Co-Creating AIoT Business Success with WISE-PaaS

ADVANTECH

WISE-PaaS
AIoT Solutions & Marketplace

Machine Data Acquisition

Video Analysis

Sensor Data Acquisition

Sensing Devices

Remote Monitoring and Edge Analytics

Edge Intelligence Servers

Scalable Cloud Operation

Business Intelligence

Dashboard and Visualization

Predictive Maintenance

Azure
arm MBED
Cloud Services

WISE-PaaS/ EnSaaS

WebAccess

WISE-PaaS/ WISE.M+
WISE-PaaS/ EdgeLink

WISE-PaaS/ DeviceOn

WISE-PaaS/ VideoSense

IoT.SENSE
IoT Solution Enabling Services

wise-paas.advantech.com/en-us
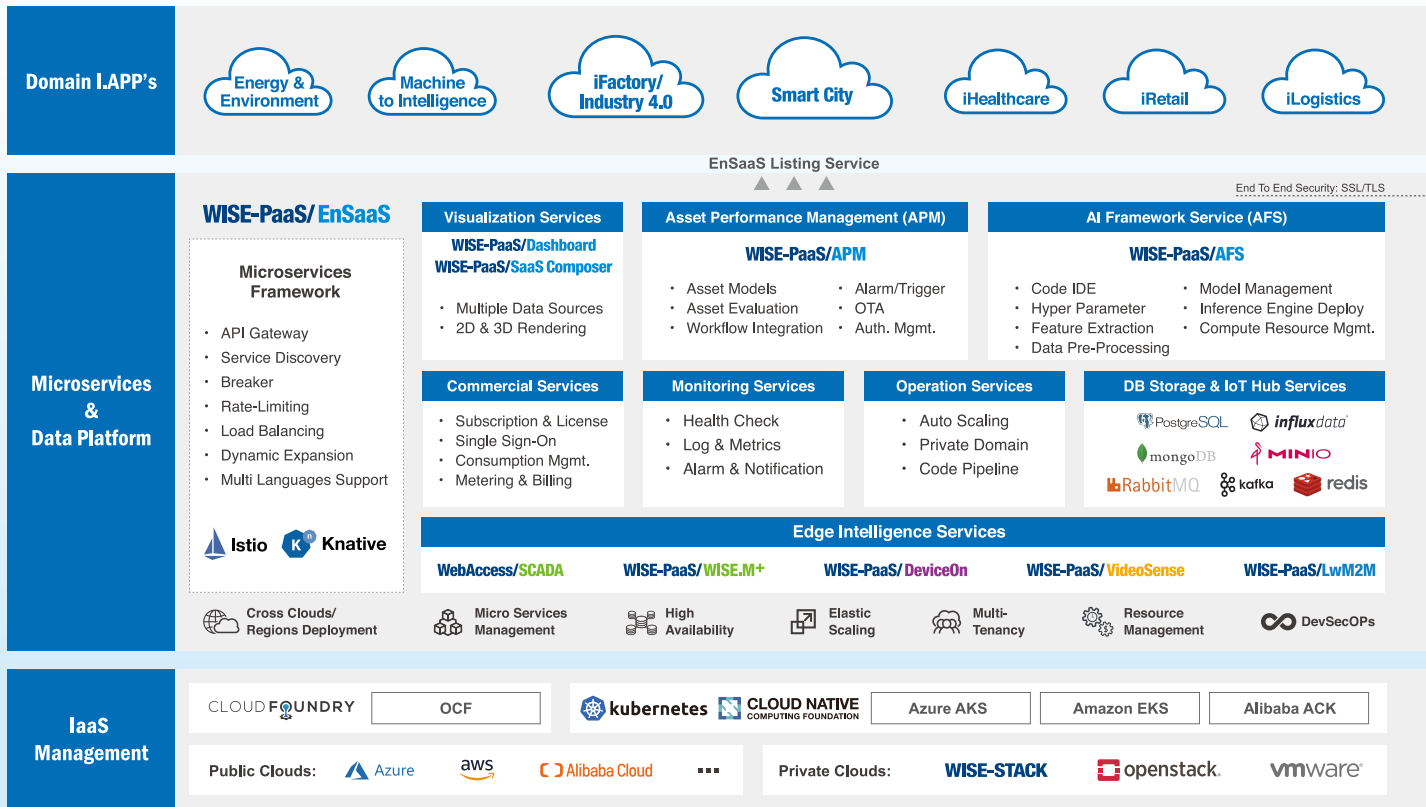
IoT, big data, cloud services, and artificial intelligence present new opportunities to increase market share by enabling the development of innovative applications. Based on our extensive hardware portfolio, Advantech has developed a multi-dimensional software service and launched the WISE-PaaS industrial IoT cloud platform to provide a variety of solutions that integrate software and hardware for system integrators, manufacturers, and traditional industries. WISE-PaaS builds an end-to-cloud integrated value chain for industrial IoT, allowing businesses to experience the innovation of cloud services and assisting vertical markets in realizing IoT intelligence, complete service innovation, and business growth.

WISE-PaaS Industrial IoT Cloud Platform

Advantech's WISE-PaaS Industrial IoT cloud platform provides edge-to-cloud software and services to help system integrators and manufacturers; enabling real IoT-powered cloud business models in various vertical markets. Leveraging Advantech's extensive hardware portfolio, WISE-PaaS integrates diverse software services, including WebAccess, WISE-PaaS/WISE.M+, WISE-PaaS/EdgeLink, WISE-PaaS/DeviceOn, and WISE-PaaS/VideoSense. Data collected for the WISE-PaaS/EnSaaS IoT cloud platform enables partners to quickly develop SaaS and domain-specific IoT solutions.

WISE-PaaS 4.0 Architecture with Microservices & I.APP

Domain I.APP's	Energy & Environment	Machine to Intelligence	iFactory/ Industry 4.0	Smart City	iHealthcare	iRetail	iLogistics

EnSaaS Listing Service

End To End Security: SSL/TLS

Microservices & Data Platform

WISE-PaaS/ EnSaaS

Microservices Framework
- API Gateway
- Service Discovery
- Breaker
- Rate-Limiting
- Load Balancing
- Dynamic Expansion
- Multi Languages Support

Istio Knative

Visualization Services
WISE-PaaS/Dashboard
WISE-PaaS/SaaS Composer
- Multiple Data Sources
- 2D & 3D Rendering

Asset Performance Management (APM)
WISE-PaaS/APM
- Asset Models
- Asset Evaluation
- Workflow Integration
- Alarm/Trigger
- OTA
- Auth. Mgmt.

AI Framework Service (AFS)
WISE-PaaS/AFS
- Code IDE
- Hyper Parameter
- Feature Extraction
- Data Pre-Processing
- Model Management
- Inference Engine Deploy
- Compute Resource Mgmt.

Commercial Services
- Subscription & License
- Single Sign-On
- Consumption Mgmt.
- Metering & Billing

Monitoring Services
- Health Check
- Log & Metrics
- Alarm & Notification

Operation Services
- Auto Scaling
- Private Domain
- Code Pipeline

DB Storage & IoT Hub Services
PostgreSQL influxdata
mongoDB MINIO
RabbitMQ kafka redis

Edge Intelligence Services

WebAccess/SCADA WISE-PaaS/WISE.M+ WISE-PaaS/DeviceOn WISE-PaaS/VideoSense WISE-PaaS/LwM2M

Cross Clouds/ Regions Deployment | Micro Services Management | High Availability | Elastic Scaling | Multi-Tenancy | Resource Management | DevSecOPs

IaaS Management

CLOUD FOUNDRY | OCF | kubernetes | CLOUD NATIVE COMPUTING FOUNDATION | Azure AKS | Amazon EKS | Alibaba ACK

Public Clouds: Azure aws Alibaba Cloud ...

Private Clouds: WISE-STACK openstack vmware

WISE-PaaS Features

Cross Clouds/ Regional Deployment

Delivers with IaaS options to satisfy your market development preferences

- Public Cloud: Azure aws Alibaba Cloud
- Private Cloud: WISE-STACK openstack vmware

Scalable

Cloud-native environment with high scalability offers operational benefits at any scale and makes release pace faster

kubernetes CLOUD NATIVE COMPUTING FOUNDATION
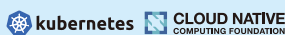
Flexible

Provides a microservice development framework for component flexibility and improved efficiency for solution development

Edge-to-Cloud-Ready

Seamless edge-to-cloud integration from devices to the WISE-PaaS data platform maximizes the potential of data utilization and accelerates solution building

Speed-to-Market

The configuration-driven WISE-PaaS platform facilitates rapid solution development and deployment with high resource-efficiency

WISE-PaaS Low-Code Visualization

WISE-PaaS provides end-to-cloud connectivity, realizing data retrieval, analysis, and application. The data visualization tools, including WISE-PaaS/Dashboard and WISE-PaaS/SaaS Composer, help display your data more clearly. By configuring how and where different objects are displayed, businesses can optimize the monitoring of day-to-day operations, assess efficiency, and manage operations with a high level of precision, thereby improving their operations management and decision-making.

WISE-PaaS
Data Visualization

WISE-PaaS/Dashboard

Data Analysis and Visualization Tool

WISE-PaaS/Dashboard is commonly used for visualizing time-series data for infrastructure and application analytics. It allows access to various data sources and gives more convenient access to WISE-PaaS data. WISE-PaaS/Dashboard uses suitable graphical tools based on different data types and situations.

Fast and Reproducible Solutions

Rapid Data Integration

Plugin Development Ecology

WISE-PaaS/SaaS Composer

Cloud Configuration Tool with Visible Workflow

WISE-PaaS/SaaS Composer supports customized component plotting for simple and intuitive 3D modeling applications and interaction. It updates views at millisecond rates, and, together with WISE-PaaS/Dashboard, presents critical management data in a visually intuitive display to help extract valuable data and improve operational efficiency.

Close to the Real Scene

High Integration

High Flexibility

SRP Dashboard iFactory Central Management System

1 Focal Point: Real-Time Information

▪ Live video streaming
▪ Key production index
▪ Production management information

2 Interactive Dashboard: Central Management System

▪ Factory overview
▪ Machine availability
▪ Line balancing rate
▪ Overall availability analysis

3 Management Scorecard: Operational KPIs

▪ Operation management
▪ Employee management
▪ Supply chain management
▪ Quality management

WISE-PaaS/AFS AI Framework Service

WISE-PaaS/AFS provides a unified platform for AI model development, training, deployment, re-training, and re-deployment. It provides a web UI interface that allows developers to quickly build up their own AI solutions. Combined with AI algorithms, the service builds an effective inference engine with automatic deployment to edge computing platforms. WISE-PaaS/AFS offers model accuracy management, model retraining, and automated redeployment. It simultaneously controls multiple AI models in the application field; offering automated model accuracy improvement and life-cycle management services.

Unified AI Platform

Model Management

Edge Intelligence Enabling

Artificial Intelligence Training Model and Deployment Service Framework

Smart Retail
- Face Recognition
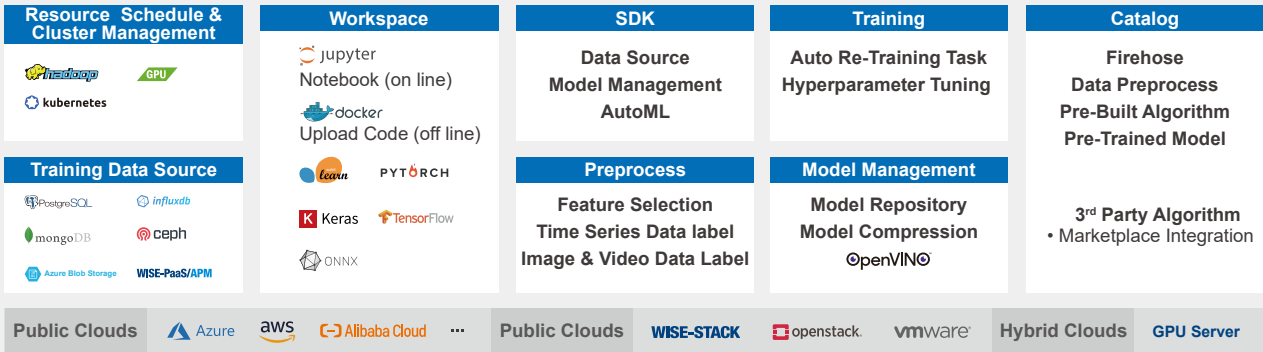- Passenger Flow Calculation

Smart Machine
- PHM
- Motor PMS
- Predictive Cutting Edge Broken

Smart Factory
- AOI
- Process Quality Analysis
- Inventory Forecast

Training and Model Management

WISE-PaaS Cloud

Resource Schedule & Cluster Management	Workspace	SDK	Training	Catalog
hadoop GPU kubernetes	Jupyter Notebook (on line) docker Upload Code (off line) learn PYTORCH Keras TensorFlow ONNX	**Data Source Model Management AutoML**	**Auto Re-Training Task Hyperparameter Tuning**	**Firehose Data Preprocess Pre-Built Algorithm Pre-Trained Model**

Training Data Source
PostgreSQL influxdb
mongoDB ceph
Azure Blob Storage WISE-PaaS/APM

Preprocess
Feature Selection
Time Series Data label
Image & Video Data Label

Model Management
Model Repository
Model Compression
OpenVINO

3rd Party Algorithm
- Marketplace Integration

Public Clouds	Azure	aws	Alibaba Cloud	...	Public Clouds	WISE-STACK	openstack	vmware	Hybrid Clouds	GPU Server

Inference

Edge Intelligence

Inference Engine Deployment	Model Deployment
Restful API **Cloud Inference and Edge Inference**	**Model & File Update** **Model Update Rule**

WISE-PaaS/ DeviceOn
WISE-PaaS/OTA

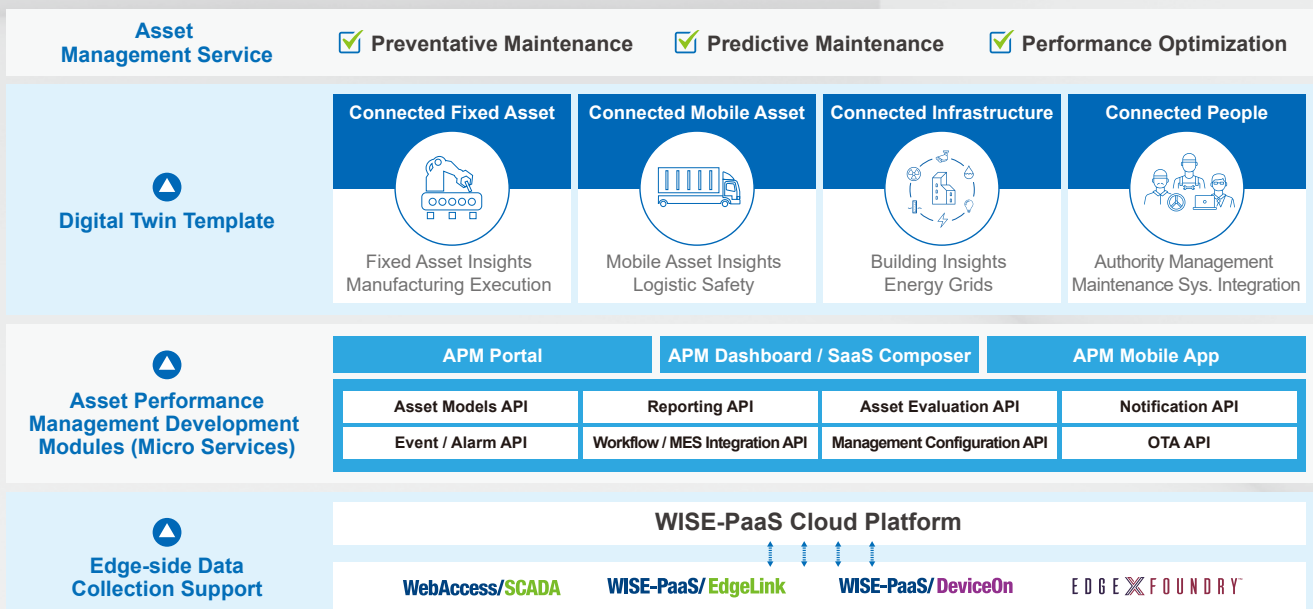| Container Runtime	docker	EDGEXFOUNDRY	Operating System	Windows	Linux	android

WISE-PaaS/APM Asset Performance Management

WISE-PaaS/APM supports remote asset management with a service framework. Built on the WISE-PaaS Platform, WISE-PaaS/APM provides a standardized way to connect diversified assets/devices, data, production lines, site infrastructure, and management staffs with a consistent interface. WISE-PaaS/APM makes asset management easier, performance better and the cross-site solution building process faster than ever.

Asset Management Service
- ☑ Preventative Maintenance
- ☑ Predictive Maintenance
- ☑ Performance Optimization

Digital Twin Template

Connected Fixed Asset	Connected Mobile Asset	Connected Infrastructure	Connected People
Fixed Asset Insights Manufacturing Execution	Mobile Asset Insights Logistic Safety	Building Insights Energy Grids	Authority Management Maintenance Sys. Integration

Asset Performance Management Development Modules (Micro Services)

APM Portal	APM Dashboard / SaaS Composer	APM Mobile App
Asset Models API	Reporting API	Asset Evaluation API	Notification API
Event / Alarm API	Workflow / MES Integration API	Management Configuration API	OTA API

Edge-side Data Collection Support

WISE-PaaS Cloud Platform

WebAccess/SCADA	WISE-PaaS/ EdgeLink	WISE-PaaS/ DeviceOn	EDGEXFOUNDRY

Smart Manufacturing

Project background and challenges

A globally renowned iron and steel company, facing the challenges of the low predictability of equipment fault diagnosis, reactive handling of production line halts, and difficulty passing on the skills and experience of senior equipment maintenance administrators, decided to invest in condition monitoring and cloudization.

Through technologies such as cloud data platforms, big data analysis, and artificial intelligence (machine learning for vibration analysis), the company aims to improve equipment maintenance, fault detection, and preventive diagnosis; using AI to make up for the lack of manpower to enhance production and management efficiency.

WISE-PaaS Architecture and Benefits

☑ **Equipment Condition Detection**
☑ **Equipment Diagnosis**
☑ **Preventive Maintenance**
☑ **Alert Notifications**

SaaS

RESTful APIs

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Online Model Training

⬇

Inference Engine
Remote Deployment

⬇

Model Remote
Deployment

⬇

APM Asset
Model Integration

WISE-PaaS/Dashboard

Data Analysis and Visualization

Intuitive and easy-to-use WISE-PaaS/Dashboard suitable for field operators, system operators, and more to improve data interpretation and management efficiency

WISE-PaaS/APM

Asset Performance Management

Utilize WISE-PaaS/APM asset models and configurations to quickly integrate management and alert notifications for each machine, production line, and factory zone

WISE-PaaS/OTA

Over-the-Air Software Updates

Meet remote software update management requirements with centralized remote software upgrade

WISE-PaaS/AFS

Enhance Equipment Prognosis with AI

Develop and train AI models online through WISE-PaaS/AFS, deploy inference engine remotely to update and integrate the asset models, and improve the correctness and scalability of equipment prognosis

Microservices **▲ Istio** **K Knative**
Container **⚙ kubernetes**
HW Resource Mgmt. **openstack.**

WISE-STACK Private Cloud

IaaS

WISE-STACK private cloud offers AI development environments with high HW/SW integration, edge-to-cloud data connectivity, system scalability, and privacy

WISE-PaaS/ EnSaaS

Industrial IoT Cloud Platform Service

PaaS

Equipment Vibration Data Collection and Computing Processing

- Smart Machine Box (industrial computer MIC-7500 with data capture card PCIE-1802) centrally manage machine operation and capture vibration data with WebAccess/SCADA and WISE-PaaS/DeviceOn

- MIC-7500 acts as an inference engine and executes edge-side prediction models

WebAccess/SCADA
WISE-PaaS/ DeviceOn

Advantech Smart Machine Box (SMB)

MIC-7500   PCIE-1802

Edge

Equipment Intelligence

Project background and challenges

A Chinese vessel company established over 25 years ago focusing on marine electrics and automation is currently transforming from an equipment manufacturer to a total solutions provider. This solution covers data collection, data transmission, cloud configuration, big data analysis, and data visualization for integrated remote monitoring and management.

So far, remote monitoring for all vessel data of up to 1,400 I/O points on new ships has been realized and real-time conditions for vessel operation have improved, enhancing the company's ability to manage their own vessels and respond to emergencies.

☑ 3D Visualization   ☑ Remote Vessel Monitoring   ☑ Equipment Prognosis
☑ Alert Notifications   ☑ Preventive Maintenance   ☑ Energy Forecasts

SaaS

RESTful APIs

Uninterrupted Service with Remote Updates and Secure Connections

Maintain remote software update requirements securely with WISE-PaaS/OTA and WISE-PaaS/VPN

WISE-PaaS/OTA
Over-the-Air Software Updates

WISE-PaaS/VPN
Virtual Private Network

2D+3D Visual Dashboard to Improve Management Efficiency

Visualization services to access WISE-PaaS/APM data to display design drawings and circuit diagrams. Supports mobile device app to view vessels around the globe in real time

WISE-PaaS/AFS
AI-Powered Energy Management and Machine Maintenance at Scale

Assess prognosis and improve energy efficiency and machine availability through WISE-PaaS/AFS AI model training, deployment, retraining and redeployment

WISE-PaaS/Dashboard
Data Analysis and Visualization

WISE-PaaS/SaaS Composer
3D Workflow Visualization

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WISE-PaaS/APM
Cross-site Asset Performance Management

Data is managed by the asset model and configurable topology in WISE-PaaS/APM to perform the cross-site overall performance management for distributed devices. Alert notifications will be sent through email, SMS, and communication software when abnormalities occur.

WISE-PaaS/EnSaaS
Industrial IoT Cloud Platform Service

PaaS

Simple Configuration, Data on the Cloud

The data is simple and intuitively configured through cloud-based WISE-PaaS/SCADA to the WISE-PaaS/EnSaaS public cloud for discrete vessel systems

WISE-PaaS/SCADA
RabbitMQ
WISE-PaaS/EdgeLink

Acquisition of Key Ground Equipment Data

Collect navigation information and key data of various equipment through the ECU-1251 communication gateway (pre-built WISE-PaaS/EdgeLink software) in the control cabin of ocean-going vessels to grasp the hull condition intuitively with detailed machine parameters

Communication Gateway
ECU-1251
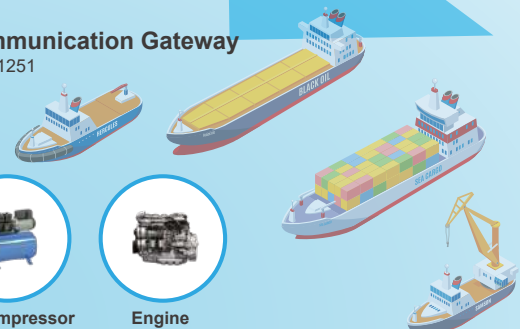
Edge

- Navigation information (location, heading, speed, displacement, etc.)
- Equipment status (current, voltage, temperature, rotating speed, etc.)
- Energy consumption information

Pump   Blower   Air Compressor   Engine

Enabling AIoT Solution Co-Creation with the WISE-PaaS VIP Program

Consulting and Training Services

- Solution Architecture Consultation
- Online Training & Certification
- Technical Documentation & Support

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AIoT Solutions & Marketplace

Ecosystem Co-Prosperity

- Business matchmaking
- Solution co-creation
- Distribution via the WISE-PaaS Marketplace

International Marketing Network

- Co-marketing
- Conference attendance
- Media exposure & Case study

WISE-PaaS/ EnSaaS

WebAccess   WISE-PaaS/ WISE.M+   WISE-PaaS/ DeviceOn   WISE-PaaS/ VideoSense

WISE-PaaS/ EdgeLink

WISE-Point

WISE-PaaS Marketplace

WISE-PaaS Marketplace is the destination for all your software needs. You can find software, end-to-end solutions, industrial apps, consulting services, marketing packages, as well as microservices tools to develop your own apps or solutions.

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WISE-PaaS   VIP Program
AIoT Solutions & Marketplace

WISE-PaaS Marketplace

WISE-PaaS Marketplace 2.0

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- End-to-End Solutions
- Industrial Apps
- Consulting Services
- Marketing Packages
- Microservices Tools

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