

Proposal for Fernbank Science Center



Proposal by:
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Why choose Magic Wall?

Magic Wall is an interactive video wall designed specifically for museums to provide visitors with a unique and immersive digital exhibition experience. Back&Rosta has been continuously developing the patented Magic Wall software since 2012, and it is now used by over 450 museums worldwide. The software is highly flexible, allowing us to adapt it to the needs of each museum and create unique, customized Magic Wall installations.

The Magic Wall's operation is uniquely stable, thanks to the patented Magic Wall software, which has been used with satisfaction in hundreds of museums for years, and to the high capacity hardware. The stability of the system is particularly important in a museum environment, where up to dozens of visitors use the Magic Wall at the same time, seven days a week.

Our partner museums can take advantage of becoming Magic Wall owners, providing them with the opportunity to contribute to the ongoing development of the software. Magic Wall is constantly improving, and our partners can always benefit from the latest version, which is regularly updated with new functionality. In addition to being a spectacular exhibit technology, Magic Wall is also an excellent educational tool for museums, with a range of features designed to assist museum educators.

The Magic Wall is highly stable, and we offer 24/7 remote monitoring to address any issues that arise during its operation immediately. In the rare event that on-site repairs become necessary, our local partners can quickly resolve these on-site, providing a level of service tailored to the museum's specific needs.

Magic Wall's hardware system comes with 36 months of warranty, and our software is kept up-to-date via an annual maintenance and operation subscription. Our servers have state-of-the-art information security protection, ensuring operational security, and the cloud-based service combined with local servers provides strong protection against data loss. Our company is also covered by liability insurance for both the construction and the operation of Magic Walls.

The Magic Wall software includes a user-friendly content management system that allows museum staff to easily add and manage new exhibition elements without any IT skills required. The museum can upload its database



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into the Magic Wall's repository, and exhibits can be retrieved any time, making it an excellent tool for short-term temporary exhibitions as well.

Perhaps the most significant advantage of Magic Wall over its competitors is our continuous innovation, developed in collaboration with our partner museums using Magic Wall. The software can be customized to any size, with our largest wall currently being 26 meters long. An unlimited number of users can engage with the wall simultaneously, constrained only by available space, whether rotating 3D objects or watching videos while receiving information in different languages. Magic Wall software also allows visitors to provide feedback to the museum to help us better understand visitor preferences.

Our partners do not only receive a product with the Magic Wall, but a comprehensive service package. Our colleagues work closely with museum professionals to develop the exhibition concept on the Magic Wall. Together, they design the features, adapt the Magic Wall to the museum's visual identity, and help with the uploading of materials, if necessary. The design elements of the Magic Wall can be flexibly adapted to the museum's needs, including the exterior cladding and the exhibition display. With the most extensive experience in interactive video walls for museums on the market, we can provide the museum with best international practice in this field.

ABOUT BACK&ROSTA

Back & Rosta is a market leader in building giant, multiuser touch-screen “Magic Walls” that exhibit any content using beautiful, dynamic and eye-catching special effects and can be used interactively by huge crowds at the same time. The company was established in 2001 with its headquarters in Budapest, Hungary, and in 2008 founded a research and development center in Shanghai, in order to popularize innovative new technologies and applications to fast-growing Asian markets. In 2023 we established our Austrian subsidiary (Back&Rosta GmbH) in Vienna, while in 2024 we established the Back&Rosta LLC in the United States of America, in Wyoming.



Contents

<i>Why choose Magic Wall?</i>	1
<i>ABOUT BACK&ROSTA</i>	2
<i>FEATURES OF MAGIC WALL SOFTWARE</i>	5
DESIGN CONCEPT	5
Large motion scenes	5
Technical highlights	5
Examples of Large Motion Scenes:	6
<i>Album System</i>	10
Album User Interface Example	10
<i>The album views consist of many different features:</i>	12
(1) Exhibit Information Card	12
(2) Labels and exhibit details	12
(3) 3D model interaction	13
(4) Exhibit Search	13
(5) Ranking of Likes	14
(6) Real-time guidance system	14
Multiuser interactive system.....	15
<i>Games</i>	15
(1) Giant puzzle	15
(2) Knowledge quiz.....	16
(3) Memory Matching Game.....	16
(4) Large jigsaw puzzle	17
<i>Other commonly used features of the Magic Wall</i>	17
(1) Full screen posters/interactive posters.....	17
(2) Vertical cut posters	18
(3) Timeline	18
(4) Interactive map.....	18
(5) Giga Pixel Zoom	19

(6) Virtual Museum	19
(7) Full screen video	19
(8) Sound	20
(9) QR-code	21
<i>Content Management System (CMS)</i>	21
User behaviour analysis system.....	22
<i>Magic Wall hardware.....</i>	22
System topology diagram for 55”	22
System configuration	23
Functional features:	24
86” touch display	26
Touch frame	27
Product Description:	27
Product features:	27
Technical parameters:.....	28
Multimedia system controller	28
<i>Maintenance and Operation Services:.....</i>	30
<i>Price Offer:</i>	31
<i>Timetable:.....</i>	31
<i>Project Case Studies</i>	32

FEATURES OF MAGIC WALL SOFTWARE

DESIGN CONCEPT

Magic Wall is a highly interactive exhibition installation enabling an unlimited number of users to interact with it concurrently without interfering with each other. Yet, when there are few or no users actively engaging with it, it also provides visually powerful and aesthetically pleasing special effects to entertain and attract visitors who are passing by. Therefore, the user interface can be grouped into two main modules: the Large motion scenes which are visible even when no users are interacting and the Album system, which is the personal interactive space where each user can engage with various features and applications interactively.

Large motion scenes

This module presents multimedia content such as text, images, videos, and 3D models to users with stunning visual effects through colourful artistic design, attracting them to explore and interact deeply.

Technical highlights

- ✓ Supports an aggregate of 48K+ ultra-high resolution, running at stable 60 frames-per-second
- ✓ The full screen area can present a huge number of items, with dynamic effects rendered in real time
- ✓ Supports multi-point, multi-gesture touch
- ✓ Supports remote monitoring and commissioning for fault analysis and operation and maintenance
- ✓ Development technology is protected by international patents and copyrights, and the underlying intellectual property is fully owned by Back & Rosta

Examples of Large Motion Scenes:







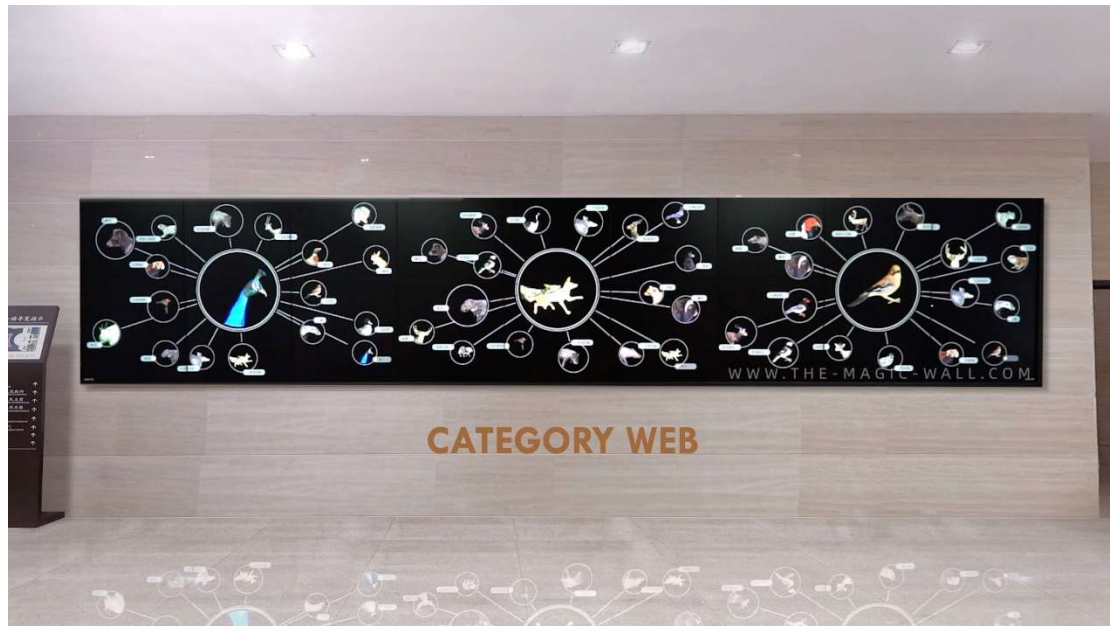
FULL-SCREEN ALBUM



INK AND PICTURE LMS



POSTERS SCENE



We offer more than 45 LMSs to our partners.

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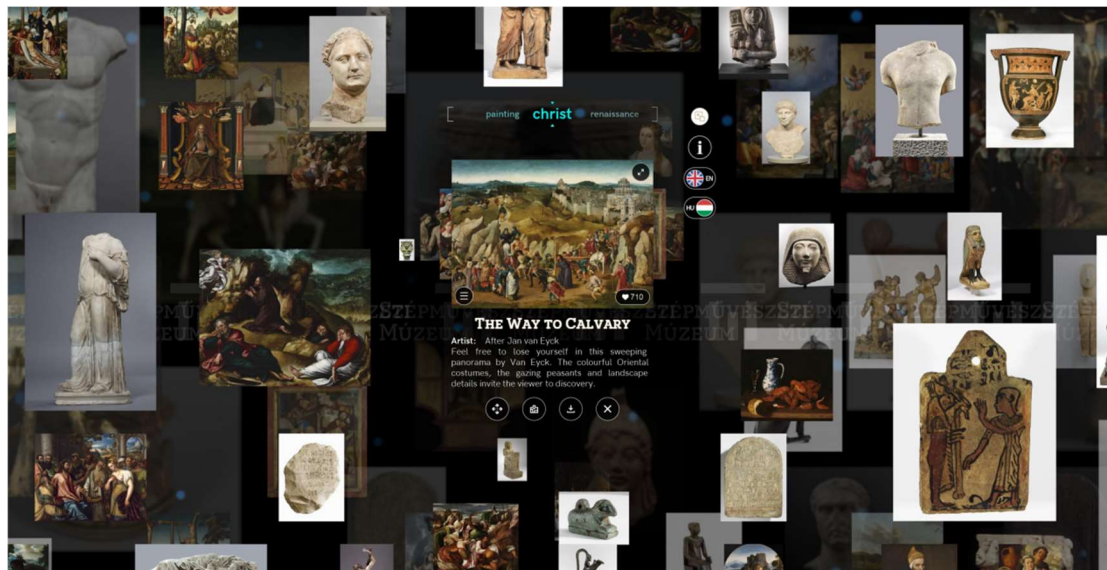
Album System

In addition to interacting with the various multimedia contents presented on the Magic Wall®, users who want to learn more about the full range of exhibits can also have a richer exploration experience in the Album system.

Album User Interface Example

We offer two types of album views to our customers.

The regular album view looks as below:



while Full-screen Album which is a premium version of the Photo Album feature and gives each user a much larger space to interact with content, to see images and other multimedia in a larger format.

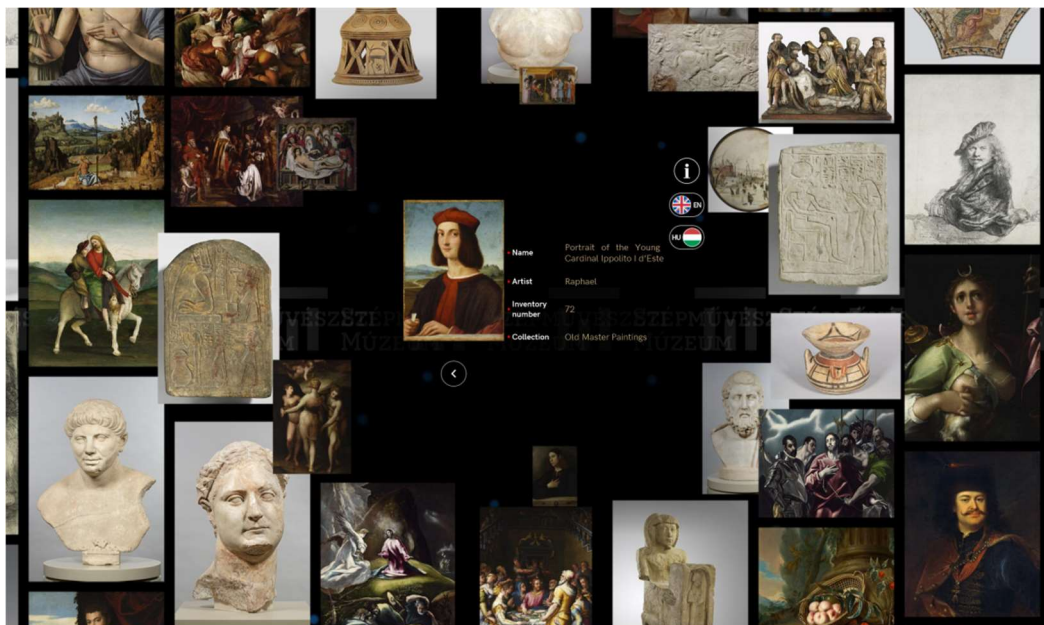
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The album views consist of many different features:

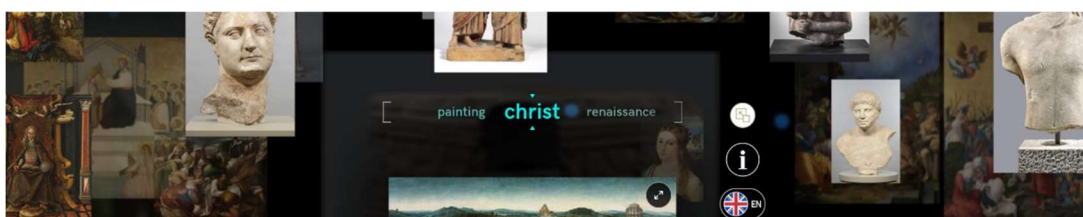
(1) Exhibit Information Card

Contains a basic display of information such as exhibit names, categories and pictures. Exhibit Detail page, with no limit on the number of words in the text. The information card and the supporting database fields can be customized to match the venue's own database format.



(2) Labels and exhibit details

Indexing is further enhanced by a high degree of freedom to customise exhibit labels according to the different attributes of the exhibit. The exhibit detail panel provides a deeper display of information. By labelling the exhibits can be categorized in different groups.



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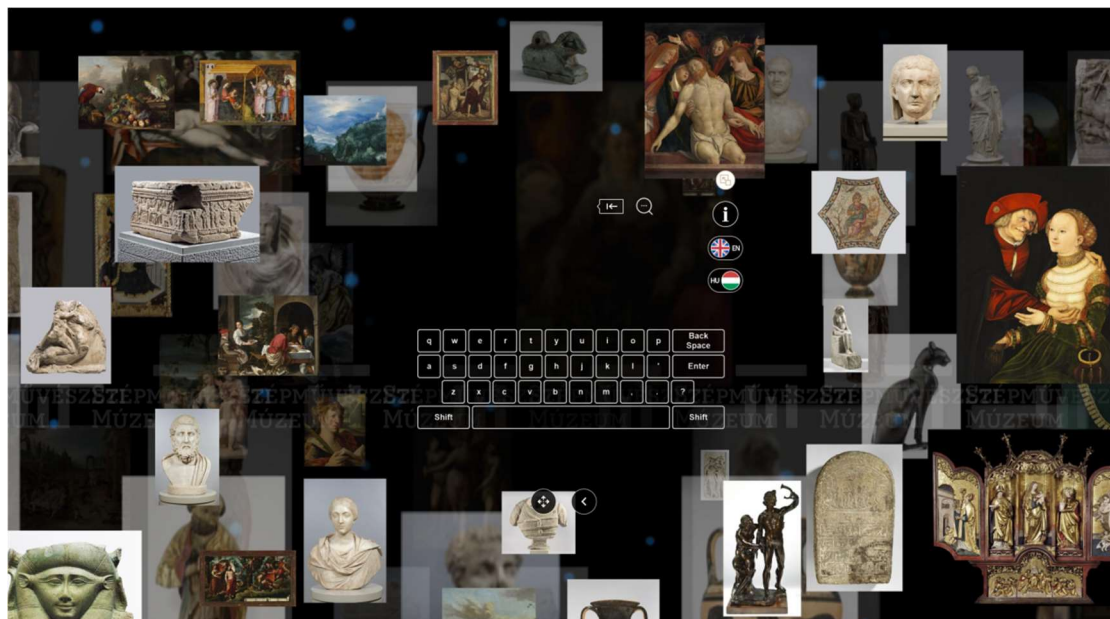
(3) 3D model interaction

Supports the display of 3D models and allows the user to scale and rotate them with a full 360 spherical degree coverage in the direction of rotation, as illustrated below:



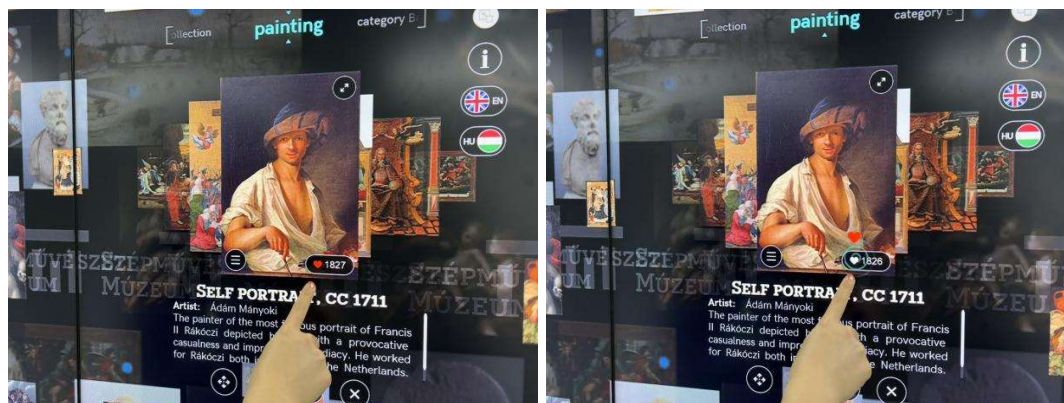
(4) Exhibit Search

Click on the exhibit and then click on the Search button to bring up the text input area; the system can support a global search function and also supports both handwriting and soft keyboard input methods.



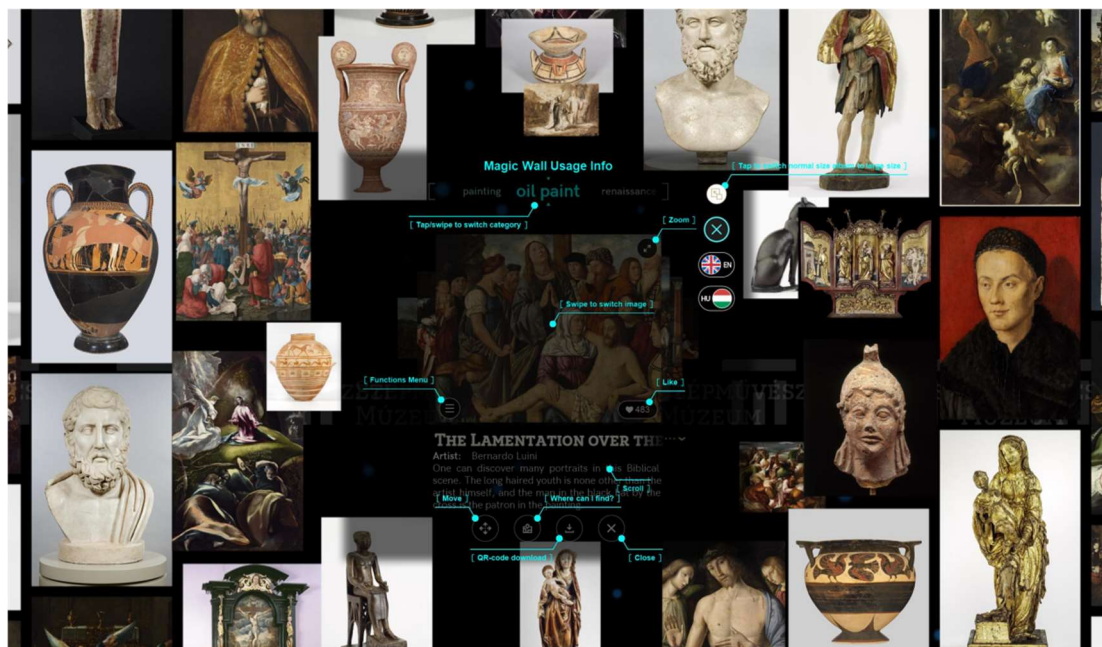
(5) Ranking of Likes

Users can "like" the current exhibit and the system accumulates the number of times the exhibit has been touched and displays the total number of likes in real time. The system will count the number of likes on all exhibits in the background and will intelligently recommend the most popular exhibits which can be categorised and displayed.



(6) Real-time guidance system

All UI's come with real time alert text that changes as the interface is switched on or off at the user's discretion.



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Multiuser interactive system

The user interface intelligently finds the most suitable area, independently and without interfering with each other, and allows unlimited users to interact with the software simultaneously (as long as space in front of the screen allows).

Intelligent allocation and dynamic adjustment of individual interactive zones without interference as illustrated below:



Games

(1) Giant puzzle

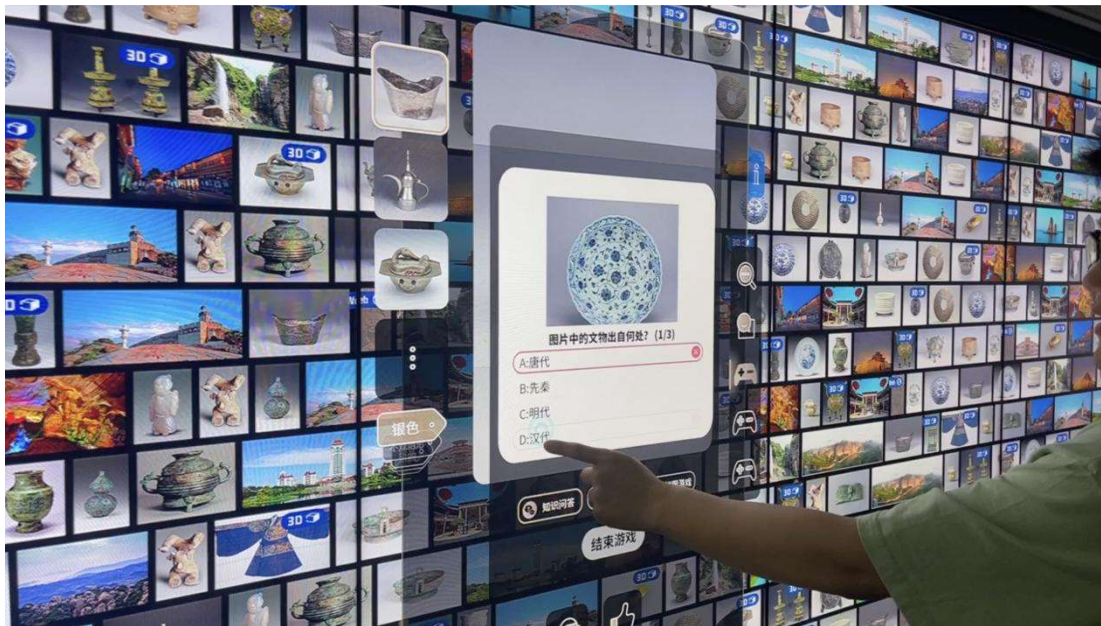
Using the giant puzzle, several children can put together a magnified picture at the same time. The shared fun and enjoyment makes their visit to the museum more memorable.



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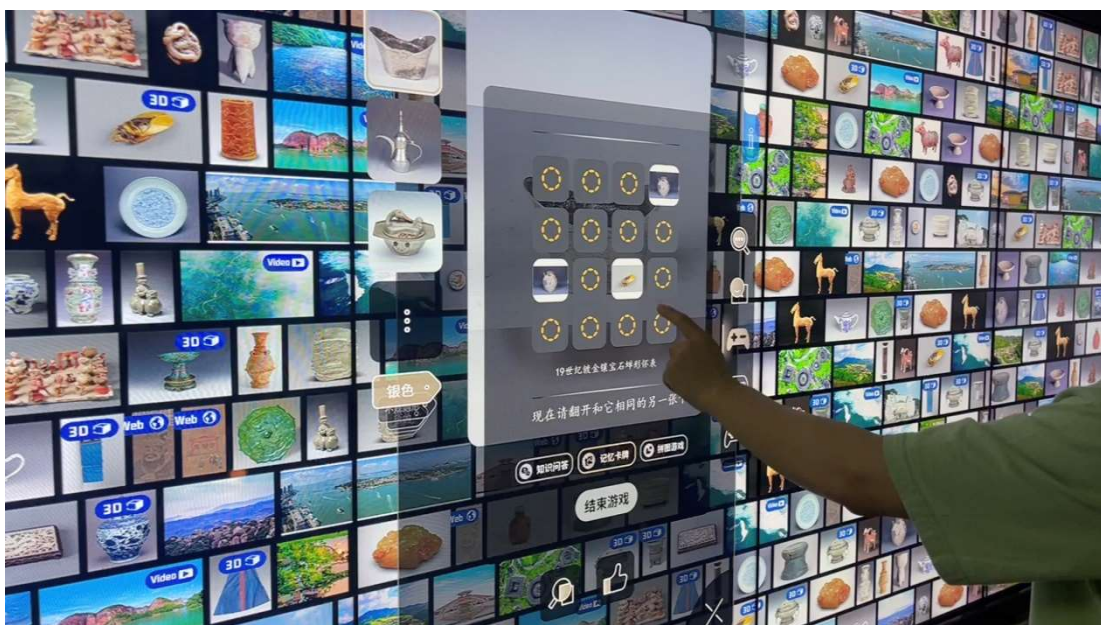
(2) Knowledge quiz

A knowledge quiz game can be set up for each exhibit, with customisable questions and answers.



(3) Memory Matching Game

The memory matching trivia game is presented in a nine-box grid to test visitors' memory.





(4) Large jigsaw puzzle

Puzzles can be displayed in full screen and viewers can drag the picture pieces on either side to work the puzzle.



Other commonly used features of the Magic Wall

(1) Full screen posters/interactive posters

This scene displays a full screen HD poster image when unoccupied or manually selected via the admin tools. Interactive elements can be added to the poster and visitors click on the interactive elements to interact.



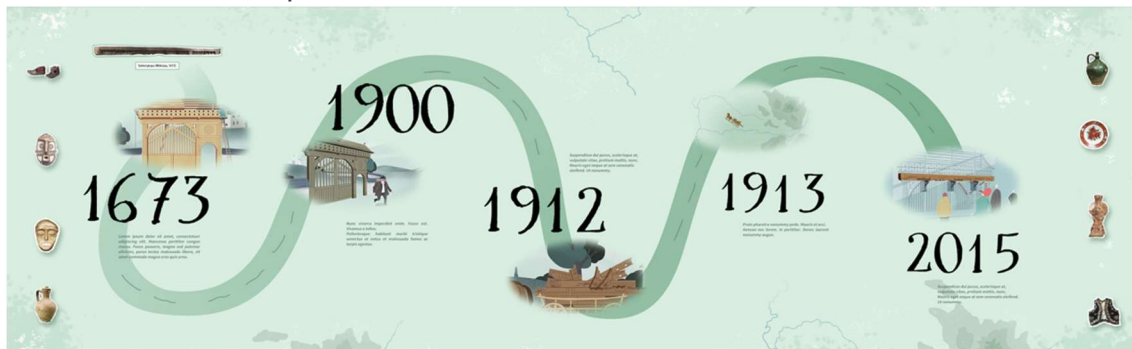
(2) Vertical cut posters

This scene displays a full screen HD poster image per screen when unattended or manually selected via the administrator's tools.



(3) Timeline

Using the timeline feature makes storytelling even easier, and it becomes even more accessible to visitors. The Magic Wall software offers numerous pre-programmed timelines to our partners, each of which has been developed with the assistance of museum education professionals.



(4) Interactive map

Through the interactive map feature, visitors can not only view the offerings of the institution but also gain deeper knowledge about these visitor spaces and their contents, enabling them to plan their own time and route accordingly.



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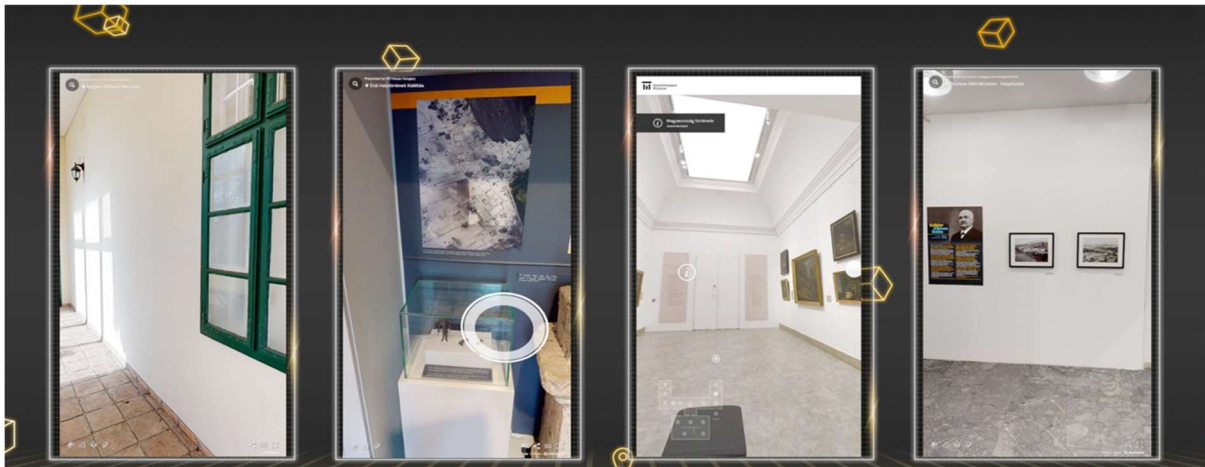
(5) Giga Pixel Zoom

Would you like to get to know a particular artwork even better? Unfortunately, many artworks cannot be handled by visitors, and even if they could, they wouldn't see its small details. With this feature, the smallest details can be thoroughly examined and understood. Museum professionals also have the opportunity to tell exciting stories to visitors about these small but important details.



(6) Virtual Museum

If the museum already has a virtual tour, it can be easily integrated into the Magic Wall software. If it does not have one, Back&Rosta is able to create it and integrate it into the Magic Wall.



(7) Full screen video

No matter the size of the Magic Wall, with its incredibly powerful hardware and unique software, it is capable of playing giant, full-screen videos. The exceptionally large yet incredibly sharp image and powerful sound effects make these videos an unparalleled experience.



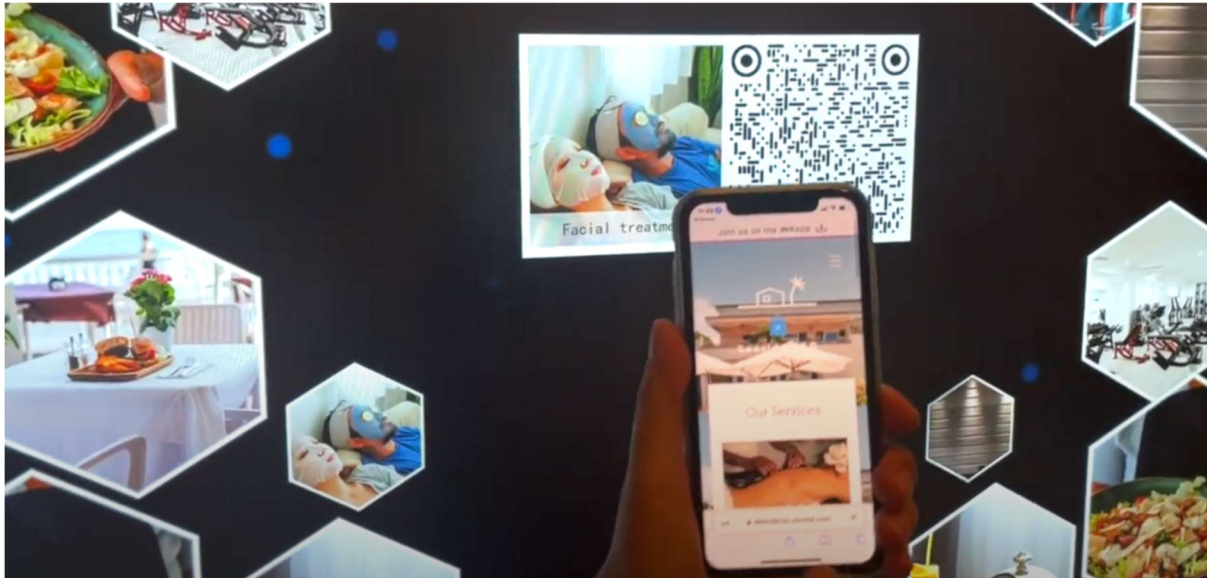
(8) Sound

The Magic Wall is capable of high-quality audio playback, whether it's a full-screen video or playing different music for multiple visitors simultaneously. The audio playback setup is always tailored to the specific needs of the museum.



(9) QR-code

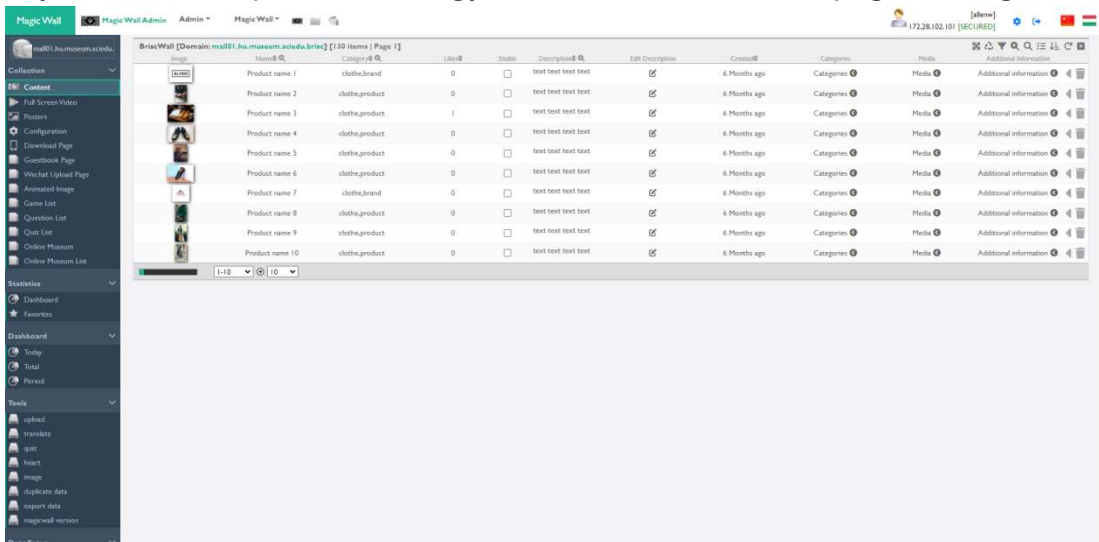
Using QR codes, visitors can download content, purchase items from the museum shop, open videos and audio files on their phones, or be redirected to any website.



Content Management System (CMS)

The CMS allows museums to independently modify and develop the content of the Magic Wall. Uploading is simple and user-friendly. As part of our cloud-based service, uploaded content is first stored on a central server in the cloud, from which new content is synchronised to the Magic Wall's local servers. This solution ensures that the museum's content is always protected, but also that the Magic Wall will not stop working in the event of an internet outage.

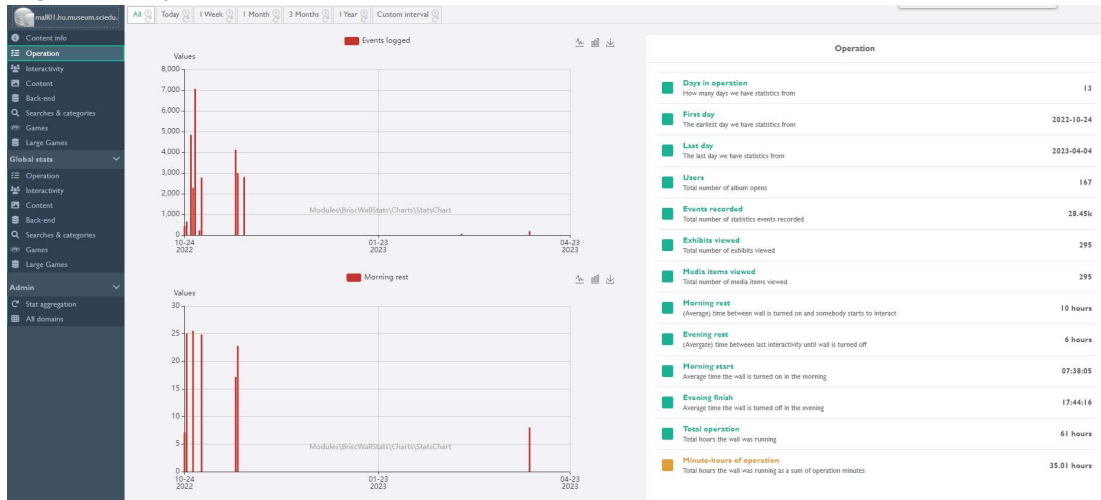
A web-based management system that enables a range of common management of text, multimedia and other content, with a user-friendly interface and the use of ajax asynchronous request technology for faster and smoother page loading.



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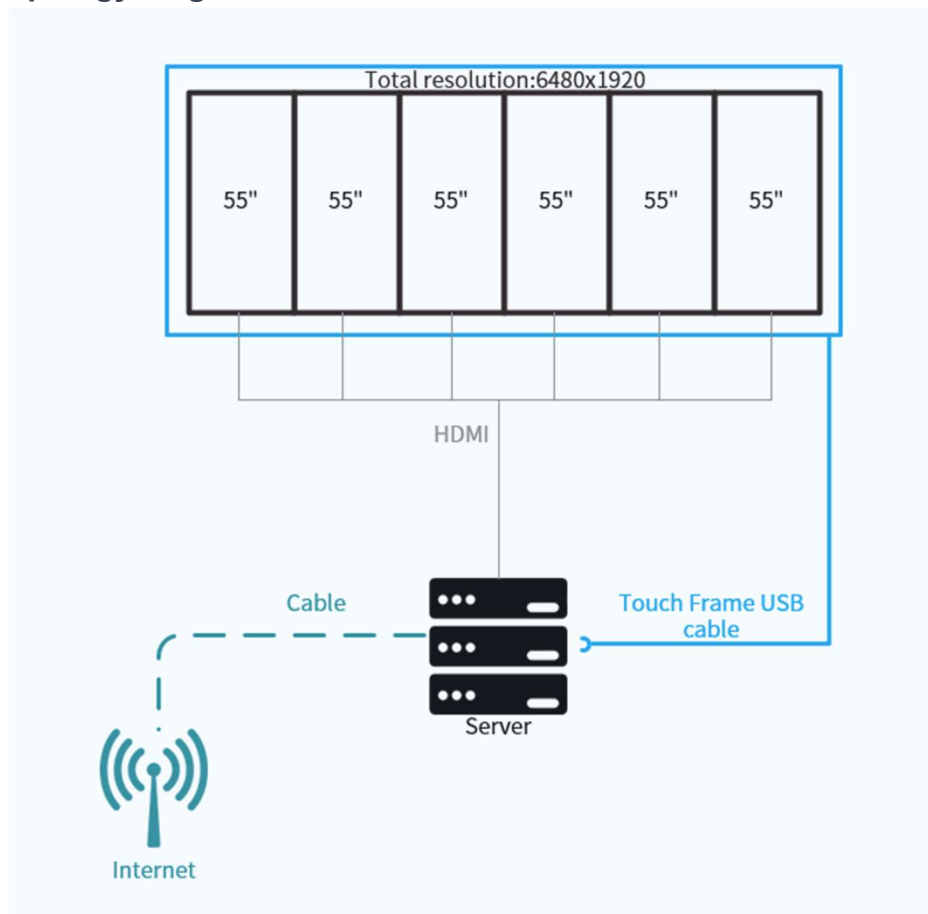
User behaviour analysis system

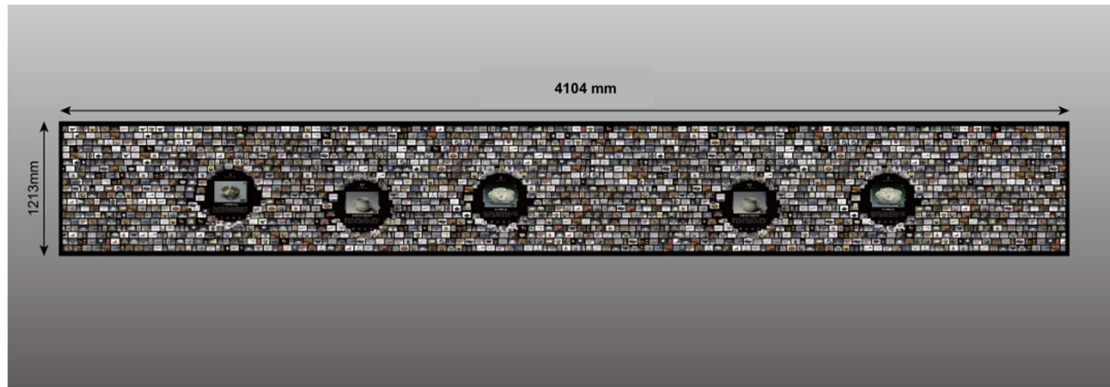
The system supports the generation of traceable logs of user interactions and can generate regular analysis reports as a scientific basis for subsequent optimisation.



Magic Wall hardware

System topology diagram for 55"





With 55-inch monitors, we constructed a screen that measures 1.213 meters in height and 4.104 meters in length, utilizing a total of 6 monitors.

System configuration

The system consists of ultra-narrow edge standard bright industrial splicing screen, display custom touch frame, multimedia system controller and magic wall interactive system, etc.; display equipment consists of 1 row and 6 columns of 55" ultra-narrow edge standard bright LCD screen.

Display size	4104 mm wide x 1213 mm high
Overall resolution	6480x1920
Installation height	default height from the ground 800mm
Installation	maintenance behind, space default 600mm (if the server is not placed behind the screen, this space size can be adjusted according to the site installation environment);

1.1.3 Hardware system working environment

1. A separate 220V safe power supply of at least 1 circuit of 5kw with good lightning protection and earthing must be provided at the equipment installation.
2. A wired Internet connection of at least 20M bandwidth is required.
3. The site should be kept clean and dustproof to avoid dust and stains on the equipment.
4. The equipment room needs to be kept clean and hygienic to facilitate ventilation and heat dissipation.
5. The screen area should not be disturbed by sunlight or strong light, otherwise it will affect the use.

1.1.4 Hardware

1.1.4.1 Industrial grade splicing screens

The display part uses a 55" original industrial splicing screen, which is a narrow bezel LCD display unit made of industrial grade LGA gauge panels for splicing purposes. There is a wealth of signal source interfaces, conventional interfaces with HDMI, DVI, VGA and AV signal interfaces. The industrialised complete solution with full metal casing is anti-static, anti-magnetic field and anti-strong electrical

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interference. All series adopt energy-saving E-LED backlight, full HD 1920 x 1080 resolution LCD, 3.5mm ultra-narrow bilateral physical spacing; industrial-grade heat dissipation design to ensure normal operation in any harsh environment; support remote control and RS232 remote control; built-in frame compensation function to adjust the graphics/image of the screen to a coherent form without frame obstruction; industrial-grade design, support 7 /24 hour operation.



Functional features:

1. A full range of energy-saving E-LED backlit, full HD 1920 x 1080 resolution LCDs;
2. Physical resolution up to 1920*1080;
3. 3.5 mm ultra-narrow bilateral physical spacing;
4. Industrial grade thermal design to ensure normal operation in any harsh environment;
5. A viewing angle of up to 178°, tending towards horizontal;
6. industrial grade design, supporting 7/24 hours non-stop operation, with an average system failure-free time of ≥ 60,000 hours;
7. Signal diversification, supporting DVI, HDMI, VGA, AV;
8. Remote control, supporting remote control and RS232 remote control;
9. A built-in frame compensation function that adjusts the graphics/images of the screen to a coherent form unhindered by the frame;
10. Adopt standard modular design, hangers, brackets, cabinets and other installation

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methods for users to choose, easy to implement installation, easy and stable operation;

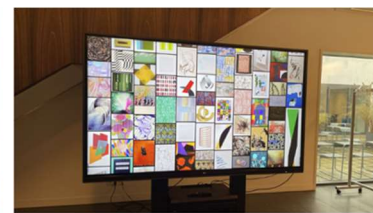
<i>Type of parameter</i>	<i>Product specifications</i>
Backlighting technology	D-LED (straight down)
Brightness	≥500cd/m ²
Contrast ratio	1400: 1
Viewable	Horizontal: 178° / Vertical: 178°
Response time	8 ms (GTG)
Display colours	16.7M Colours
Display resolution	1920x1080 (16:9)
Refresh frequency	60Hz
Input interface	VGA x1 /HDMI x1 /DVIx1 /AV x1 , RS232 (RJ45) x1
Output Connector	RS232 (RJ45) x1
Horizontal scanning frequency	30 KHz
Vertical scanning frequency	114 ~ 126 Hz
Input resolution	1920 x 1080 @ 60Hz (VGA,DVI,HDMI)
Patchwork	3.5mm on both sides
Size	1213.4mmX684.2mmX88.65mm
Box size	1385 x 858 x 218mm (single screen pack) / 1385 x 858 x 348mm (double screen pack)
Weight (approx.)	24 kg / 55kg
Wall mounted form	VESA,12-M6,600x400mm
OSD control	Push button, IR remote control
OSD Language	English, Chinese
Power input	AC in: AC 100V ~ 240V (50/60 Hz)
Power supply power	B3≤ 180W (typ.); B3H≤ 225W (typ.)

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Standby power	≤ 0.5 W (typ.)
Working environment	0 °C ~ 40 °C, 90% RH
Storage environment	-10 °C ~ 60 °C, 90% RH
Other	Front maintenance telescopic bracket, custom bracket

86” touch display

<i>Type of parameter</i>	<i>Product specifications</i>
Display inch	86”
Display Resolution	3,840 × 2,160 (UHD)
Brightness (w/ Glass)	450 nit (Max.), 350 nit (Typ.)
Brightness (w/o Glass)	490 nit (Max.), 390 nit (Typ.)
Touch Type	IR
Multi Touch Points	Max. 20 Points
Input	HDMI (3, HDCP 2.2/1.4), Audio In, RS-232C In, RJ45 (LAN), USB 3.0 Type A (4), USB 2.0 Type A, USB Type C (USB-PD, DP-Alt. Mode)
Output	HDMI Out, Audio Out (1, (Optical) (SPDIF)), Touch USB (2), RJ45 (LAN)
Size	1957mmX1159.8mmX86.3mm



Touch frame

Customised touch frames for displays use a dense infrared matrix in the X and Y directions to detect and locate the user's touch. Usually the infrared touch frame is installed in front of the display with an outer frame, and the circuit board hidden in the outer frame is lined up with infrared transmitter tubes and infrared receiver tubes on all sides of the screen, one after the other, forming a horizontal and vertical cross infrared matrix. When the user touches the screen, the finger will block the horizontal and vertical infrared rays passing through the position, thus allowing the location of the touch point on the screen to be determined.

Product Description:

The touch part of the display uses infrared multi-touch technology and supports multi-touch. Advantages of infrared touch frames in all types of touch:

- Large size: compared to resistive, capacitive, optical and sonic screens, infrared frames are currently the most advantageous for meeting large touch sizes;
- High stability: in large-sized screens, the infrared frame has no blind spots and no drift, and its performance in terms of light resistance and precision is significantly better than other types of touch;
- Long life: The infrared touch frame is formed by LED infrared lamps, the long life of which is itself a feature of LEDs, with a life span of up to 100,000 hours.

Product features:

1. True multipoint, support for multiple systems win7, win8, win10 etc., plug and play, support for SDK call extensions.
2. Operation mode: support 2 point, 4 point, 6 point, 12 point, 64 point, 128 point etc. touch, touch screen operation, paste screen operation, direct instruction and control of the screen in various operation modes, the accuracy can reach 2.5mm.
3. Touch screen positioning deviation ≤ 0.5 mm.
4. Supports the WINDOWS protocol/TUIO protocol.
5. Finger gestures enable functions such as right-clicking, dragging and dropping icons, as well as playing PPTs and turning pages. Plug and play on MAC OS Apple systems, there are also a variety of defined gestures, single tap, two finger, three finger and five finger operations.
6. It is resistant to blocking and can be used outside of 5cm even if there are isolated points of blocking.
7. Infrared touch has a high degree of smoothness, allowing multiple people to write independently at the same time, with smooth writing strokes and no inflection lines, folds or jagged lines.

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8. Independent research and development of calibration software, smooth filtering, enhance touch continuity, reduce the rate of infrared misjudgement. Area calibration function can be set, such as 2x2,3x5 matrix calibration; drawing point test, can test multi-touch effect.

9. Single usb cable for power supply and data acquisition, with self-developed electromagnetic isolator to ensure the purity of the electrical signal.

Technical parameters:

<i>Type of parameter</i>	<i>Product specifications</i>
Touch Size	80"-600"
Touch Points	32 points
Resolution	32767 x 32767
Positioning deviations	0.5 mm
Response time	6-16ms
Support protocols	WINDOWS protocol/TUIO protocol
Using the operating system	win7, win8, win10 etc.
Minimum touch object diameter	6mm
Input method	Finger, special pen, opaque touch sensitive media
Output method	Coordinate values
Structural dimensions	38mm(W) x 12.9mm(D)
Power supply method	USB powered
Operating voltage	+5VDC, allowable range +4.75V to +5.25V
Number of touches	Unlimited
Interface	USB/UART

Multimedia system controller

The multimedia system controller supports multiple video signal access modes, analogue and digital video matrix switching, decoding, large screen control, image splicing, touch control and other functions. The server is a high performance device from BlackRock. The new design is smaller and faster, providing higher efficiency without compromising on performance.

- ◆ Uninterruptible power supply with back-up UPS for safety.
- ◆ Compact size, powerful performance: with the latest Intel processors.
- ◆ Support for multiple displays: DisplayPort and HDMI connections bring greater visibility to tasks and can even be viewed across multiple applications.

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- ◆ Exceptional expandability: designed to support dual hard drives and expandable discrete graphics cards, capable of expanding as demand grows.
- ◆ Secure ports and cables: optional custom-designed cable sheaths reduce clutter and seamlessly match the chassis design.
- ◆ Seamless ease of management
- ◆ The world's easiest to manage: easily handle BIOS setup and configure systems with the ample flexibility required for enterprise-class IT infrastructures.
- ◆ Easy to control: flexible automatic BIOS or system configuration.
- ◆ Meeting the needs of organisations of any size: KACE systems management solutions can meet the demands of demanding IT management.
- ◆ Enjoy your mobile life with ease: built-in wireless technology plus the latest long-range 802.11 ac wireless technology makes it easy to stream and stay connected.
- ◆ High security
- ◆ Centralised remote management: meet regulatory compliance requirements out of the box and protect data on all devices.
- ◆ Authentication options: Ensure that only authorised users can access data with the help of a FIPS 201 certified smart card, fingerprint reader or contactless smart card reader.
- ◆ Secure credential storage: FIPS 140-2 certified ControlVault enhances hardware security by storing user passwords and credentials separately on a separately controlled hardware chip.
- ◆ Block advanced malware: Data Protection | Protected Workspace launches applications in a virtualised container and restores a secure environment in as little as 20 seconds.
- ◆ Security through a single console: The Data Protection | Endpoint Security suite provides comprehensive threat protection, authentication and access management, and encryption, all through centralised management.
- ◆ In order to ensure the stability and expandability of the system at a later stage, the control server we use is a distributed server, mainly divided into 1 control server and 2 content servers, with the following specification parameters:



Maintenance and Operation Services:

Our company offers continuous remote monitoring for the Magic Walls we operate. Our staff at headquarters constantly monitors the Magic Walls' operation and intervenes remotely if necessary. During the science center's opening hours, our operations service provides continuous customer service, allowing us to quickly respond to any faults detected by the museum. We begin repairing faults within 4 hours and complete them as soon as possible. Our local partner in Atlanta carries out the on-site maintenance and repair work on the Magic Wall when necessary. In addition to maintenance and operation activities, our partners will always have access to the latest version of the Magic Wall software and receive information about our latest developments.



Price Offer:

Price for the Magic Wall built from 55” 2K monitors:

Hardware devices (for 55' case - 6 pcs): net 97,000 dollars (frame: 30,000 dollars, structure: 28,000 dollars, server: 21,000 dollars, monitors: 18,000 dollars)

Software license: net 90,000 dollars

Price for the Magic Wall built from one 86” 4K monitor:

Hardware device (86' monitor + server): net 47,990 dollars

Software license: net 15,000 dollars

Total: net 249,990 dollar

Transport, construction, coordination (for both Magic Walls): free.

On-site maintenance and software-upgrades, remote control, CMS and cloud services: free.

Timetable:

PO preparation: 15 days

Content review, definition of needs, content production: 1 months

Purchase of equipment: 1 months

Delivery of equipment to Atlanta: 2 weeks

Equipment installation on site: 1 weeks

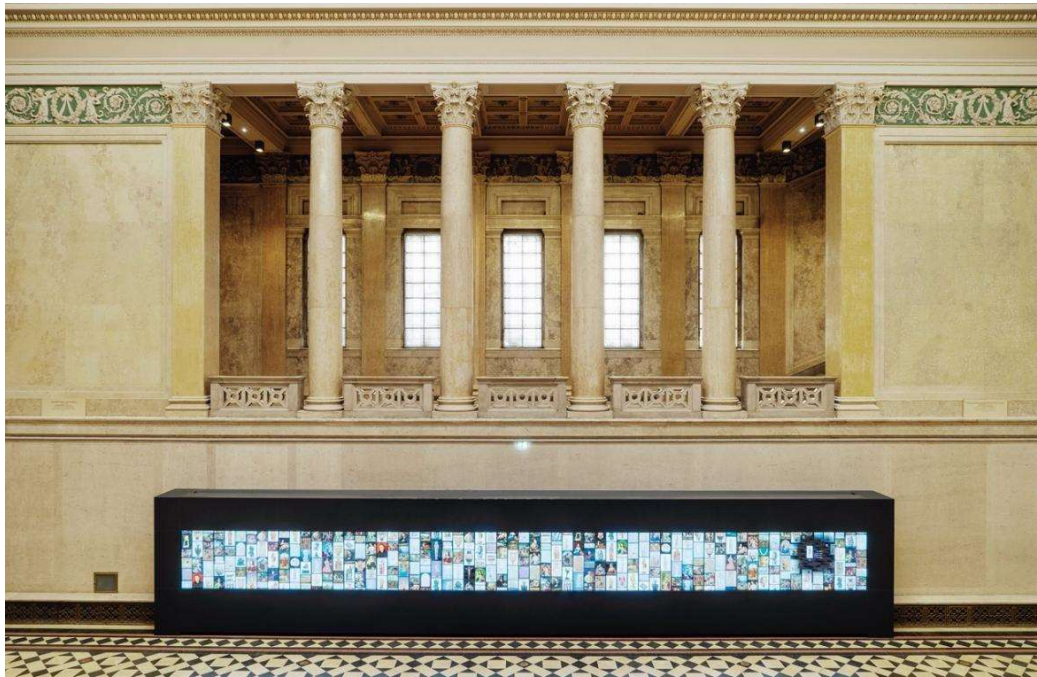
Test period: 10 days

Final handover of Magic Wall: in September, 2024.

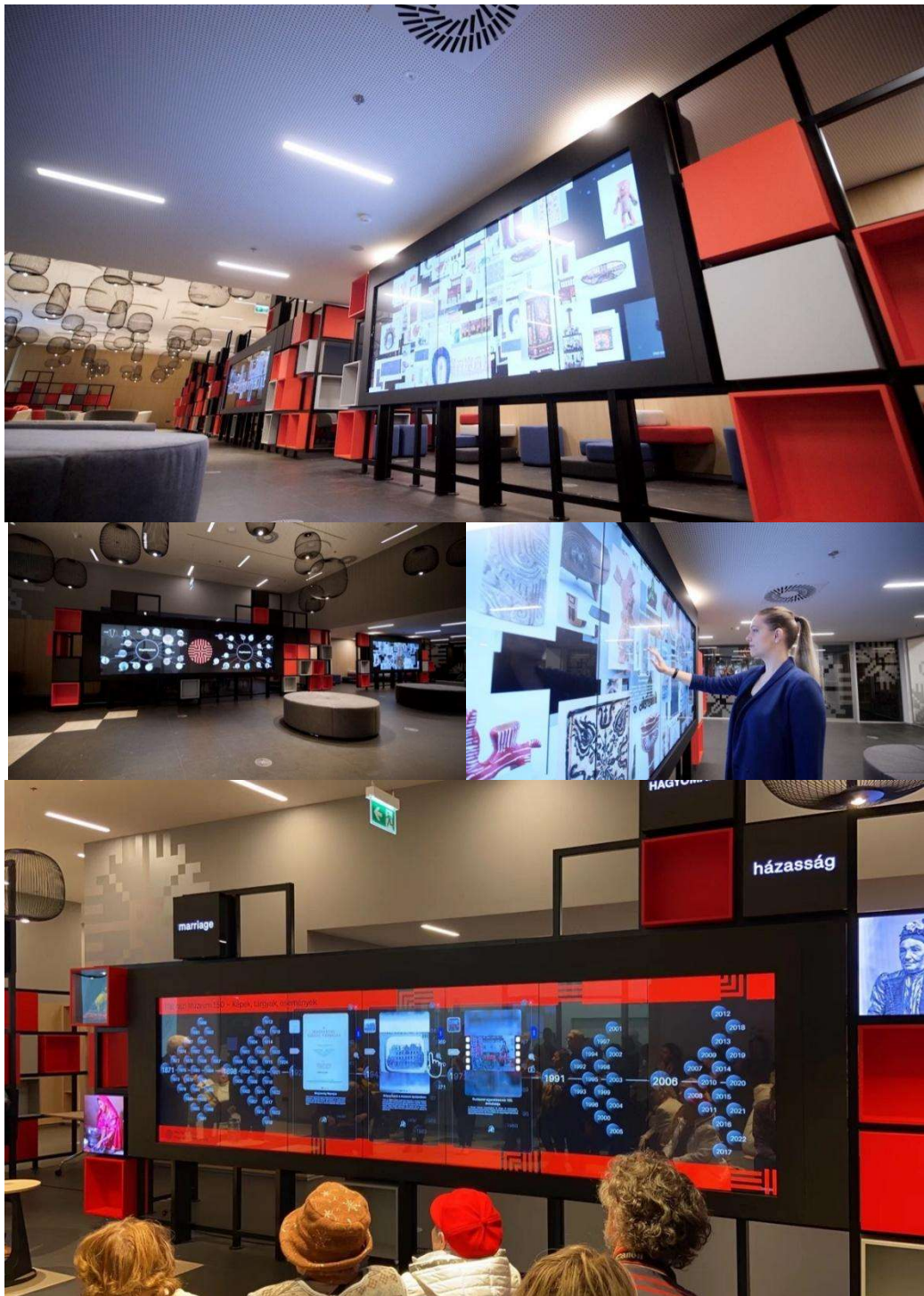
Total time needed from contract signature to completion date: 2.5 months

Project Case Studies

MUSEUM OF FINE ARTS BUDAPEST



ETHNOGRAPHIC MUSEUM



ROHEIM-MAISON



SHANGHAI SCIENCE AND TECHNOLOGY MUSEUM



SICHUAN SCIENCE AND TECHNOLOGY MUSEUM





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