



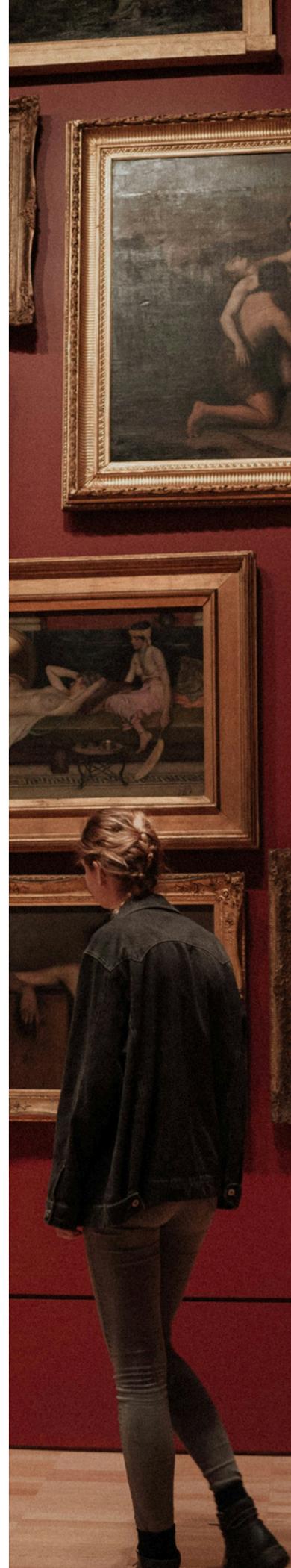
# DIGITAL GUARDIANS: MUSEUM TRANSFORMATION WITH WANWAVE

# INTRODUCTION

Museums are vital cultural institutions that serve as custodians of art, history, and science, preserving the collective heritage of humanity for future generations. They play a crucial role in education, offering immersive experiences that inspire curiosity, learning, and appreciation for diverse cultures and historical periods. However, the management and operation of museums present unique challenges, from ensuring the security and preservation of invaluable artifacts to enhancing the visitor experience in an increasingly digital world.

**wanwave**, a leader in Internet of Things (IoT) technology, offers a comprehensive suite of solutions designed to address these challenges. By leveraging wanwave's secure, low-power, wide-area network (LPWAN) technology, museums can implement a range of applications from monitoring environmental conditions and securing artifacts to managing personnel and waste.

This white paper explores the transformative potential of **wanwave's** technology in the museum sector and aims to demonstrate how adopting such advanced technological solutions can help museums safeguard their collections, enhance visitor satisfaction, and streamline their operations, ultimately contributing to their mission of cultural preservation and education.



# THE NEED FOR ADVANCED TECHNOLOGICAL SOLUTIONS IN MUSEUMS

In today's digital age, museums face a unique set of challenges and opportunities that demand advanced technological solutions. Traditional security measures and operational practices are increasingly inadequate in addressing the diverse needs of modern museums.

## Preservation and Protection

Museums are custodians of cultural heritage, responsible for preserving and protecting priceless artifacts, artworks, and historical objects. These items are often irreplaceable, making their security and conservation paramount. Advanced technologies, such as environmental monitoring systems and asset tracking, are crucial for maintaining optimal conditions for these items, such as stable temperature, humidity, and light levels. Moreover, sophisticated security systems are necessary to protect against theft, vandalism, and unauthorized access.

## Operational Efficiency

Managing a museum involves a wide range of activities, from security and maintenance to staff coordination and visitor services. Efficient operations are crucial for the smooth functioning of these institutions, which often operate on limited budgets. Technological solutions, such as automated systems for waste management, personnel monitoring, and energy management, can significantly reduce operational costs and resource use, allowing museums to allocate more resources to their primary mission of education and preservation.

# APPLICATIONS OF WANWAVE IN MUSEUMS

wanwave offers a suite of solutions designed to meet the unique needs of museum operations:

## 1. Security and Asset Protection

Museums house valuable and sometimes irreplaceable artifacts, making security a top priority. wanwave's IoT solutions include discreet sensors and alarms for monitoring exhibit cases, storage areas, roof access and other restricted zones. These systems detect unauthorized access, potential theft, or vandalism, and immediately alert security personnel. The robust security protocols and encrypted communications ensure that data integrity is maintained at all times.

### AUTONOMOUS PERIMETER SENSOR



- ✓ **Automatically transmits messages about intruders crossing controlled zones**  
For both indoors & outdoors use
- ✓ **Ingress Protection Code**  
IP67
- ✓ **5 year battery life**  
No maintenance required

### BLE INVENTORY TAG



- ✓ **Used primarily for indoor asset tracking**  
Transmits an alarm if detached from items or when it is carried past checkpoints
- ✓ **Sealed housing**  
IP67
- ✓ **6 year battery life**  
No maintenance required

## 2. Environmental Monitoring

Maintaining optimal environmental conditions is critical for the preservation of artifacts. Variations in temperature, humidity, and air quality can damage sensitive materials. **wanwave**'s sensors provide real-time monitoring of these parameters, alerting staff to any deviations from set thresholds. This proactive approach helps prevent deterioration and extends the lifespan of collections.

## 3. Leak and Flood Detection

Museums are often located in buildings that may be vulnerable to leaks or floods, which can cause severe damage to exhibits and artifacts. **wanwave** offers advanced leak and flood detection sensors that provide early warning alerts in case of water ingress. These sensors can be strategically placed in areas such as basements, exhibit halls, storage rooms, and near plumbing installations.

By detecting leaks or rising water levels in real time, museum staff can respond promptly to mitigate damage, protect valuable collections, and prevent disruptions to museum operations. The system can also be integrated with automatic water shut-off valves to provide an added layer of protection.

### WANWAVE AIR QUALITY SENSOR



- ✔ **Measures and reports air quality values**
- ✔ **Measures VOC**  
Volatile organic compounds
- ✔ **Ingress Protection Code**  
IP44
- ✔ **5 year battery life**  
No maintenance required

### WANWAVE WATER LEVEL SENSOR



- ✔ **Detects liquid level changes**
- ✔ **Rugged design**  
For harsh environments
- ✔ **Ingress Protection Code**  
IP68
- ✔ **5 year battery life**  
No maintenance required

## 4. Personnel Monitoring

Managing staff movement within a museum environment is crucial for both security and operational efficiency. **wanwave**'s personnel monitoring solutions provide real-time tracking and analytics, enabling museums to ensure that staff and security personnel are deployed effectively across different areas. Wearable devices or access badges integrated with the **wanwave** network can monitor the location and activity of personnel, helping to manage workflows and respond quickly to emergencies.

## 5. Waste Bin Monitoring

Effective waste management is crucial for maintaining the cleanliness and hygiene of museum facilities. **wanwave**'s waste bin monitoring solution provides a smart way to manage waste collection efficiently. Equipped with sensors, waste bins can transmit data regarding their fill levels to the central management system. This information allows facility managers to optimize waste collection schedules, ensuring bins are emptied only when necessary, thereby reducing labor and operational costs. Moreover, the system helps prevent overflow and ensures that public areas remain clean and presentable, enhancing the visitor experience.

### UNIVERSAL WASTE BIN SENSOR



- ✔ **Monitors the fill level of waste containers**
- ✔ **Universal fit**  
Works with any container
- ✔ **Ingress Protection Code**  
IP67
- ✔ **5 year battery life**  
No maintenance required

### PERSONNEL MONITORING TAG



- ✔ **Determine the zone in which an employee is located.**  
Alarm transmitted when entering restricted areas.
- ✔ **High range**  
Up to 10 km in urban areas
- ✔ **1 year battery life**  
No maintenance required

## 6. Panic Button System

Ensuring the safety and security of both staff and visitors is paramount in any museum setting. The **wanwave** panic button system offers a robust solution for emergency situations. Strategically placed panic buttons throughout the museum can be used by staff or security personnel to instantly alert central security and law enforcement in case of emergencies, such as medical incidents, security breaches, or natural disasters. This system provides real-time location data of the triggered alert, enabling a swift and precise response. By integrating this with other security systems, museums can create a comprehensive emergency response framework, enhancing overall safety and ensuring quick assistance when needed.

## 7. Asset Tracking and Inventory Management

Managing a museum's collection involves tracking a vast number of items, including those on display, in storage, or on loan. **wanwave's** solutions provide an efficient way to monitor the location and status of artifacts. This is particularly useful for managing loans and temporary exhibits, ensuring that all items are accounted for and their conditions are documented.

### WANWAVE AIR QUALITY SENSOR



- ✔ **Measures and reports air quality values**
- ✔ **Measures VOC**  
Volatile organic compounds
- ✔ **Ingress Protection Code**  
IP44
- ✔ **5 year battery life**  
No maintenance required

### WANWAVE PANIC BUTTON



- ✔ **Starts predetermined activities or processes.**
- ✔ **Sealed housing**  
IP64
- ✔ **High range**  
Up to 10 km in urban areas
- ✔ **5 year battery life**  
No maintenance required

# THE WANWAVE NETWORK: SECURITY AND RELIABILITY

The security, reliability, and versatility of **wanwave**'s network make it an ideal choice for transforming museums into smart environments. By providing a dedicated, secure, and jamming-resistant communication infrastructure, **wanwave** ensures that all operational aspects are efficiently managed and protected. The unified infrastructure supports various use cases, from personnel monitoring and perimeter control to air quality monitoring and flood detection, all managed from a central platform.

## Independent and Secure Network

**wanwave**'s network operates independently of external communications providers, ensuring that museum operations are not subject to the vulnerabilities and disruptions associated with third-party services. This independence provides a higher level of control and security.

## Resistance to Jamming

The robustness of **wanwave**'s communication protocol is a key advantage for ensuring uninterrupted operations in high-stakes environments. The network can dynamically select channels to avoid interference, further enhancing its reliability and robustness.

## Unified Infrastructure for Multiple Use Cases

**wanwave** offers a versatile and comprehensive infrastructure that can be applied to a wide range of use cases within the smart farm environment. This unified approach simplifies deployment, maintenance, and management and allows for future applications to be easily added.

# INTEGRATION WITH OTHER SYSTEMS

**wanwave's** technology is designed to integrate seamlessly with existing museum systems, including security, HVAC, and lighting control systems. This interoperability allows museums to create a unified, efficient, and easy-to-manage infrastructure. Furthermore, the data collected can be integrated with museum management software, providing comprehensive insights into operations and enabling data-driven decision-making.



The background of the page is a photograph of the Louvre Museum in Paris at night. The glass pyramid is illuminated from within, and the classical facade of the museum is lit up, with its lights reflecting in the water in the foreground.

## CONCLUSION

As museums continue to adapt to the digital age, the integration of advanced technologies like **wanwave's** IoT solutions becomes increasingly important. By enhancing security, improving environmental controls, streamlining visitor management, and optimizing resource use, museums can better preserve their collections and provide engaging experiences for visitors. This whitepaper outlines how **wanwave** can support these goals, offering museum administrators a roadmap to modernizing their operations while safeguarding cultural heritage.

## CONTACT US FOR FURTHER INQUIRIES

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