Log Message="Hello World!" />
```

Mother Element: Use

Attribute	Predefined Values	Type	Application
Message		xs:string	required

Writes the report indicated in `Message` into the log. If a `LogFileName` is indicated in the `Use` element it is additionally written into this log file.

Wait Element

```
<Wait S="1" />
```

Mother Element: Use

Attribute	Predefined Values	Type	Application
S		xs:integer	required

For delayed executions the `Wait` element is used. The execution is paused for für `S` seconds.

Command Element

```
<Command Name="Display an">
 …
</Command>
```

Mother Element: Use

Attribute	Predefined Values	Type	Application
Name		xs:string	required

`Command` elements are the actual core of the script. Chains of commands are sent to the connection defined in the `Use` element and return values are evaluated, if applicable.

The `Name` attribute should be assigned a significant value so that the commands within the command become more comprehensible.

Send Element

```
<Send Value="[2]DON[3]"/>
```

Mother Element: Command

Attribute	Predefined Value	Type	Application
Value		xs:string	required

Contains the command to be sent. Byte codings or regular strings can be used.

NoLog Element

```
<NoLog />
```

Mother Element: Command

If the return values of the commands shall not be logged logging can be suppressed using the NoLog command.

While Element

```
<While Name="Busy" ReturnValue="[] 12 23 34" MaxTries="5"/>
```

Mother Element: Command

Attribute	Predefined Values	Type	Application
Name		xs:string	optional
ReturnValue		xs:string	required
MaxTries		xs:integer	optional

The element executes the command as long as the defined ReturnValue. The loop is carried out as often as defined in MaxTries but not more often than 1000 times.

If Element

```
<If ReturnValue="3" Type="Number" Is="LessEqual" IgnoreCase="true">
  ...
</If>
```

Mother Element: Command

Attribute	Predefined Values	Type	Application
ReturnValue		xs:string	required
Type	String Number	xs:string	optional
Is	NotEqual Less LessEqual	xs:string	optional

	Equal GreaterEqual Greater		
IgnoreCase		xs:boolean	Optional

To react to the return value of the command the further script process can be controlled by the `If` element.

The expression is always evaluated in the following mode: [Return value] [Operator] [Device return value]

If the defined condition is true the commands within the `If` element are executed.

Possible child elements:

- Log (see `Log` element)
- Wait (see `Wait` element)
- Command (see `Command` element)

Any order and number of elements is possible.

Else Element

```
<Else>
 ...
</Else>
```

Mother Element: Command

The `Else` element can follow an `If` element only. If the element condition was false the commands within the `Else` element will be executed.

Possible child elements:

- Log (see `Log` element)
- Wait (see `Wait` element)
- Command (see `Command` element)

Any order and number of elements is possible.

Script Examples

If Example

```
<?xml version="1.0" encoding="utf-8" ?>
<RS232Script>
  <Config ExecuteMethod="onetime" />
  <Connections>
```

```
      <Connection Name="Con1" PortName="COM1" BaudRate="9600"
      DataBits="4" FlowControl="None" Parity="None" StopBits="Two"
      Timeout="2000" />
  </Connections>
  <Use Connection="Con1" LogFileName="Display1">
    <Command Name="Temperatur Status">
      <Send Value="[]12 33 24"/>
      <If ReturnValue="[2]89 23[3]" Type="Number" Is="LessEqual" >
        <Log Message="Display Temperatur Ok" />
      </If>
      <Else>
        <Log Message="Warnung sehr hohe Display Temperatur" />
      </Else>
    </Command>
  </Use>
  </RS232Script>
```

While Example

```
<?xml version="1.0" encoding="utf-8" ?>
<RS232Script>
  <Config ExecuteMethod="onetime" />
  <Connections>
      <Connection Name="Con1" PortName="COM1" BaudRate="9600"
      DataBits="4" FlowControl="None" Parity="None" StopBits="Two"
      Timeout="2000" />
  </Connections>
  <Use Connection="Con1" LogFileName="Display1">
    <Command Name="On Screen Display ein">
      <Send Value="[]12 33 24"/>
      <While Name="Busy" ReturnValue="[2] 64 93[3]" MaxTries="10"/>
    </Command>
  </Use>
</RS232Script>
```

Interfaces

Via interfaces the Oxygen Media Platform provides access to all its core features for third party applications.

These interfaces can be accessed as follows:

Oxygen Core .NET API

The Oxygen Core .NET API provides full access to all features of the Oxygen Media Platform. Due to its security architecture it is currently not available for managed environments.

For authorized partners the Oxygen Core .NET API SDK is available separately.

Oxygen Webservices

Oxygen Webservices provide access via the HTTP/SOAP protocol. They are also available for managed environments and isolate users/teams from each other like in the UI.

For authorized partners the Oxygen Webservices SDK is available separately.

Oxygen Messaging Bus

An efficient messaging infrastructure is the basis of the Oxygen Messaging Bus. Via so-called adaptors legacy applications can be tied to which set a service frame around the application.

Main task of the Oxygen Messaging Bus is the data exchange between digital signage infrastructure endpoints. The data exchange takes place in the form of service calls.

The Oxygen Messaging Bus offers encryption and data conversion and also caching of often used data and the "stand in" processing in case of unavailability of specific endpoints.

For authorized partners the Oxygen Messaging Bus *SDK* is available separately.

Support

The following websites advise you of our extensive support offerings:

http://www.42mediagroup.com/Support.4.0.html?lang=1

Please read and follow our „Best Practices for Succesful Support" that can be found here:

http://www.42mediagroup.com/Technical-Support-Guide.97.0.html?lang=1

Tools

Oxygen Station Explorer

The Oxygen Station Explorer finds and lists all stations available in the local network. You can enter the local administration frontend or change the network settings of a station. The Oxygen Station Explorer can be downloaded here.

Overview

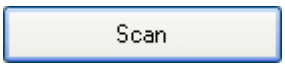
- Scan – Starts search for stations
- Connect – Opens the local administration frontend in your browser
- Change Settings – Opens the network settings window of the selected station
- Help – Opens the online help menu of the Oxygen Station Explorer

Installation

By clicking **Install** on the Oxygen Station Explorer download page the tool will be downloaded and installed. When the installation is completed the Oxygen Station Explorer will open and you will see the main window.
If you have already downloaded and installed the Oxygen Station Explorer you will find it in Start --> Programs --> 42media group GmbH. The online help menu for this tool is also available there.

How to Use the Oxygen Station Explorer

Scan the Network for Stations



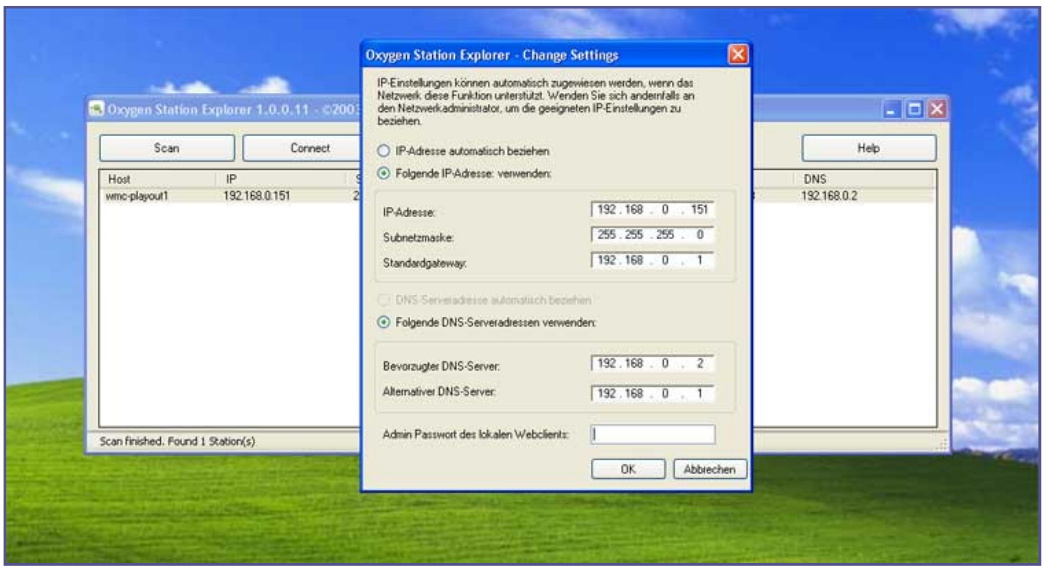
By clicking the **Scan** button the Oxygen Station Explorer will start searching for stations in the local network.
When the scan is completed the number of the found stations will be displayed in the lower area of the window. The found stations will be listed and can be marked for further actions.

Show the Local Administration Frontend of the Marked Station

To enter the administration frontend of a station mark the respective station and click the **Connect** button. The Oxygen Station Explorer will then open the Internet Explorer which will connect to the station and show its login screen.

Change the Network Settings of a Station

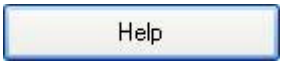
If you want to change the network settings of a station mark the respective station and click **Change Settings**. The network settings window will open.



The network adjustment is carried out like in Windows. You can change the IP address, the subnet mask, the standard gateway and the DNS server. You need the password of an admin account belonging to the station you are about to change. Please wait for a feedback signal from the Oxygen Station Explorer whenever you have changed a setting. The change to "Obtain IP address automatically" will usually take a little longer.

ATTENTION: Please make sure that the entered network settings are correct and that the station can connect to a network. Otherwise it is not possible to access the station. If you are not sure we recommend to contact the network administrator responsible for your network.

Get Help



Open the help menu by clicking the **Help** button. Within the Oxygen Station Explorer help menu you can also get to other sections of the Oxygen help menu.

Troubleshooting

What kinds of problems may occur and how can they be solved?

Q: The Oxygen Station Explorer does not find all stations within my network!
A: Make sure that all stations that cannot be found are online and that the network cable is connected correctly. After that carry out the scan once more.

Q: I cannot enter the administration frontend of the marked station!
A: The station must be located in the same network as the PC the Oxygen Station Explorer is run on. If the station is not in the same network adjust the network settings of the station so that it is located in the same network. Contact your network administrator if you are not sure about the settings.

Q: I have changed the network settings but the Oxygen Station Explorer still shows the old settings!
A: Please check the admin password you have entered and execute the changes once more.