Smart signage Technical guide

MagicINFO Event Trigger

Ver 1.0

Visual Display Division
Samsung Electronics Co., Ltd.

Contents

Acronyms

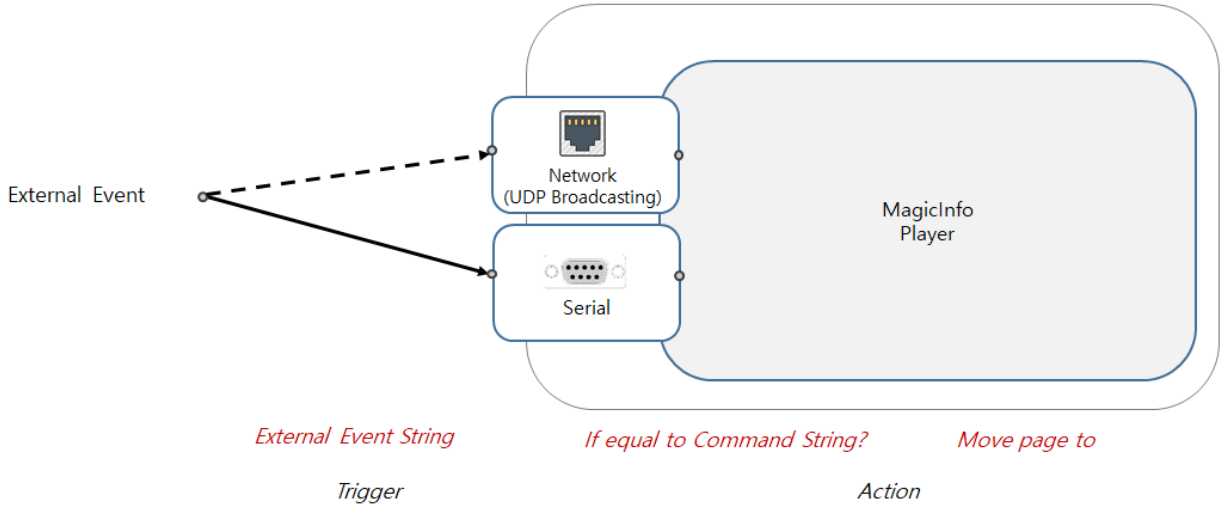
CMS	Content Management System
UDP	User Datagram Protocol

1. Overview of MagicINFO Event Trigger

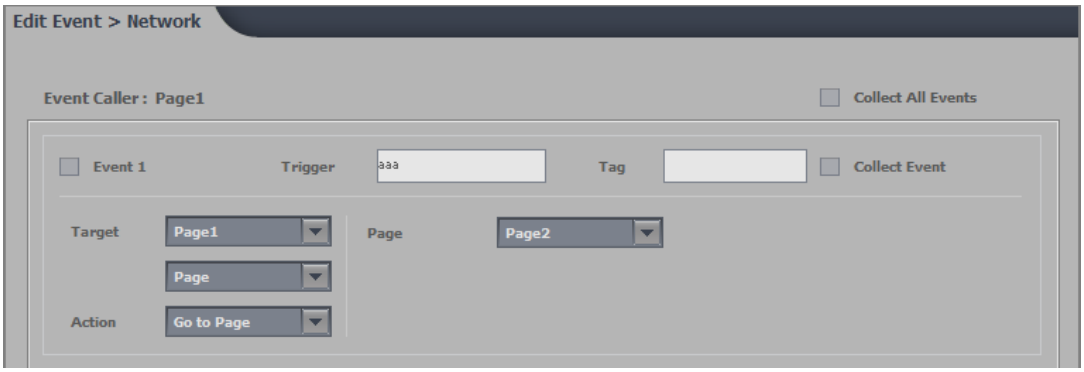
Most CMS content will show the content on a schedule. The MagicINFO solution provides a Datalink or EventSchedule to create content that changes according to external conditions, but the player should get an event information, but the player devices have to use a polling method for getting event information from the server at regular intervals so there are several limitations to dealing with local events immediately. The Event Trigger function introduced in this document is provided to make LFD content that can respond in real time to external event from the device or user around the display. External event inputs and internal event methods are provided for local event processing. External event means a string coming from outside through a network or serial port, and internal event means an event that is generates from touch input or the player device itself.

1.1. External Event

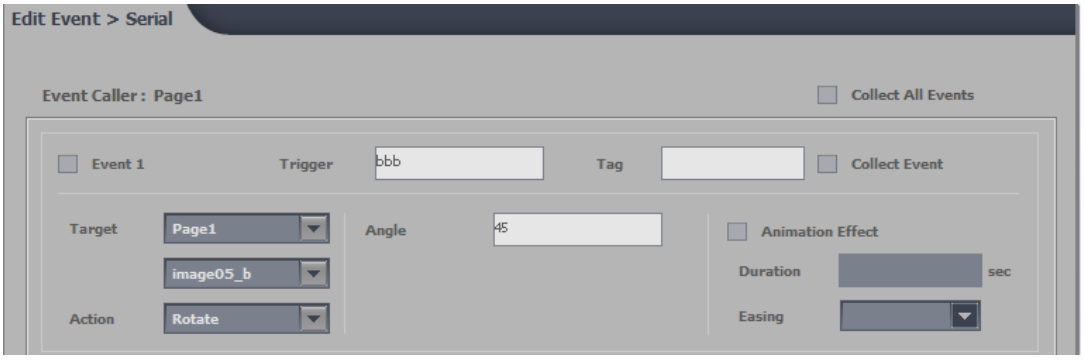
MagicINFO provides serial and network methods for external events. Serial Event consists of a string sent by an external device connected to the device via RS232-C COM port. Network events receive UDP Broadcast strings as event messages that occur on event source devices connected to the same LAN environment. Because Network Event is sent over UDP Broadcast, player devices connected to the same AP can receive the same event at the same time.



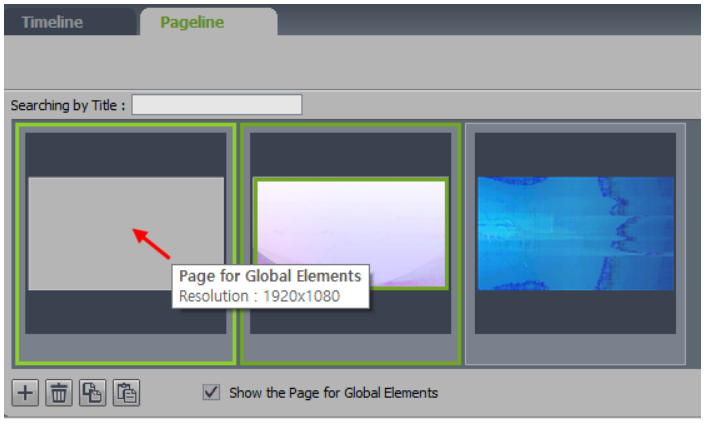
To receive external events, you must register the event with the LFD content. Each page can be configured to register external events and specific actions you want. The Player device performs the action associated with an external event that enters through the network or serial if the external event string matches with the registered event. For example, "Page2 is shown when a string 'AAA' appears on the network" can be configured as follows.



It is also possible to construct "rotate Image1 when the string "serial "BBB" comes in"



You can register these external events in each page within the LFD and each page will only receive its registered event. Therefore, when a particular event occurs, it only responds if the event has been registered on the current page. If you want to receive an event regardless of the current page, you can specify an event on the Global Page. (see the far left page on Pageline)

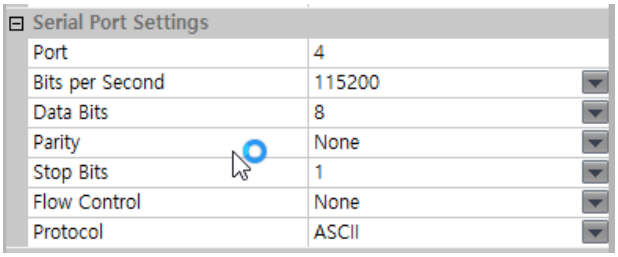


Setting up and configuring Event Trigger in MagicINFO is described in Chapter 3

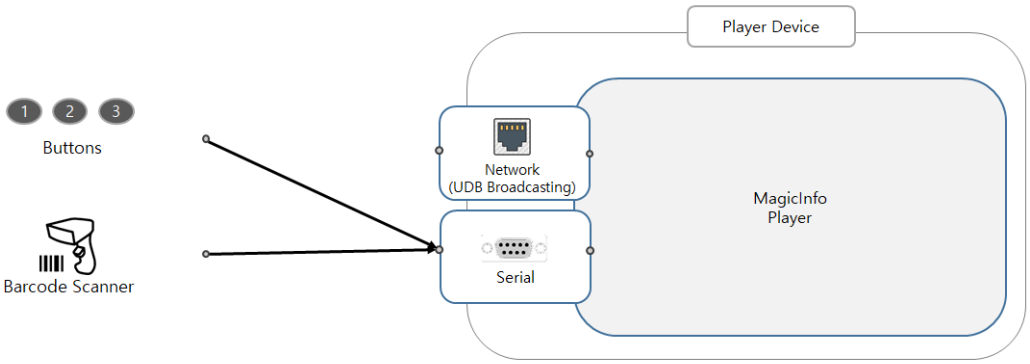
1.1.1.External Event Source

1.1.1.1. **External Event from Serial (COM Port)**

A device, such as a button or a barcode that is used by connecting directly to a serial port can be used as an event source. The MagicINFO Player waits for a specific string that enters through the serial port and performs an event action when a specified string is entered. COM Port settings can be specified by the Author at LFD creation.

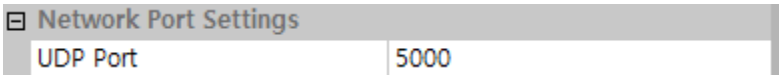


When the device plays LFD content, it opens the designated COM Port and wait for the event. The event source device must send the same string as the event string specified in the Event Trigger setup.

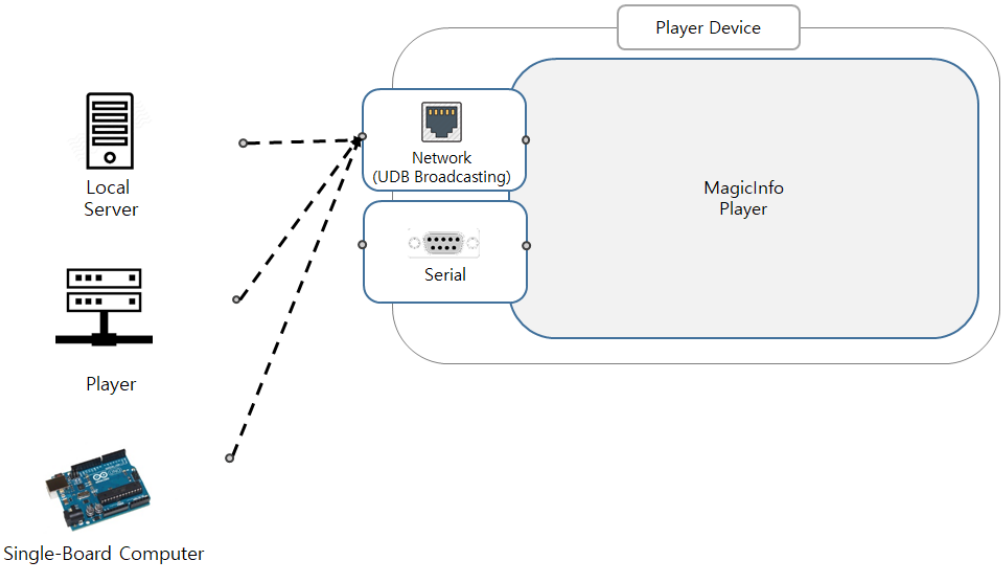


1.1.1.2. **External Event from Network (UDP Broadcasting)**

UDP Broadcast signals can be sent from PCs connected to the same network or from the MagicINFO Player. UDP port settings can also be specified by LFD in the Author.



Any device capable of UDP communication can be used instead of a PC. (e.g. Arduino)



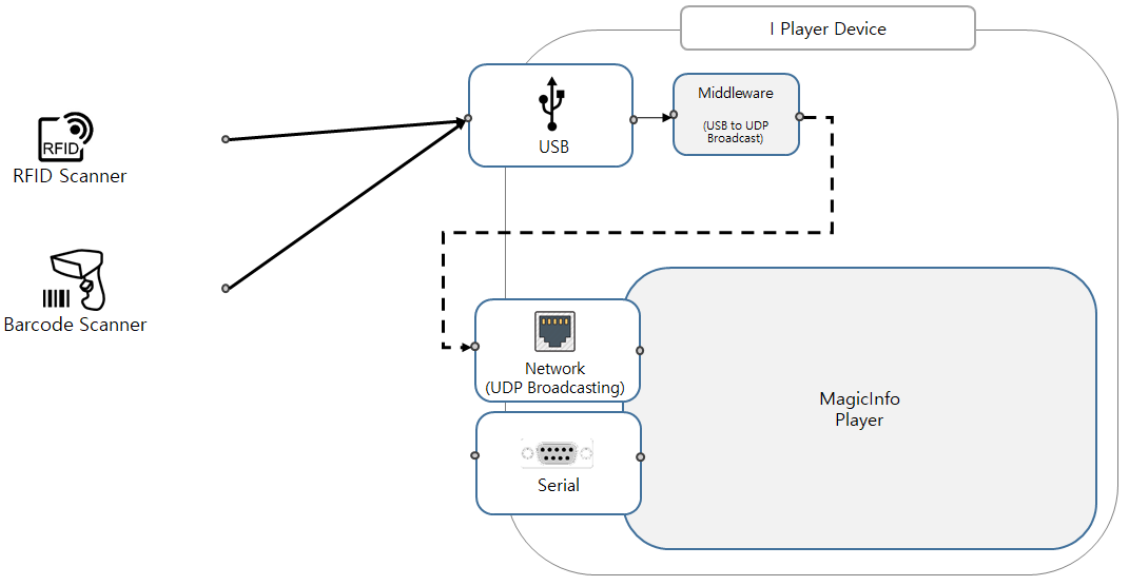
The function to perform event messages through a designated port can be implemented in the following manner. (When using C#)

```
using System;
using System.Net.Sockets;
using System.Net;
using System.Text;
using System.Threading;

namespace UDPer
{
    class UDPBroadcast
    {
        const int PORT_NUMBER = 5000;

        public void Send(string message)
        {
            UdpClient client = new UdpClient();
            IPEndPoint ip = new IPEndPoint(IPAddress.Broadcast, PORT_NUMBER);
            byte[] bytes = Encoding.ASCII.GetBytes(message);
            client.Send(bytes, bytes.Length, ip);
            client.Close();
            Console.WriteLine("Sent: {0} ", message);
        }
    }
}
```

1.1.1.3. **External Event from USB (Not directly supported, I-Player Only)**

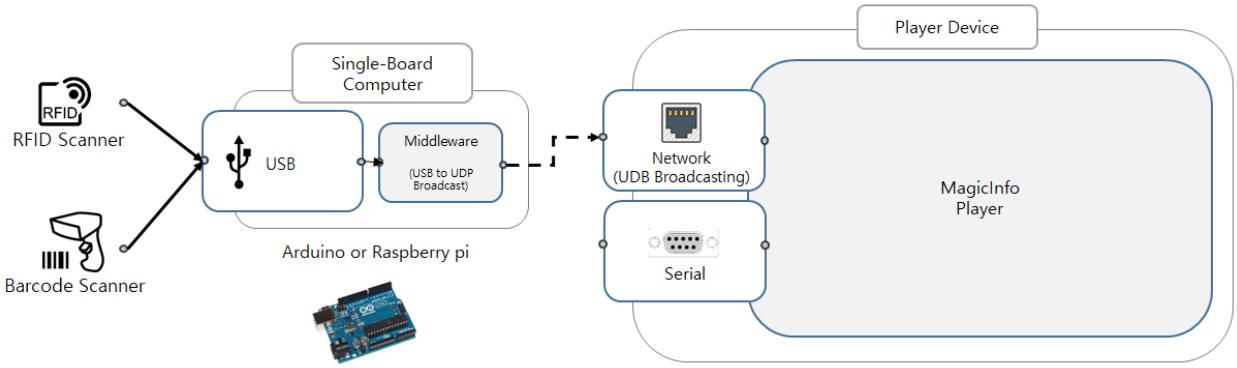
Event Source devices can use several types of sensors, most of which support the USB interface. Because each USB device requires a driver or has a variety of signal formats, it is difficult for MagicINFO to handle USB signals directly. Therefore, a separate Middleware program is required to receive and process USB raw data for sensor specifications. The program should receive a USB signal and convert it to a network event that the MagicINFO can handle.

This is only possible with I Player because it is difficult for an external SI company to create an embedded program that plays in S Player. S Player team is also considering using the Zig-Bee Dongle or receiving signals from various sensors via an embedded BLE module, which will require the provision of methods for registering sensors with each S Player with the specified specifications.



1.1.1.4. **External Event for USB (using single-board computer)**

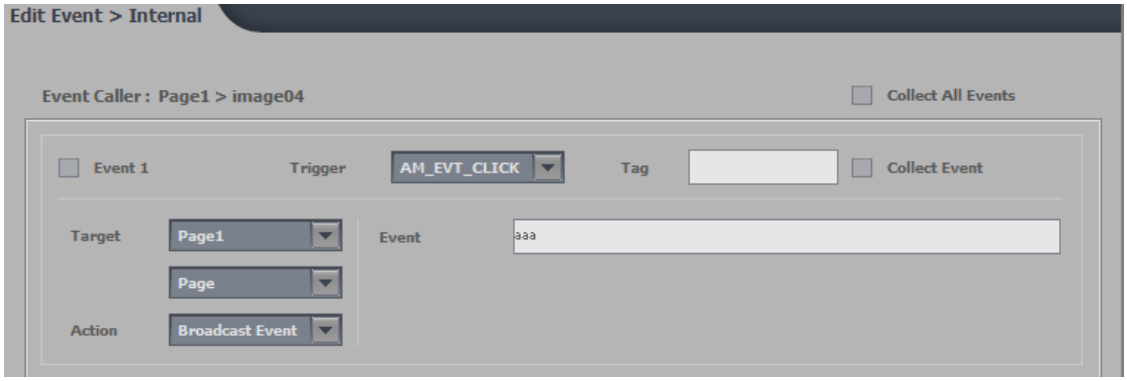
S Player can also receive events from USB sensors indirectly using a single-board computer. Create Middleware that converts USB signals into Network Event for Arduino or Raspberry Pi equipped with Network function so that USB signals can be received from MagicINFO.



1.1.1.5. **Network Event from Player (Using Event Broadcast)**

The MagicINFO Player can also send Network events on its own. The "Broadcast Event" action provided by the Page Element is used to the Broadcast the specified parameter value into the Network Event at execution.

The figure below shows the scene that constitutes an event when the Author clicks on a specific image, selecting the Page element, selecting the "Broadcast Event" Action, and specifying a parameter value of "aaa."



Later, when the device plays this LFD content, if the user touch the image, the network event called "aaa" is broadcasted to all players on the same network.

1.1.2. Advanced Network Event

Network events allow you to change the predetermined event action parameter in real time. By adding action parameter information to a network event, you can change the contents of a text element or control the position and rotation of an image to any value. You can also send multiple events at once. In this case, the content of the Network event should be sent in XML format, not in simple strings.

1.1.2.1. **Change Action Parameter**

Use the following XML format for sending events and parameters together. Although you already configured an event that changes to predetermined text, you can change the text element by sending the following XML event to the Network. For example, the text content will be changed to "changed!!" by sending the event below.

```
<Event>
<Trigger>aaa</Trigger>
<Params>
<Param>"changed!!"</Param>
</Params>
</Event>
```

It is also possible to send the following in a single line.

```
<Event><Trigger>aaa</Trigger><Params><Param>"changed!!"</Param></Params></Event>
```

1.1.2.2. Send multiple events at once

When you want to send and process multiple events at the same time, you can also send them simultaneously by wrapping them in <Events> node.
For example, if you want to change the contents of multiple text elements at the same time, you can configure each text element to change the text when receiving the Network Event and send the events and parameters at once, as shown below.

```
<Events>
<Event><Trigger>aaa</Trigger><Params><Param>"A changed!!"</Param></Params></Event>
<Event><Trigger>bbb</Trigger><Params><Param>"B changed!!"</Param></Params></Event>
</Events>
```

If you send the above event, you send the 'A changed!' parameter with 'aaa' event trigger and 'B changed!!' parameter with 'bbb' event simultaneously, and the corresponding text will change.

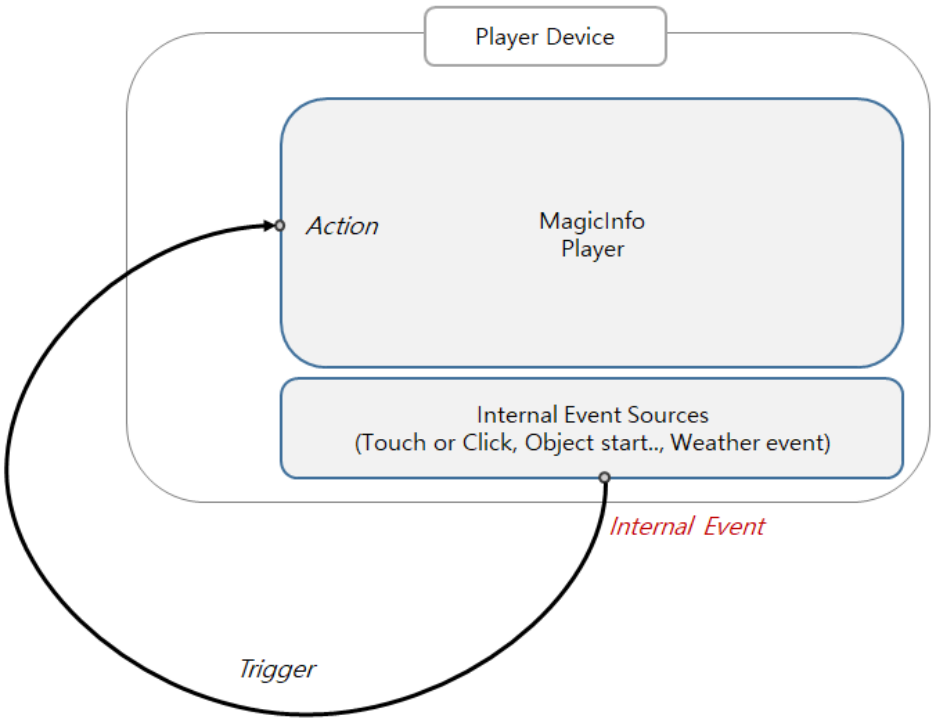
1.2. Internal Event

An internal event means the touch event from a specific element on the screen or the generated event inside the Player when an element in the content is at a certain state. Touch events are available on displays with touch capabilities. When a user touches an element within a content (image, video, etc.) an internal event occurs on the element. For example, "Page2 is shown when you touch Image1" or "Rotate Image2 by touching Image2".

The Weather event element generates the current weather condition as an event. In addition, events can occur when a page or element begins to start or stop.

The connection between events and actions is the same as for external events and can be configured through the Author.

A detailed description of each internal event is provided in the 3.1.3 Add internal event section.



1.3. Event Trigger Features in each Phase

Event Trigger features was differs from Phase1 and Phase2.
Event Trigger Phase1 provides only a Page Move action when received an external events such as Network and Serial Event.
In addition to the Phase1 function in Event Trigger Phase2, the following additional functions are provided:
- Controlling each element in the page (Move, Rotate, Scale, Show/Hide, Z-Order, etc.) as well as Page Move.
- Add internal events (Touch/Weather Event) in addition to external events.

Phase2 functions are available in I Player 6.0 and Premium Author 6.0 and later. (Phase2 will be applied to S Player later)

1.4. Limitations

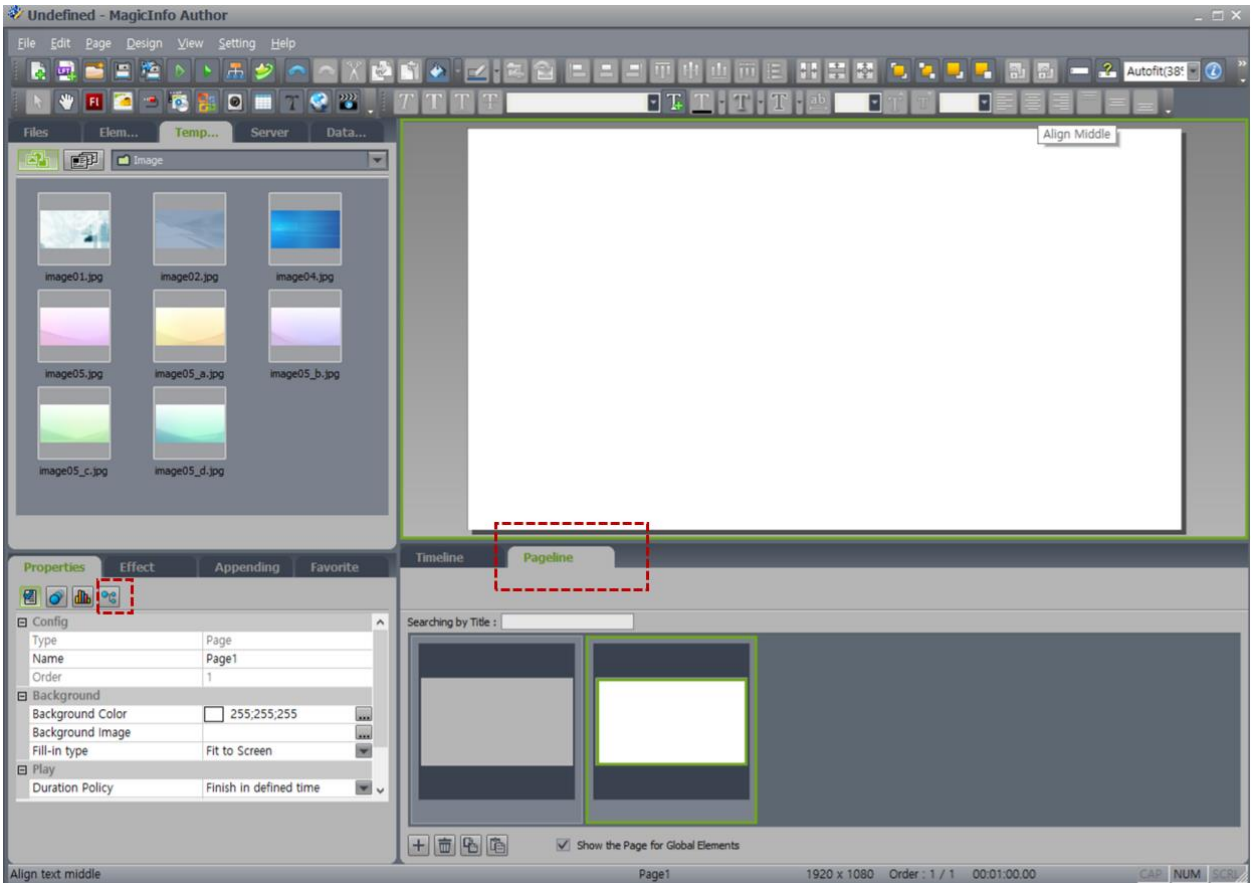
Content that can use Event Trigger is limited to content in LFD format. Use the Premium Author or Web Author to create LFD content and configure Event Trigger.

2. Author – Configure Event Trigger

Describe how events are specified and the actions that can be assigned to each element when they occur.

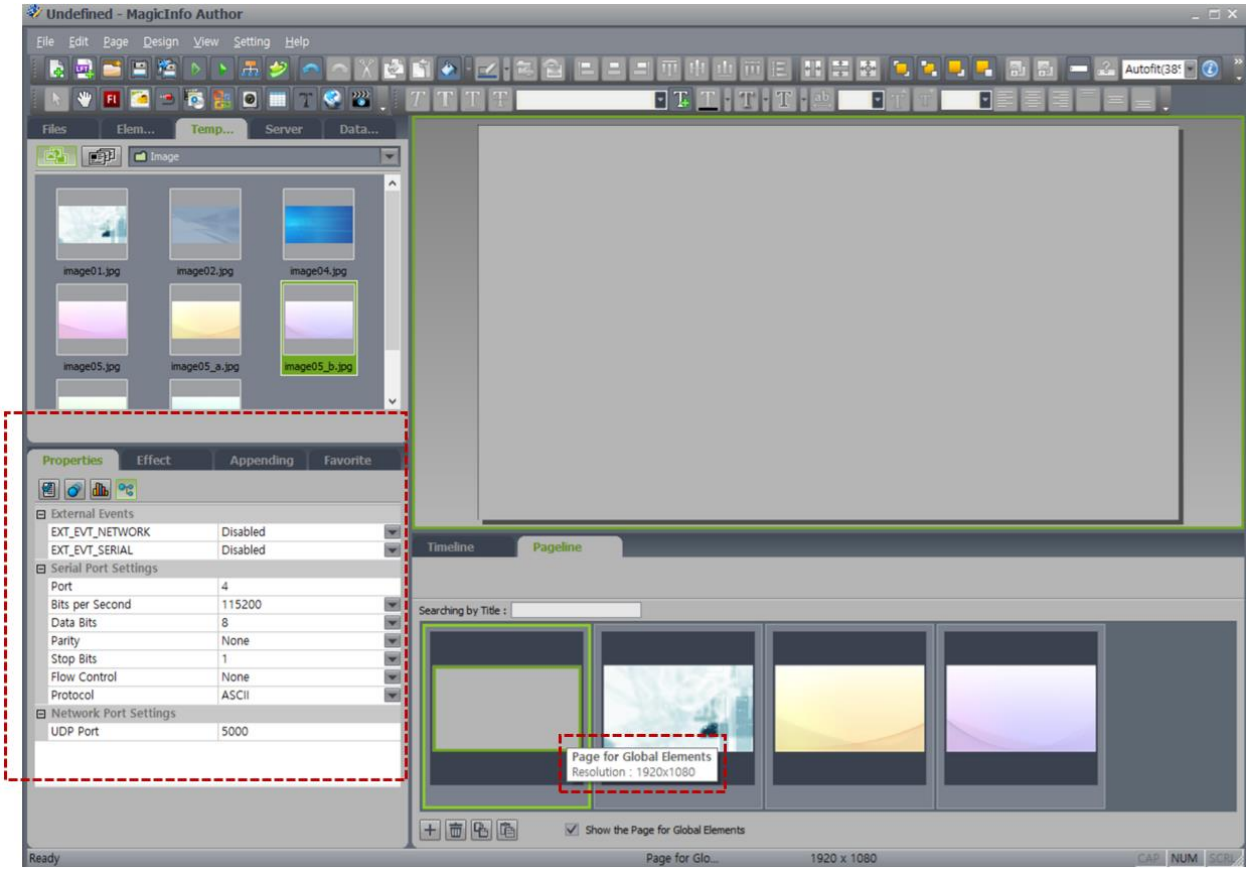
2.1. Define Trigger Event using MagicINFO Premium Author

- Launch MagicINFO Premium Author (higher than version 3.3 0901.0)
- File -> New Contents -> Create
- On the "Pageline" menu you can select or add the page.
- On the properties tab there is a button for external event.



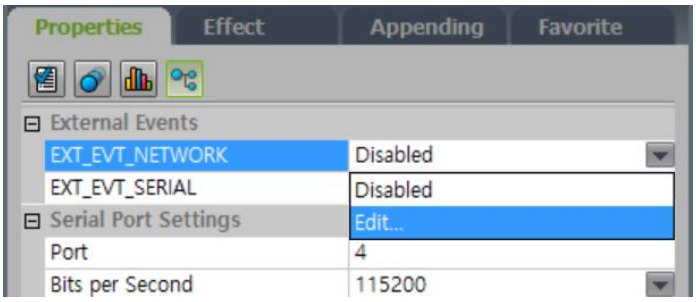
2.1.1. Serial and Network Settings

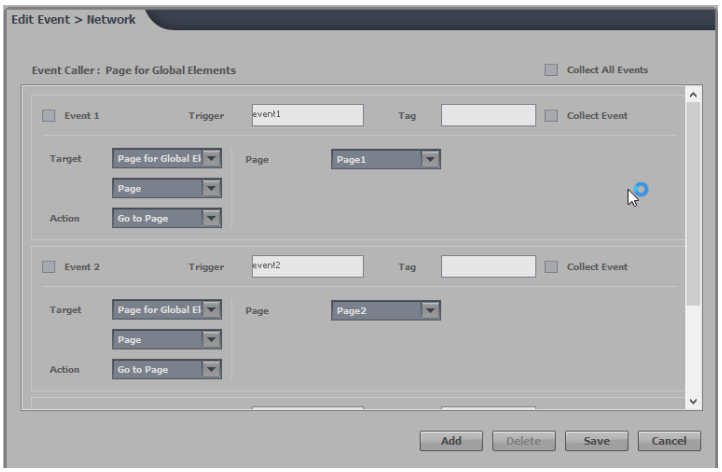
- Check Serial and Network settings
- Add some pages and contents on each page.
- Select "Page for Global Elements" page.
- If you add a trigger event on the global page, the event can be received whatever the current page is.
- If you add a trigger event on the specific page, the event can be received during the specific page is displayed.

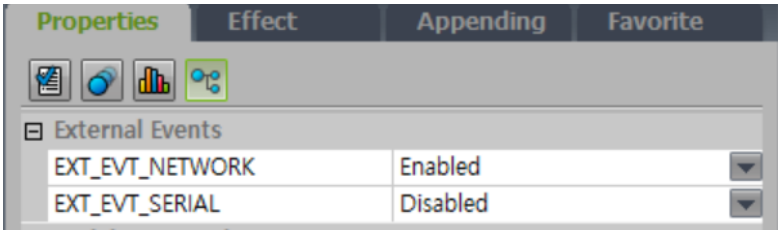


2.1.2. Add external events

- Network or Serial External event can be added by selecting Edit menu
- You can put event command string in the Trigger edit box
- These event string should be come from Network or Serial when you test it on the MagicINFO I Player
- After adding event string select save button
- Check the external event changed to Enabled state



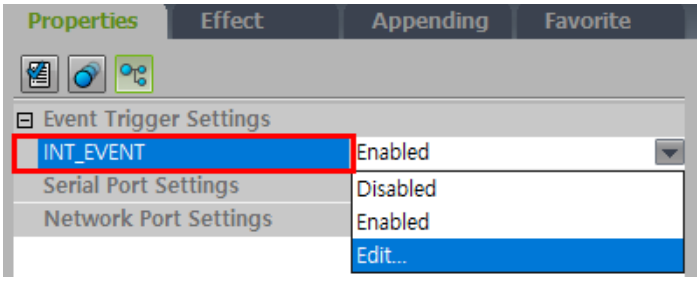




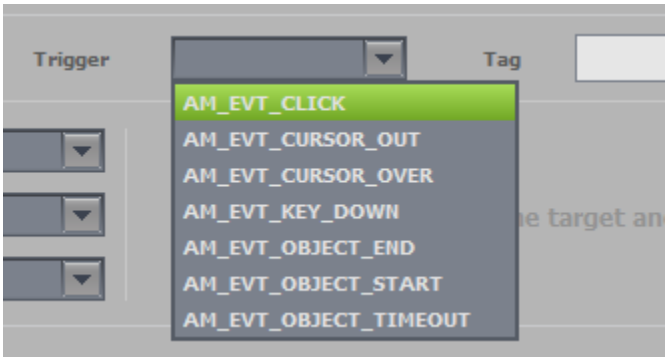
2.1.3. Add internal events

2.1.3.1. Touch Event

Touch events can occur when touching elements within an LFD content
To configure a touch event, select the element, select Event Trigger Settings in the Properties tab, and select Edit in INT_EVENT.



Select AM_EVT_CLICK from Internal Event Trigger list.



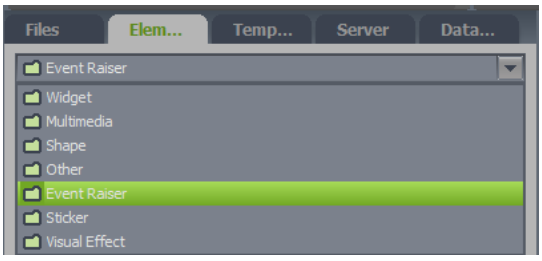
AM_EVT_CURSOR_OUT occurs when the mouse cursor is out of the element and AM_EVT_CURSOR_OVER occurs when the mouse cursor is over the element. AM_EVT_KEY_DOWN will occur when any key is pressed.

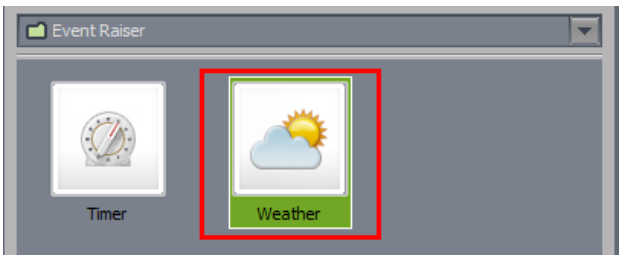
AM_OBJECT_START occurs when the part's Time Line starts, and AM_EVT_OBJECT_END occurs at the end of the element's Time Line. Adjusting the Time Line of a specific element allows you to control the elements in the content at any time.

AM_OBJECT_TIMEOUT can be shown periodically on the Time Line when the Duration Policy of the element is set to Loop. This enables the implementation of Timer functions that can generate events at regular intervals. The details are explained later in this chapter.

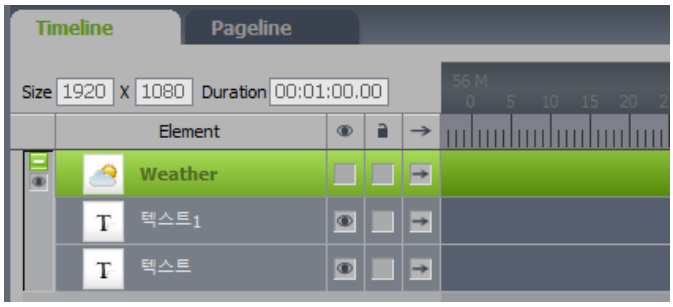
2.1.3.2. **Weather Event Element**

Weather event elements generate weather events (Sunny, Cloudy, Rainy, and Snowy) depending on the current weather.

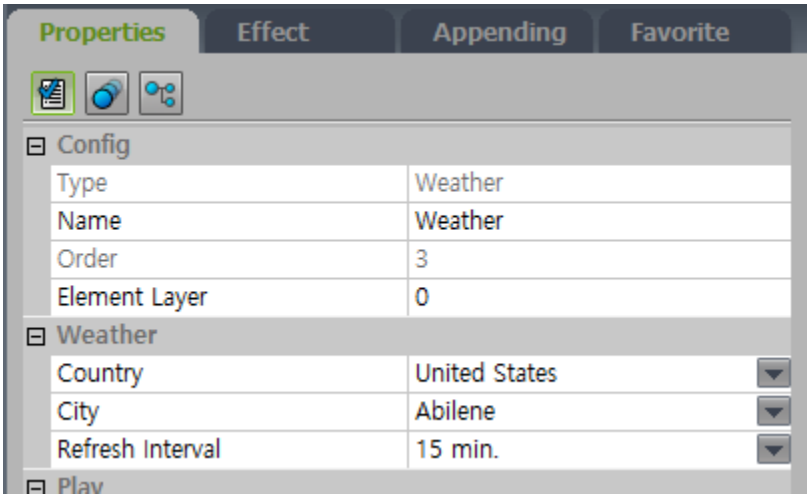




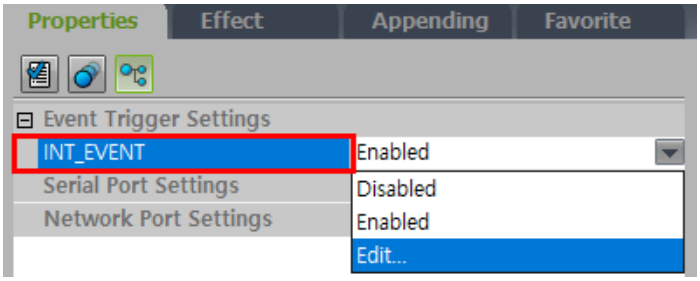
Note that weather event elements are not visible on the page but can only be selected on Timeline.



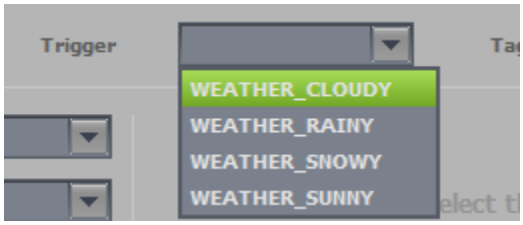
Selecting the Weather Event component and the Property tab allows you to select the country and city of the Weather Element and the frequency with which it receives events.



Select the Weather Event element, select Event Trigger Settings in the Properties tab, and select Edit in INT_EVENT.

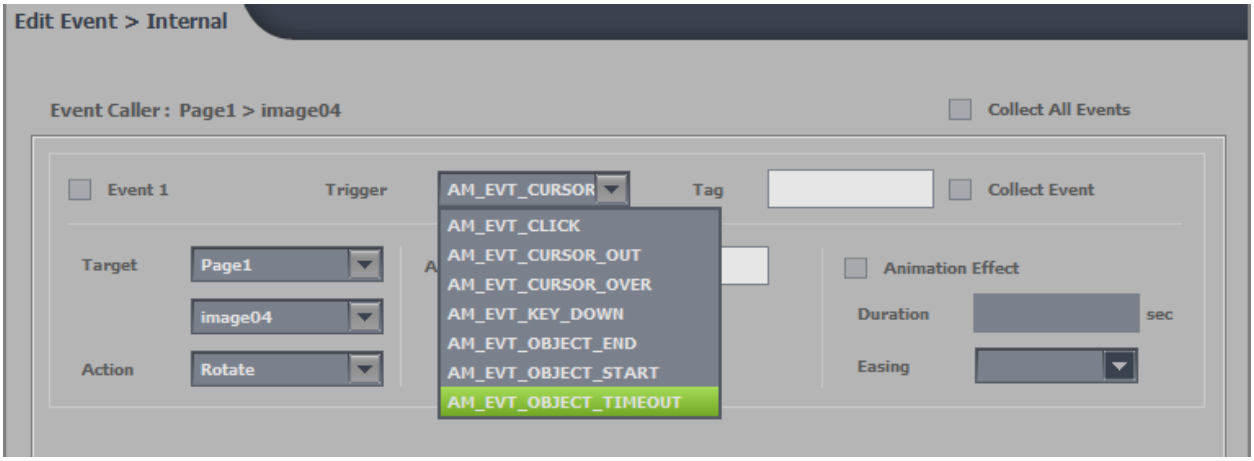


When you add an event in the Edit Event window, you can see a list of weather events provided by the Weather Event element. (Sunny, cloudy, snow, rain)



2.1.3.3. **Implementing the Timer**

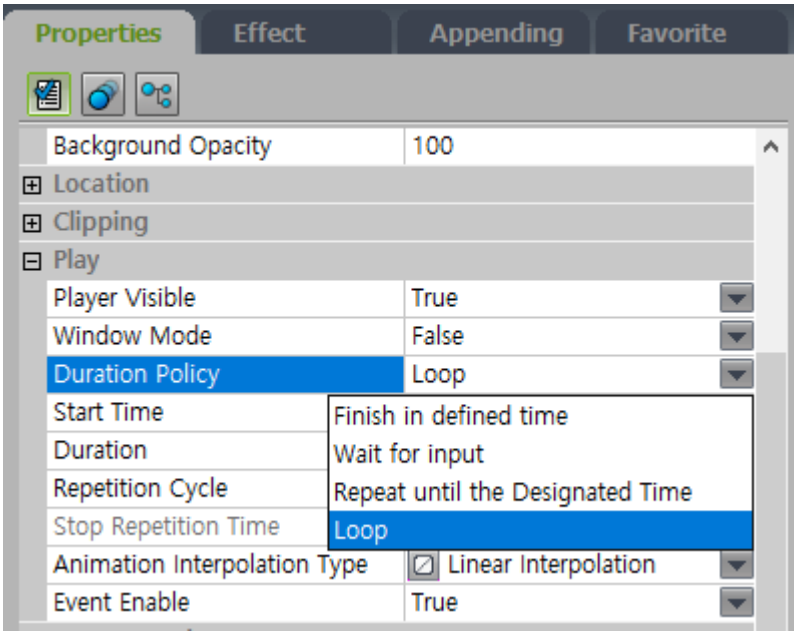
AM_EVT_OBJECT_TIMEOUT can be generated periodically and can be used as a Timer function.



The following steps are required for AM_EVT_OBJECT_TIMEOUT to occur periodically.

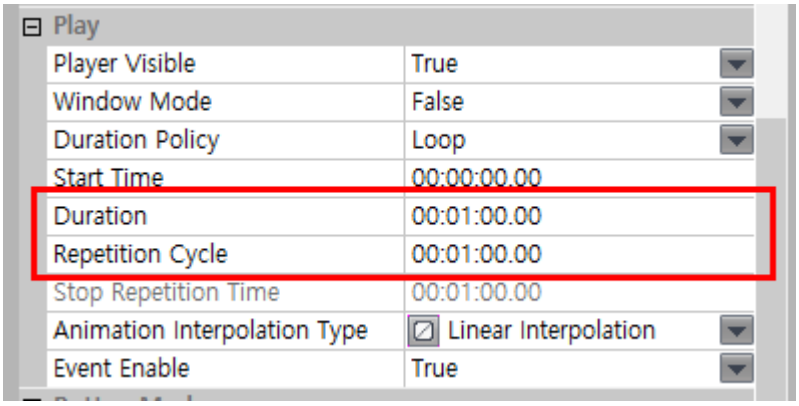
1. Set the Duration Policy to Loop.

   If not set to Loop, AM_EVT_OBJECT_TIMEOUT will occur only once at the end of the play time.

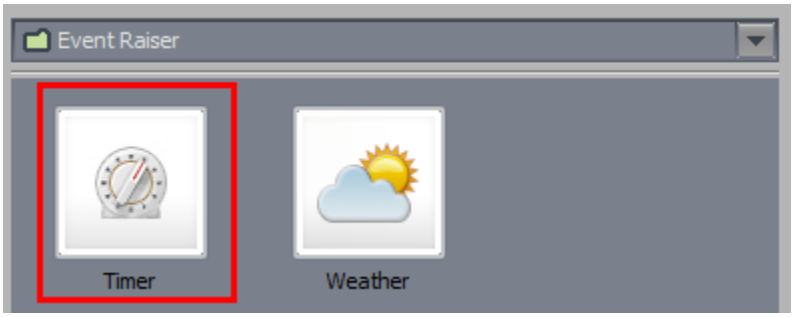


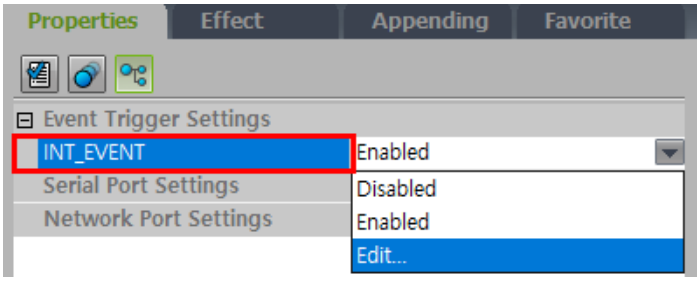
2. Set the Duration and Repetition Cycle to the desired time.

At the end of Duration, AM_EVT_OBJECT_TIMEOUT is called and repeat the next replay after the Repetition Cycle. If the Duration value is smaller than the Repetition Cycle, the element disappears after the Duration and reappears after the Repetition Cycle. If the Duration value and the Repetition Cycle value are the same, the element is shown continuously and does not disappear.



Note that the Timer element in Event Raiser type was provided for the use of the event with VB Script, and is not used in Event Trigger.

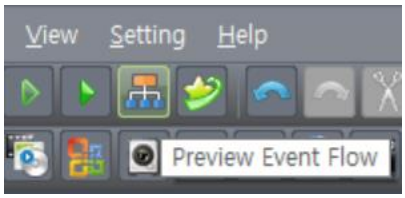


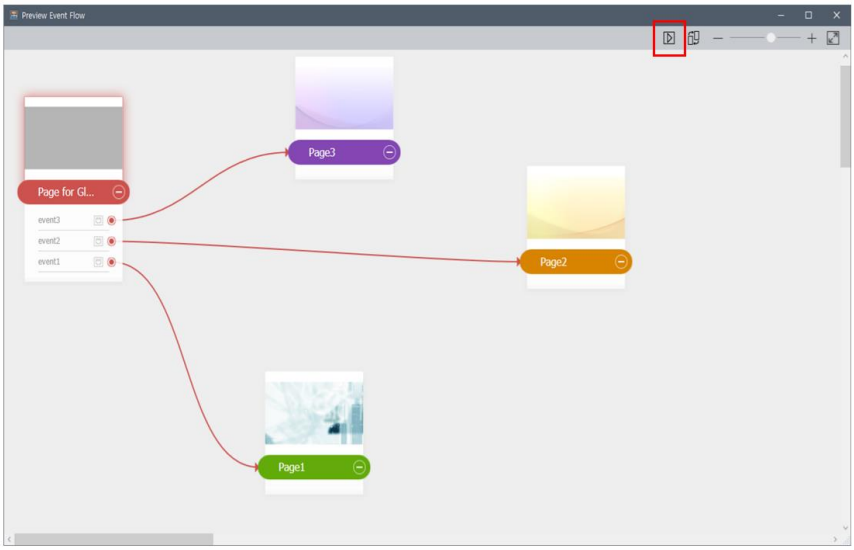


2.1.4. Preview Event Flow

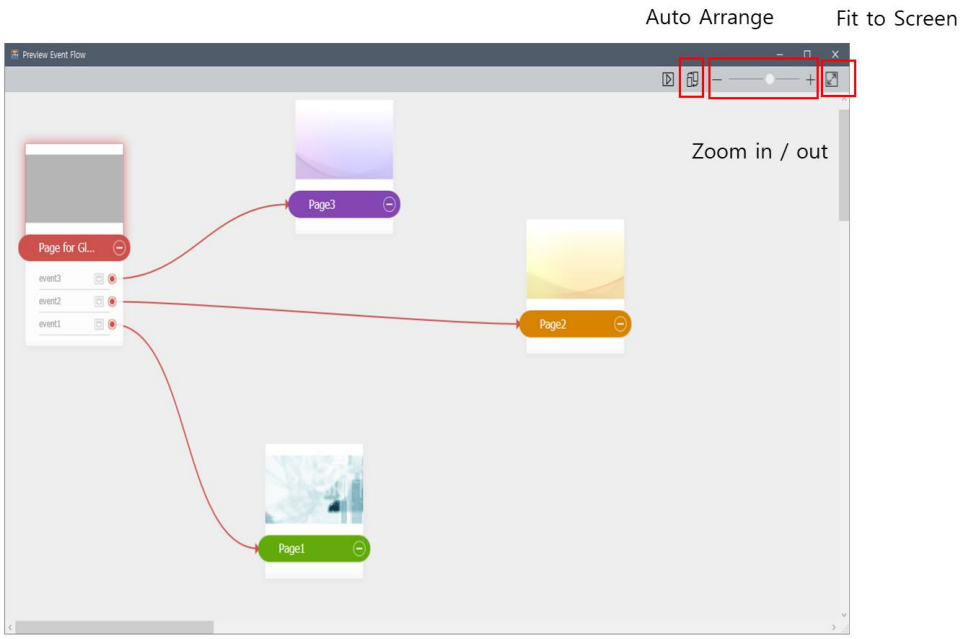
- It is hard to remember which event occurs on which page and move to the which page

- You can see the whole event flow by select "Preview Event Flow" button
- "Preview Event flow" shows the each page thumbnail that have event flow.
- You can test each event is working with I Player Preview. Select "Preview" button. (GUI button is not updated yet)





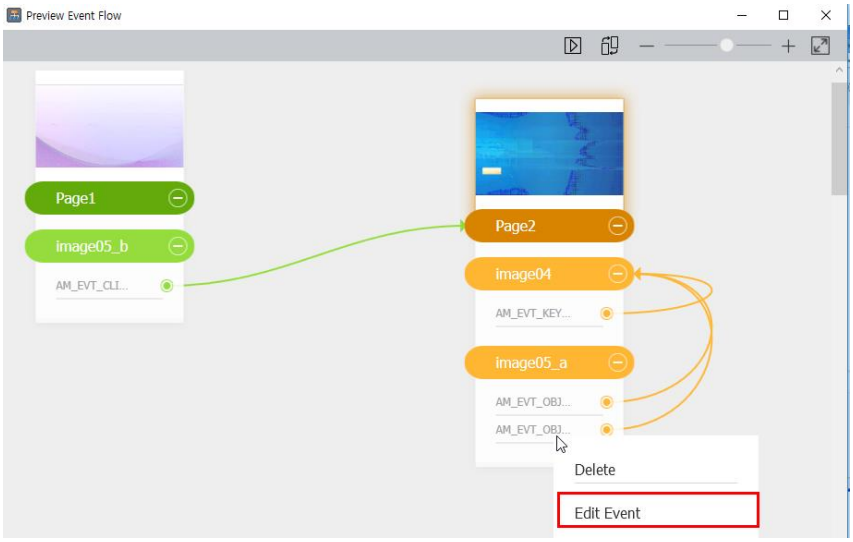
- You can add some events on each page and preview event flow
- Adjust position of thumbnails and screen size by dragging thumbnails and using Auto arrange, zoom in / out, fit to Screen menus.
- Quit preview event flow before go back to the MagicINFO Premium Author



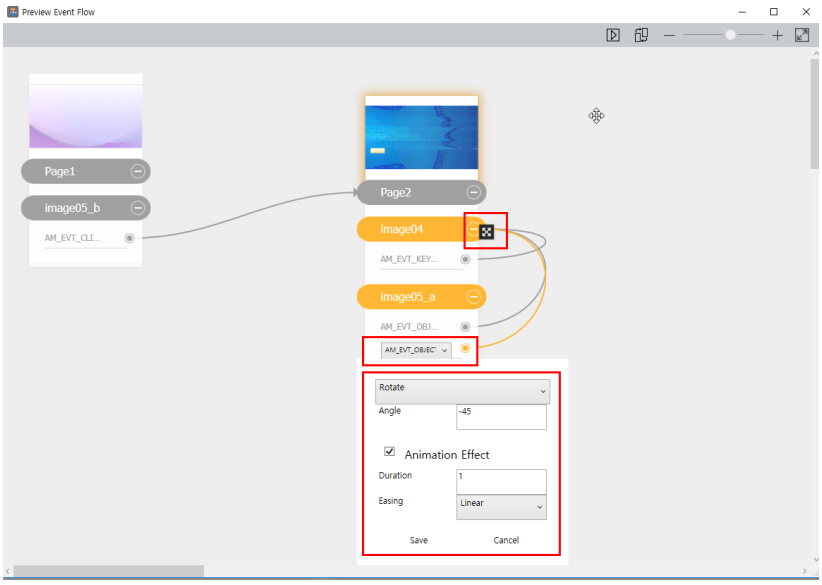
2.1.4.1. **Edit Preview Event Flow**

Hovering the mouse cursor over the desired event item will highlight the event and show what action the event performs. Clicking the event item performs the action in the Player Preview status.

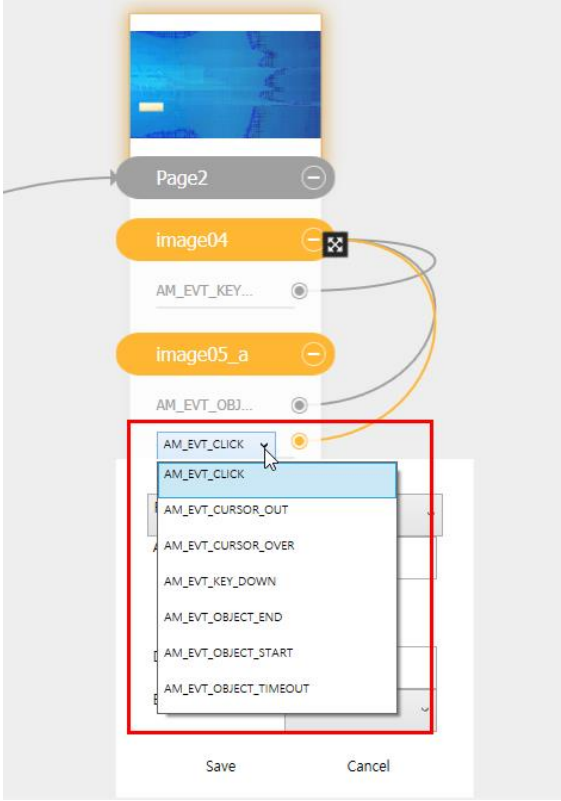
If you want to edit an event item, select the event item and right-click to select the Edit Event function from the Context Menu.



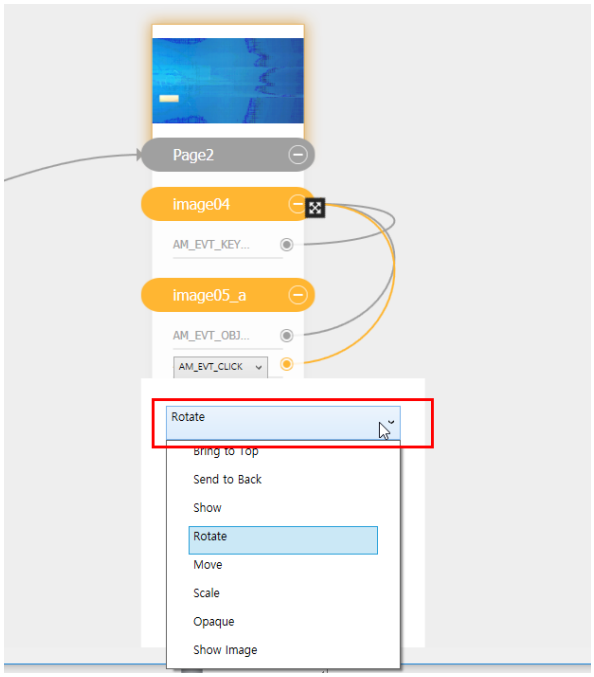
In Edit mode, you can change the Event Type, Target, Action and Action Parameters, and Animation settings.



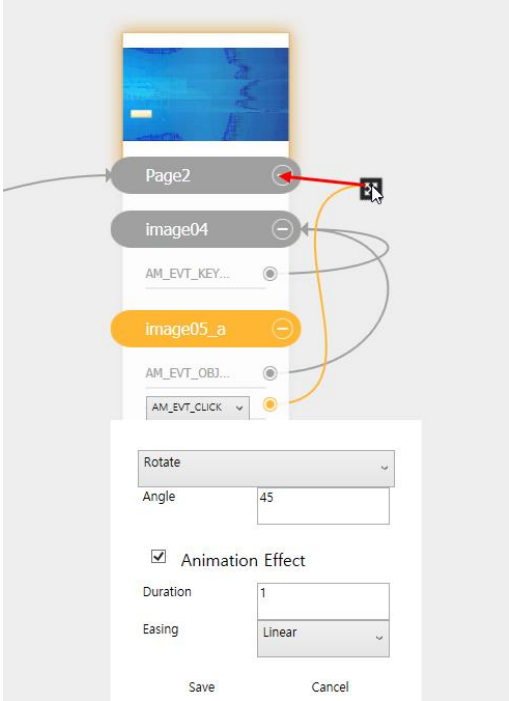
If you want to change the Event Trigger type, select the one from the event trigger list.



If you want to change the Action, select the one from the action list.



Targets can be changed by dragging the end of the connected arrow and taking it to another element of your choice.

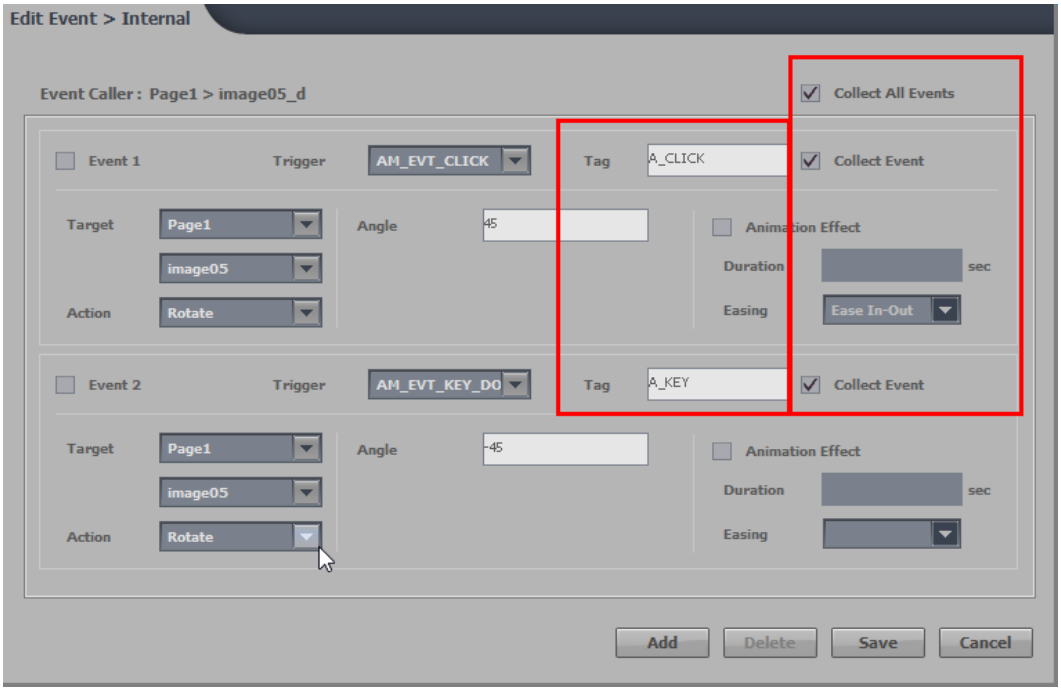


When you exit Event Flow after editing, a pop-up window is displayed asking if you want to reflect the changes.

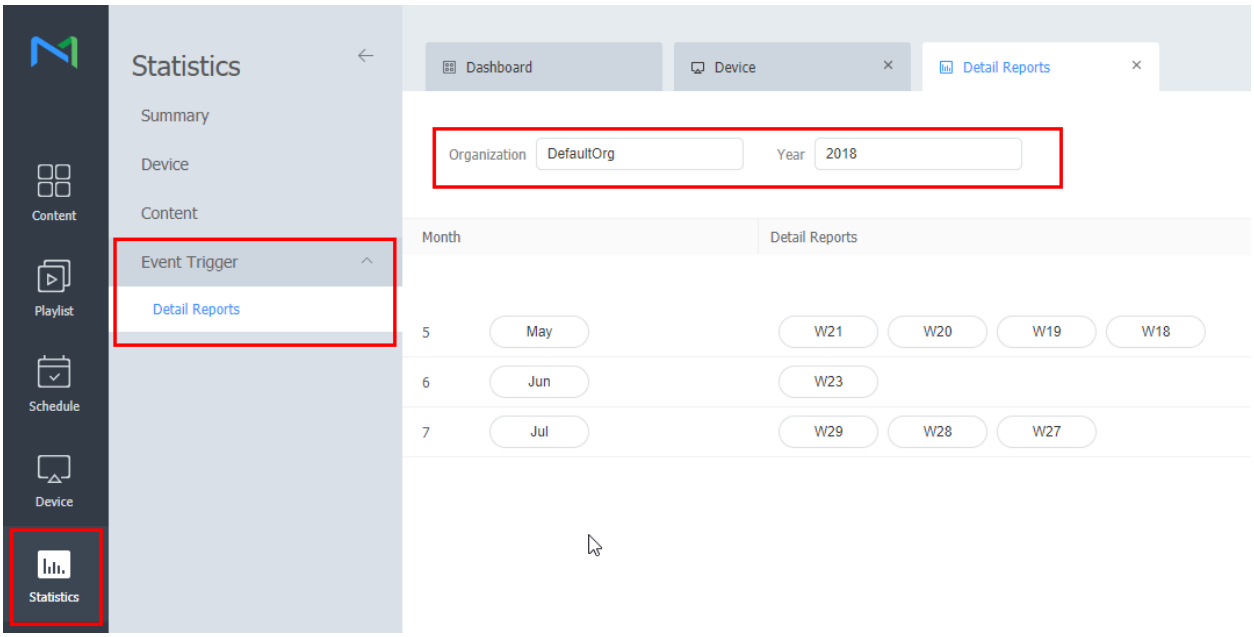
2.2. Event Statistics

When you edit an event, select the Collect Event checkbox to log the event.
The log format is as follows.

EventTime	DeviceID	ContentID	ContentName	TriggerName	TAG



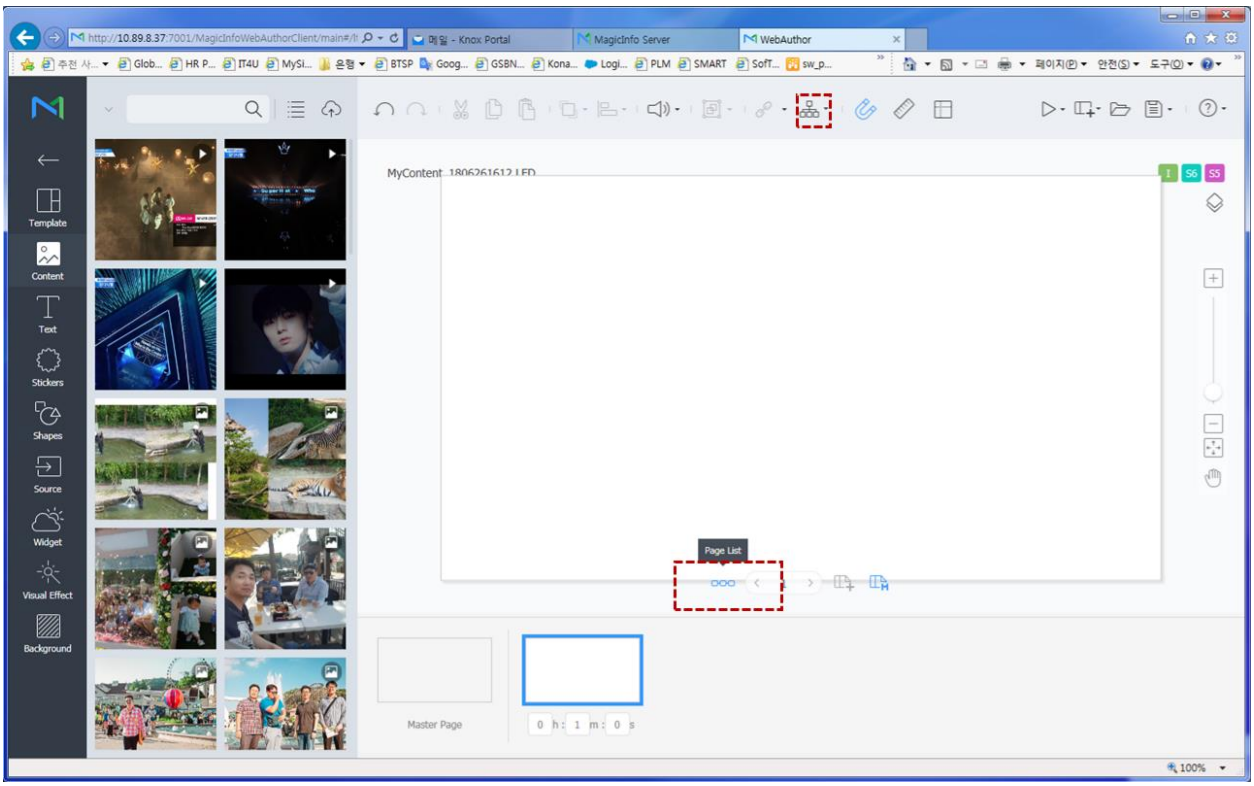
These logs are sent to the server on a daily basis, allowing the server to download event logs on a per-device and content basis.



You can select Statistics > Event Trigger> Detail Reports from the Server menu and receive monthly and weekly event statistics data when you select Organization and Year.

2.3. Define Trigger Event using MagicINFO Web Author

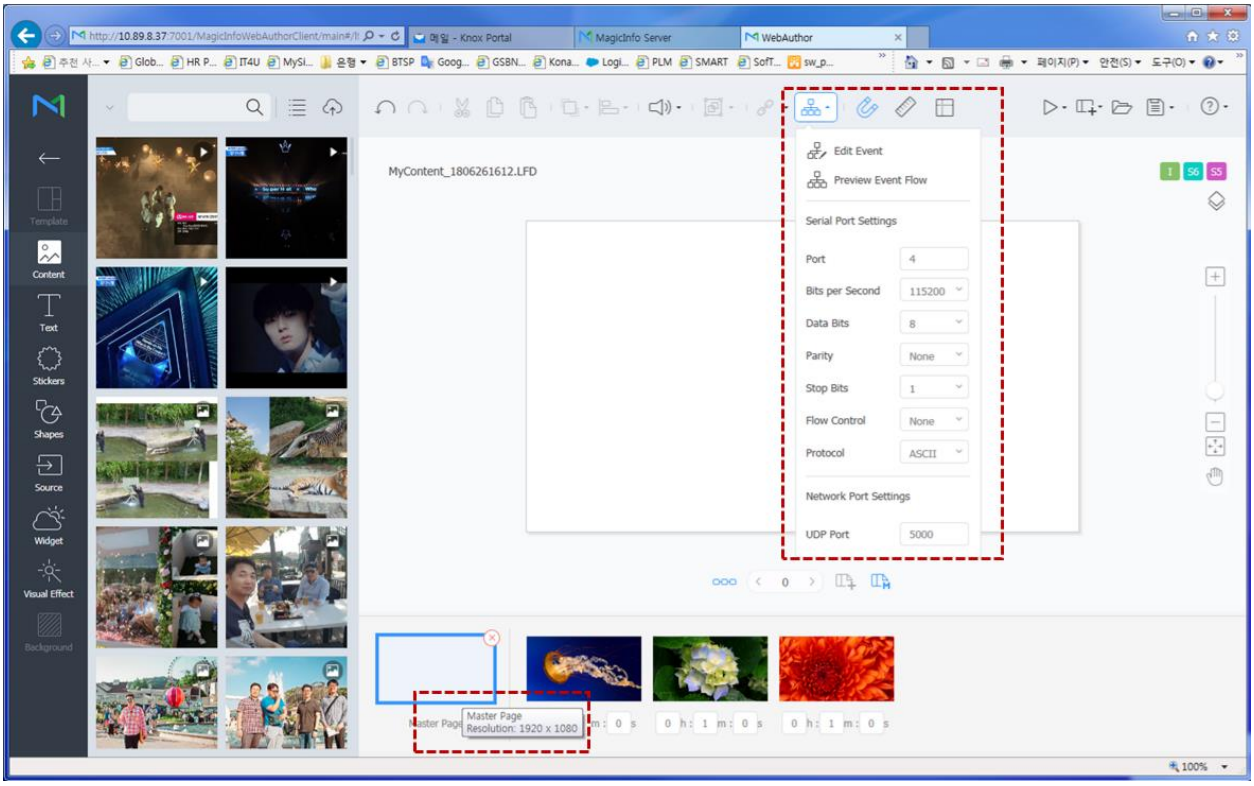
- Launch MagicINFO Web Author (higher than version 6000.0)
- Server Content -> Create Content
- On the Page List you can select or add the page.
- On the Toolbar menu there is a button for external event.



2.3.1. Check Serial and Network settings

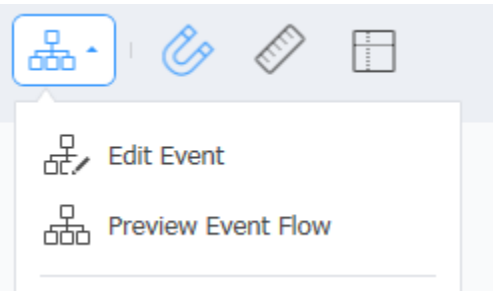
- Add some pages and contents on each page.
- Select "Master Page" page.
- If you add a trigger event on the Master page, the event can be received whatever the current page is.

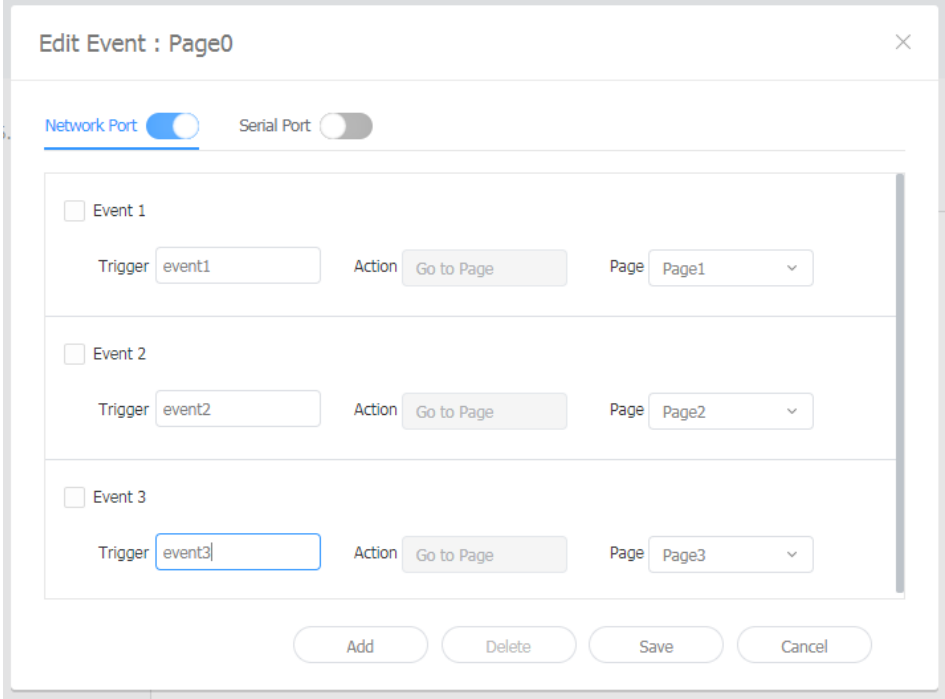
- If you add a trigger event on the specific page, the event can be received during the specific page is displayed.



2.3.2. Add External Event

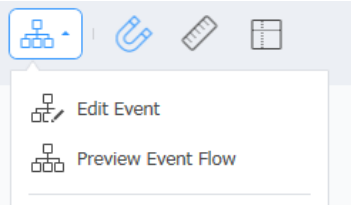
- Network or Serial External event can be added by selecting Edit Event
- You can put event command string in the Trigger edit box
- These event string should be come from Network or Serial when you test it on the MagicINFO I Player
- After adding event string select save button
- If you select edit again you can change or add or delete event trigger

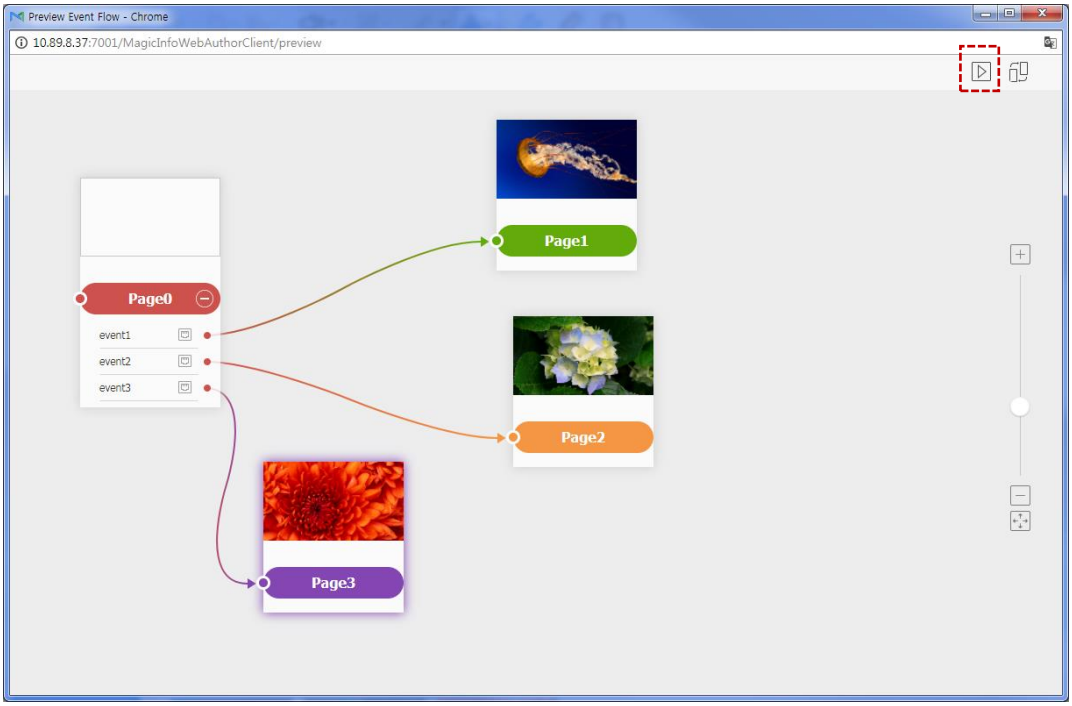

Edit Event
Preview Event Flow


Edit Event : Page0
Network Port
Serial Port
Event 1
Trigger event1
Action Go to Page
Page Page1
Event 2
Trigger event2
Action Go to Page
Page Page2
Event 3
Trigger event3
Action Go to Page
Page Page3
Add
Delete
Save
Cancel

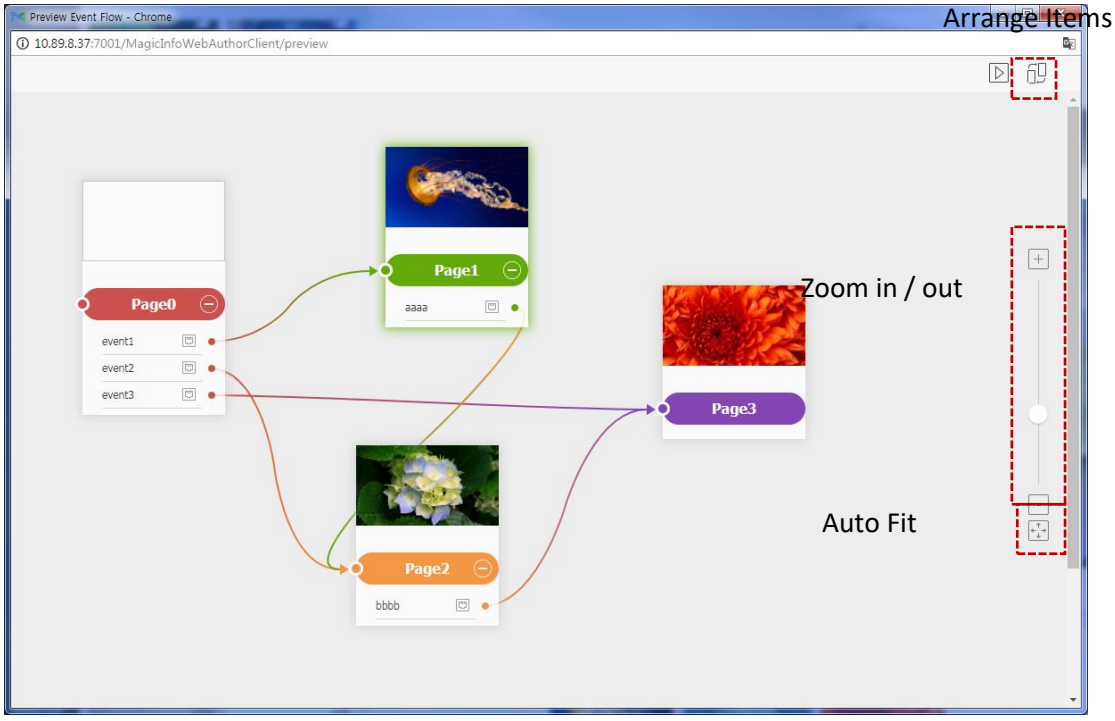
2.3.3. Preview Event Flow using MagicINFO Web Author

- It is hard to remember which event occurs on which page and move to the which page
- You can see the whole event flow by select "Preview Event Flow" button
- "Preview Event flow" shows the each page thumbnail that have event flow.
- You can test each event is working with Web Author Preview. Select "Preview" button.





- You can add some events on each page and preview event flow
- Adjust position of thumbnails and screen size by dragging thumbnails and using Arrange Items, zoom in / out, Auto Fit to Screen menus.
- Quit preview event flow before go back to the MagicINFO Web Author



3. Setup MagicINFO I Player for Event Trigger

Event Trigger functionality is enabled by default in I Player 6.0 and later.

3.1. Enable Event Debug Window

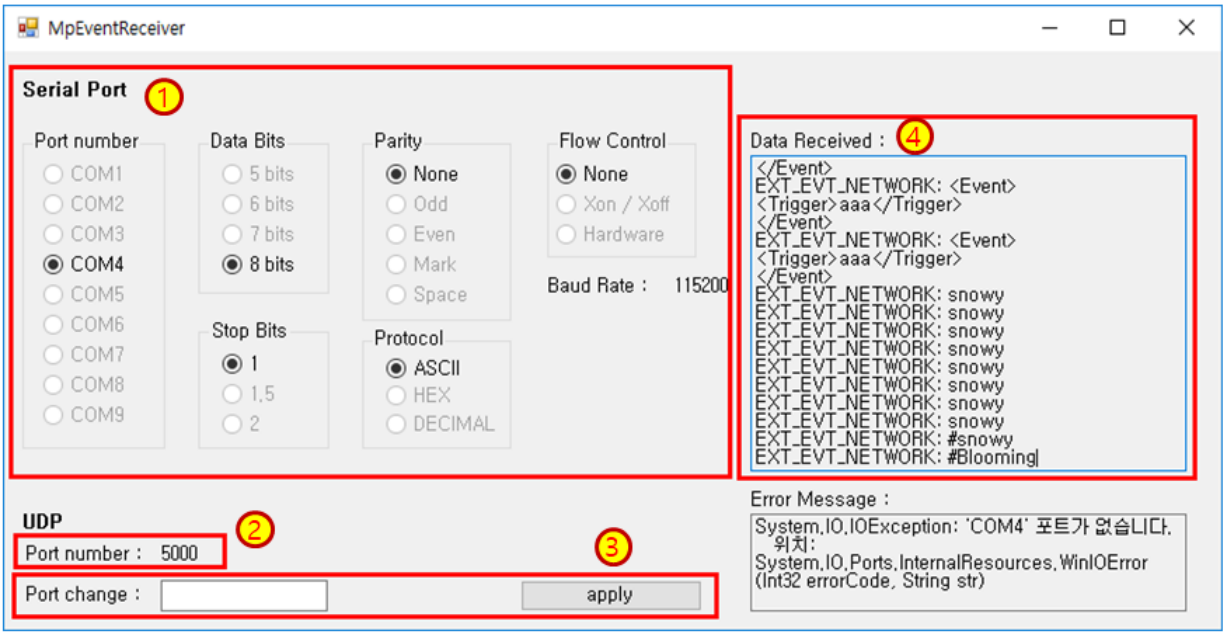
If you want to verify that you have received the external event correctly, add the following values in Configuration.ini file. Then you will see a debugging window of Event Receiver.

```
[EventReceiver]
 BoolDebugWindow=1
```

This file exists in the MagicINFO folder. (D:/MagicINFO/Config/Configuration.ini)
Restart the system after changing the file.

3.2. Check Event Trigger String

- While I Player running, MpEventReceiver will get the configurations for Serial and UDP port from current playing LFD file.
- If you send external trigger using Serial or UDP, it will show External event string.
- You can check event string data in "Data Received :" window



1. Serial port settings from current playing LFD file

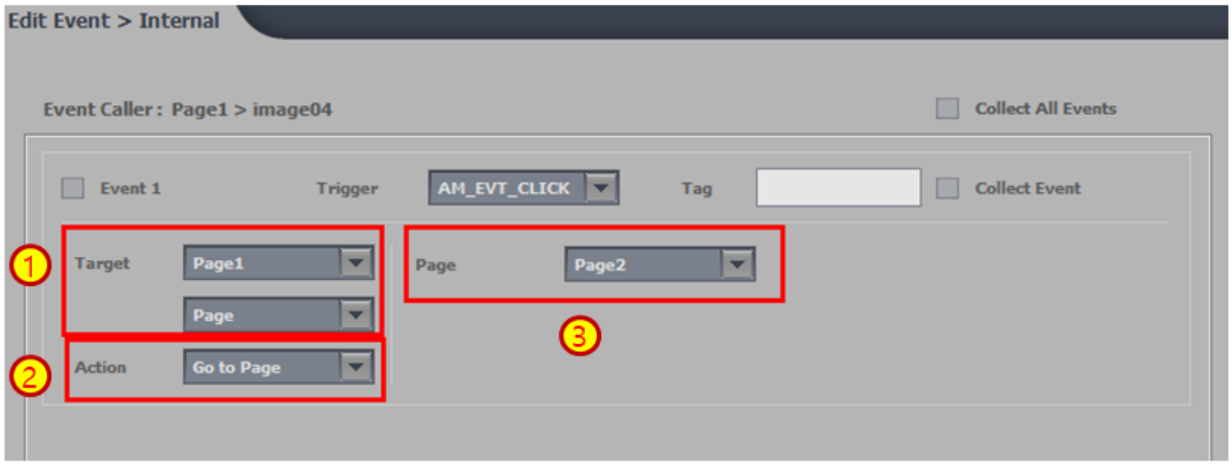
2. UDP port number from current playing LFD file
3. You can change UDP port number for testing
4. External event data from serial port or UDP can be seen here

4. Target Element Actions

Target Element means the target element that performs a specific action when an event occurs. Depending on the target element, you can select the actions that the element has.

4.1. Page

To use a Page as a Target Element, only the Page that contains the element receiving the Event Trigger can be used as a Target. Other pages cannot be selected as Target.



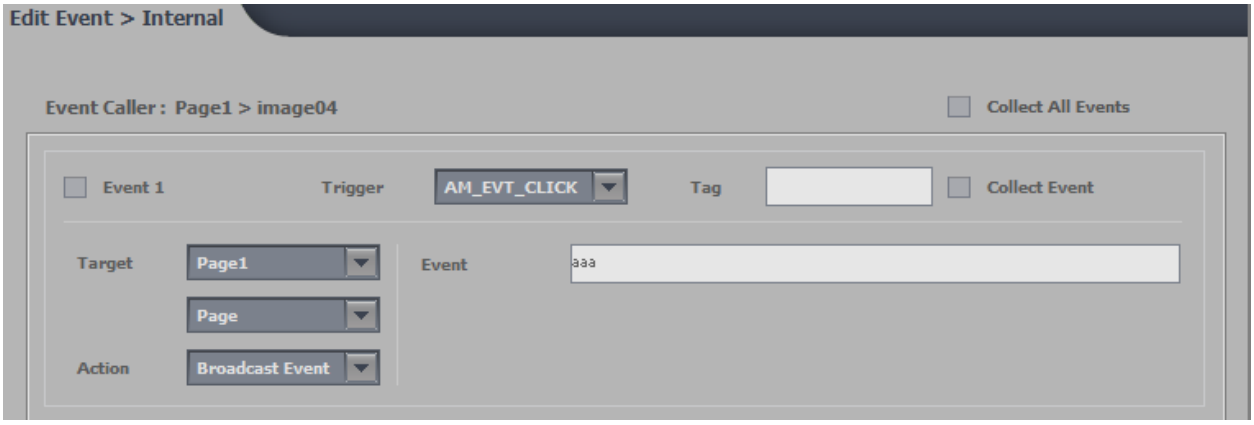
1. Specify the target page, page, and select the bottom element selection page. Note that if you do not specify the current page, nothing appears in the bottom element selection.
2. Select Action.
3. Select Parameter.

4.1.1. Move Page

To use the Page Move function, select the current Page as Target, select the "Go to Page" Action, and select the Page to move as the parameter.

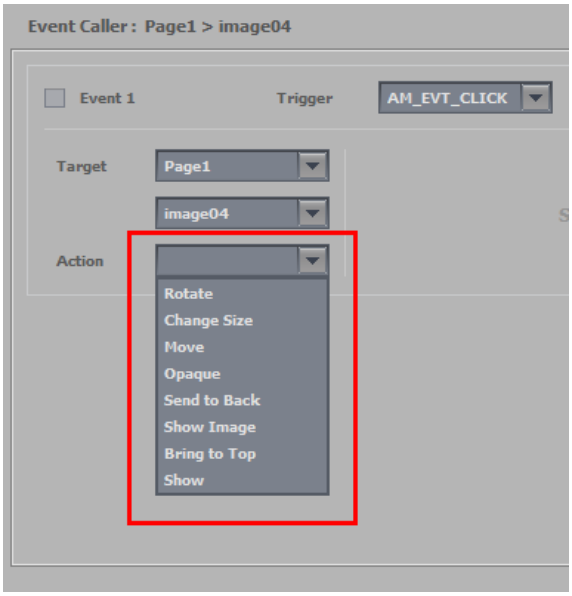
4.1.2. Broadcast Event

This function generates network events using UDP Broadcast. Select the current page as Target, select "Broadcast Event" as an action, and enter the event string you want to send as parameter.



4.2. Elements Action

This section describes the actions that are common to each element.
When configuring an event, you can control the element by selecting the desired Target Element and then selecting Action. The figure below shows a list of possible actions when an image is clicked and selected as Target Element.



4.2.1. Rotate / Change Size / Move

Most elements provide these actions. Rotate is not supported when window mode is set.
When rotate action is selected, it will rotate by the specified parameter value (Angle). If you continue to call Rotation, it will continue to rotate by the specified Angle.

Select Change Size and specify the scale value with the parameter. For example, if you specify 0.1, it becomes 0.1 times smaller. When called again, it will be further smaller or larger in its current size, similar to Rotate.

When selecting Move, specify the target positions X and Y values to move to the parameter. It will move from the current position to the target position. Even if Move is called again and the target is the same, it will no longer move because the target position has been already reached.

4.2.2. Opaque / Show

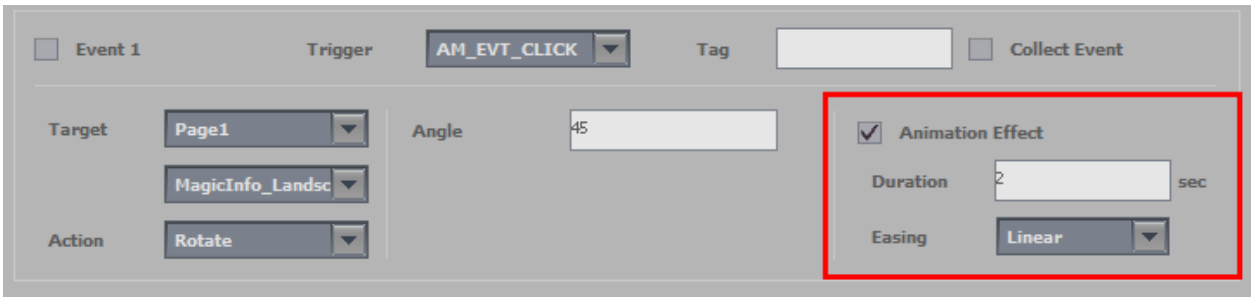
Opaque can control transparency. Supports 0 to 100% values as parameters. Only Image and Video elements support this action.
Show can make the element show or invisible. This action is applied to most elements.

4.2.3. Send to Back / Bring to Top

These change the Z-Order value. 'Send to Back' sends the target element to the bottom order and 'Bring to Top' shows the target element at the top order.

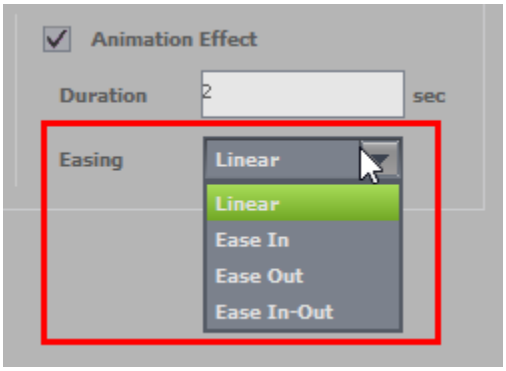
4.2.4. Animations of Actions

Animation of an action is possible if a parameter of the action is specified as a numerical value, such as Rotate / Change Size / Move / Opaque. The current value and target value are changed during Duration, showing the motion as Animation. The figure below shows the image rotating at 45 degrees for 2 seconds as an animation.



Selecting the Easing value allows you to specify the speed change of the animation and provides four changes as follows:

Linear – Constant Movement
Case In – Smooth at Start, Fast at End
Case Out – Quick at Start, Smooth at End
Case In-Out – Smooth at Start and End, Fast in middle

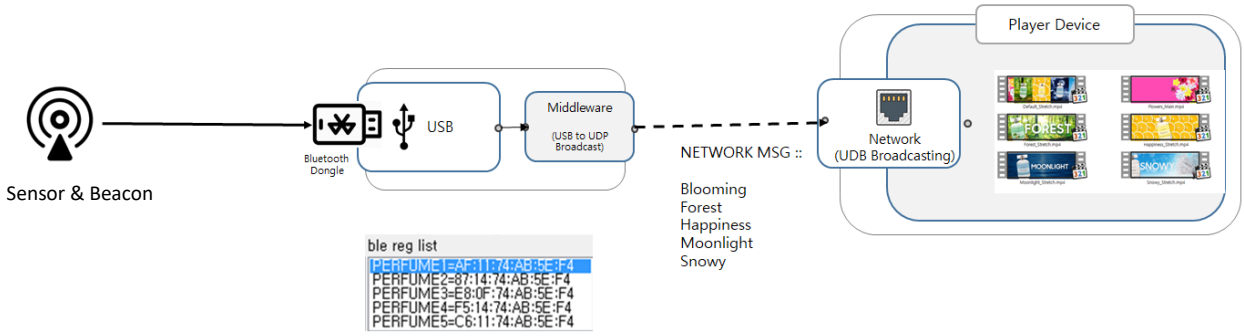


5. Event Trigger Use Cases

5.1. Example of Exhibition

Scenario where users can pick up a bottle of perfume and view its contents on the display.
- Sensor that combines acceleration sensor and Beacon is attached to a bottle of perfume.
- If a bottle is lifted, the acceleration sensor detects it and sends a beacon signal.
- The middleware checks the ID of the beacon and converts it into a mapped message and sends the network event.

What SI to do:
- Obtain beacon signals using Bluetooth Dongle
- Show specific content to that beacon signal
    1. Create a mapping table that converts the ID of the Beacon signal into a network message
    2. When a beacon signal is received, send the network event corresponding to that beacon signal.



A. Use Case add. (TBD)

6. About Samsung Electronics Co., Ltd.

Samsung Electronics Co., Ltd. is a global leader in technology, opening new possibilities for people everywhere. Through relentless innovation and discovery, we are transforming the worlds of televisions, smartphones, personal computers, printers, cameras, home appliances, LTE systems, medical devices, semiconductors and LED solutions. We employ 236,000 people across 79 countries with annual sales exceeding KRW 201 trillion. To discover more, please visit www.samsung.com

Samsung Electronics Co., Ltd.
416, Maetan 3-dong, Yeongtong-gu
Suwon-si, Gyeonggi-do 443-772, Korea