GOOGOLTECH 固高科技 | Cynovan 赛诺梵

# Industrial Internet Edge and Cloud Computing

## Solution Introduction

2020. 4

# System Orientation

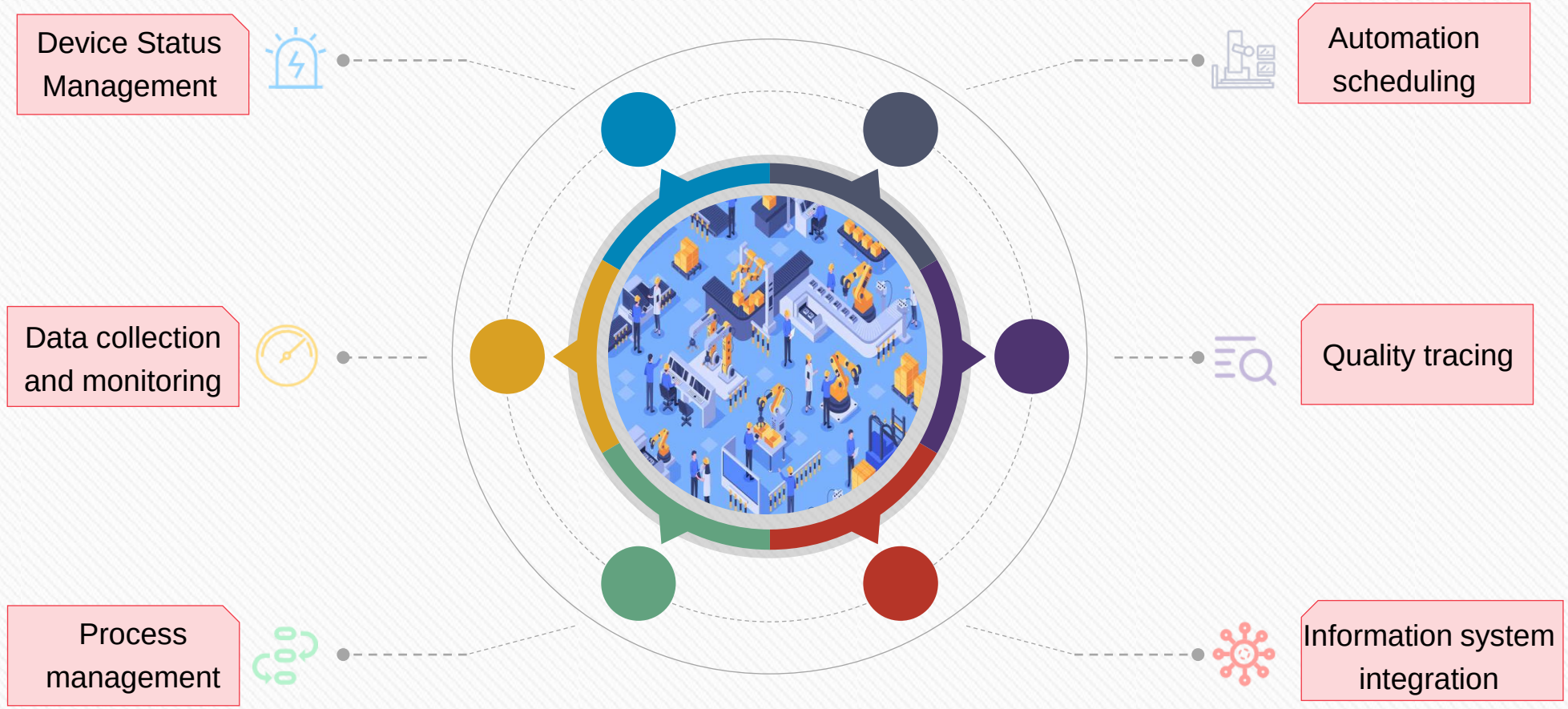


Janus Edge computing system and NEPTUNE IIoT cloud platform are aimed to solve the data collection and analysis problems for on-site industrial devices. Advanced Industrial Internet of Things (IIoT) and cloud technologies enable data collection, analysis, remote maintenance and intelligent algorithms for industrial devices of different brands, in order to improve the flexibility and intelligence of the production lines.

# Applications



Empowerment for machining equipment and automation production lines from the following aspects:

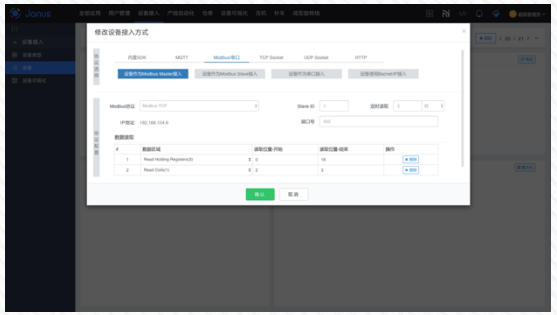


# Hardware Structure

| Specifications | Description |
|---|---|
| Processor | Intel Core i5-3210M<br>(Options: Pentium/i3/i5/i7) |
| System RAM | 4GB DDR3<br>(Options: 4G/8G/16G/32G) |
| Storage | 64GB SSD<br>(Options: 64GB/128GB/256GB/512GB/1TB) |
| Network | Intel 8257 1Gbits Ethernet x 2 |
| Expansions | PCI-e x 2 |
| External Connectors | USB 3.0 x 4 / USB 2.0 x 4 / DVI x 1 / COM x 3<br>RS-485 x 1 / GPIO x 16 (8 in, 8 out) |
| **Physical** | **Description** |
| Power | DC 24V 5A |
| Size (LxWxH) | 215x109x55 mm |
| Installation | Desktop/Wall Mount |
| Working Temperature | -20°C ~ 70°C |
| Working Humidity | 0% ~ 90% (Non-condensing) |
| **Software** | **Description** |
| Operating System | Ubuntu Linux 18.04 LTS 64-bit |
| Core Software | Janus Edge Computing System |

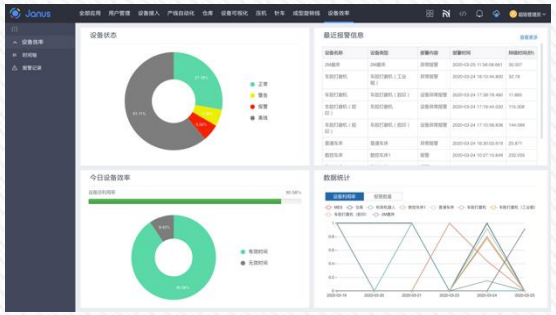
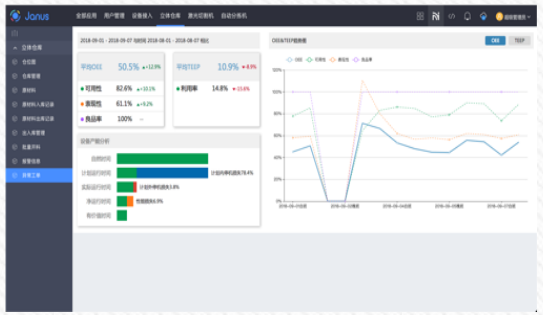
# Overview: Core Software Features

## Device Access (Supports multiple protocols and brands)

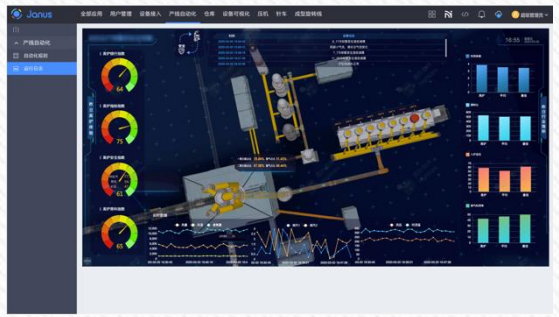
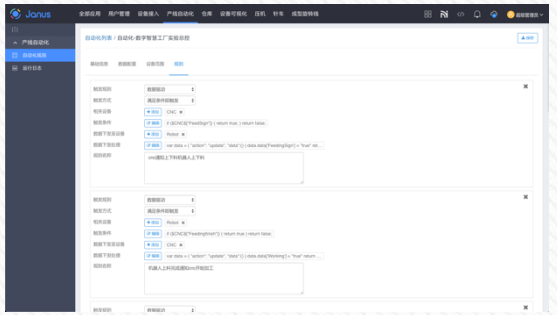


## Visualization (Kanban, Dashboard, SCADA)

## Data Monitoring (e.g. Overall Equipment Effectiveness)

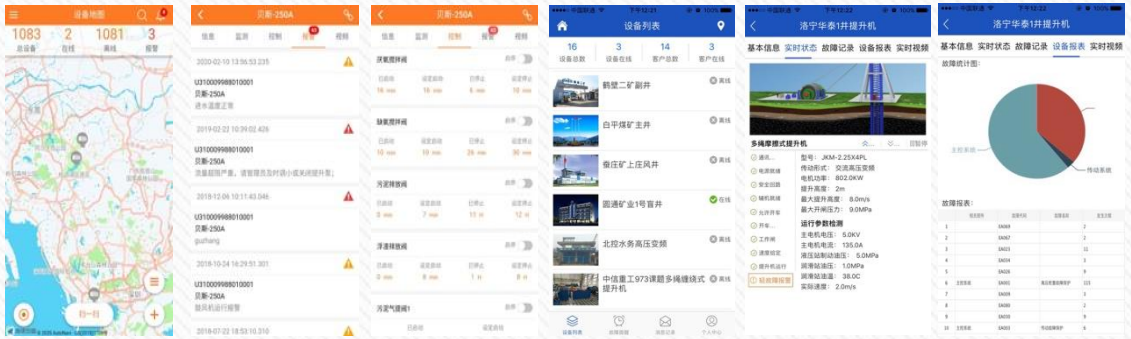



## Production Line Automation (Online Scheduling Policy Configuration)

## Application Development Platform and Standard APIs

## Mobile Applications via Cloud Platform APIs



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# Core System Features



**1. Access**

Following access methods are supported:
**1.Protocols:** Modbus / Socket / RS485/422/232 / CANOpen / OPC UA / HTTP / MQTT / HostLink
**2. Brands:** Googol/KEBA/FANUC/Mitsubishi /Siemens/Mazak/Heidenhain

**2. Data Monitoring**

User defined alarm logic via drag and drop GUI or code, with support for push notifications to mobile applications

**3. Visualization**

Single device, production line and mobile monitoring, Kanban interfaces built via drag and drop web interface, and control devices with less strict real-time requirements (150ms+)

**4. Automation**

Flexible scheduling logic between devices in production lines configured via a graphical interface, without using extra PLC or PC. Supports controlling devices with less strict real-time requirements (150ms+)。

**5. OEE**

Automatic statistics and graphs of device OEE for monitoring device efficiency in real-time.

**6. Mobile Application**

Used as a backend for mobile applications that monitor device status, efficiency, alarms and working site status in real-time, also enables controlling devices with less strict real-time requirements (150ms+)

**7. Standard API**

Standard APIs that enable integration and data exchange with third party systems like ERP, MES and HR systems

**8. Development Platform**

An online development platform that enables easy development of device-specific applications and algorithms, and deployed remotely via cloud push.

# Application Architecture

5 to 10 scattered devices[1]

5 to 10 devices in a production line[1]

LAN

LAN

**Edge Compute System**

| | |
|---|---|
| Access | Automation |
| Monitoring | OEE |
| Visualization | Standard APIs |

LAN

Router

Internet

LAN




Third Party Systems

WiFi/4G

**Mobile App**

- Remote Monitor
- Modify Parameters
- View Faults/Alarms

NEPTUNE

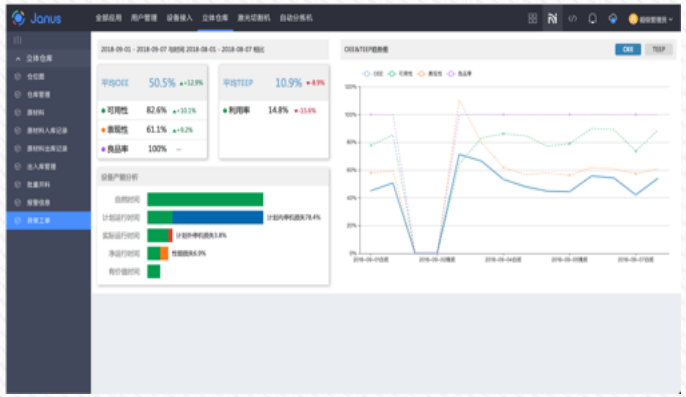
**Cloud Platform**

- Remote Monitor
- Modify Parameters
- Data Storage
- Faults/Alarms Push
- Cloud Storage
- Development Platform

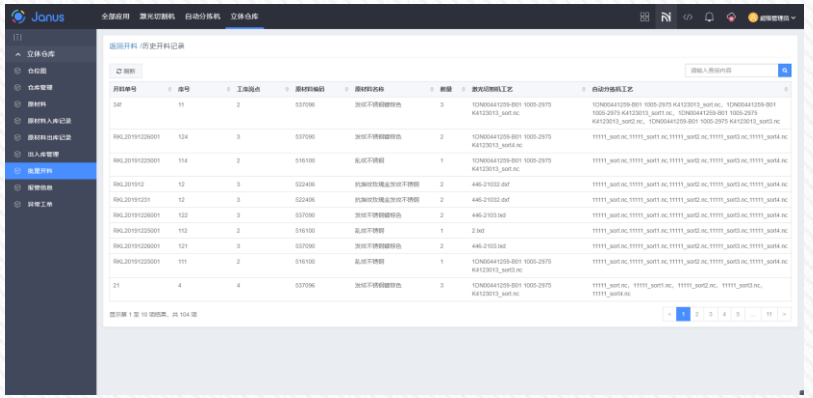
**1: Typically, 5 to 10 devices per edge compute node is recommended. Actual numbers may vary according to device data.*

# Highlight: Supports collection and monitor of various data types

Device Data Monitor (e.g. parameters, energy consumption etc.)



Overall Equipment Effectiveness



Production Progress Management

Network

Network

**Protocols**

- Modbus
- Socket
- MQTT
- CANOpen
- RS485/232
- I/O

**Brands[1]**

- Googoltech
- FANUC
- Mitsubishi
- Siemens
- Mazak
- Heidenhain

**Existing Systems**

- ERP
- MES
- WMS
- APS

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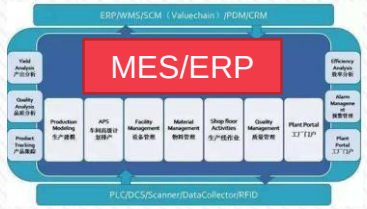
***1: Some devices of certain brands may require additional purchase of data collection components or licenses from the manufacturer.***

# Interactive scheduling between different devices and systems






Existing Systems

HTTP

Automatic Material Delivery System

I/O

Modbus RTU

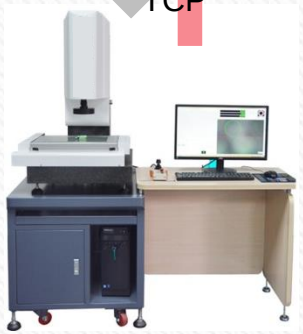
Fanuc
Googol

TCP

Modbus

CNC

CNC



Inspection
Instruments

AGV

**Implement following functions with the Edge Compute System:**

1. Automatic material delivery according to MES
2. Automatic machine tool process file replacement according to MES
3. Automatic CNC parameter recommendations
4. AGV scheduling for material delivery and workpiece delivery to inspection instruments
5. Status report to material delivery system on material anomalies or absence
6. Automatic QA report upload

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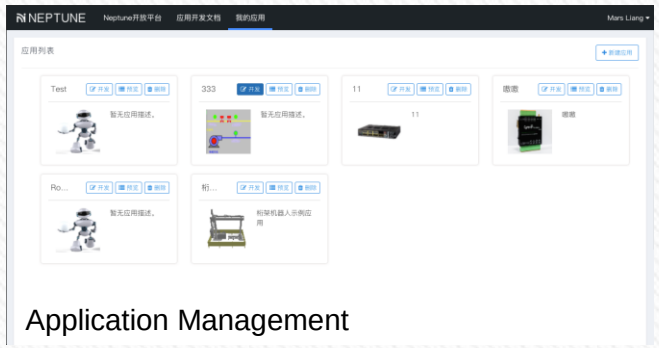
# Powerful development tools and APIs on the Cloud



Application Development Platform

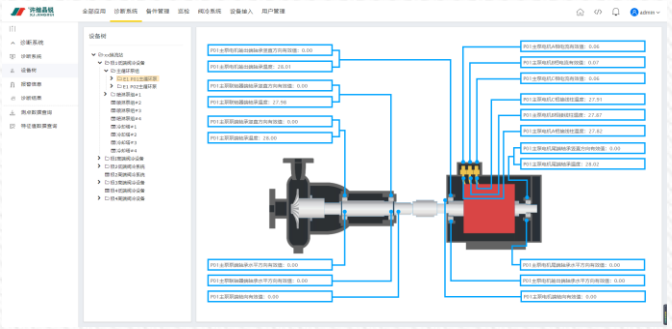



Application Management

Development Documentations

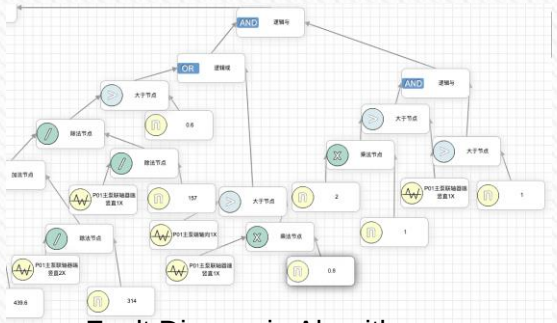
Web IDE

All kinds of applications developed with the toolkit

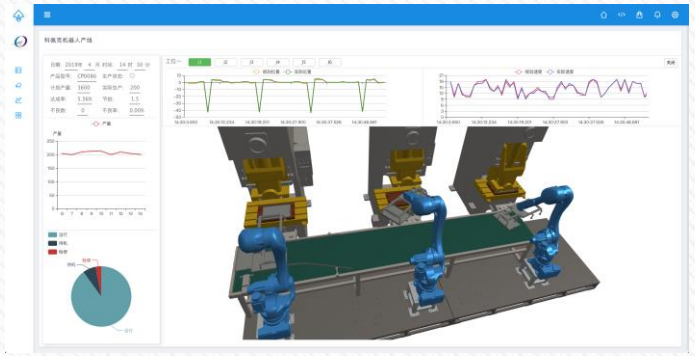


Process Parameter Recommendations

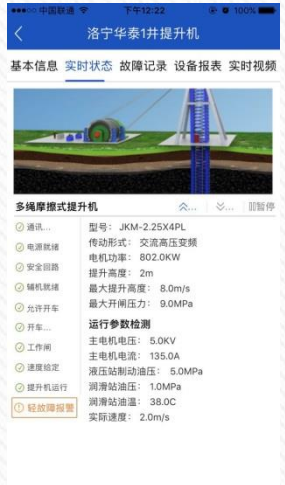
Spare Parts Management



Fault Diagnosis Algorithm



Digital Twins



Mobile Applications

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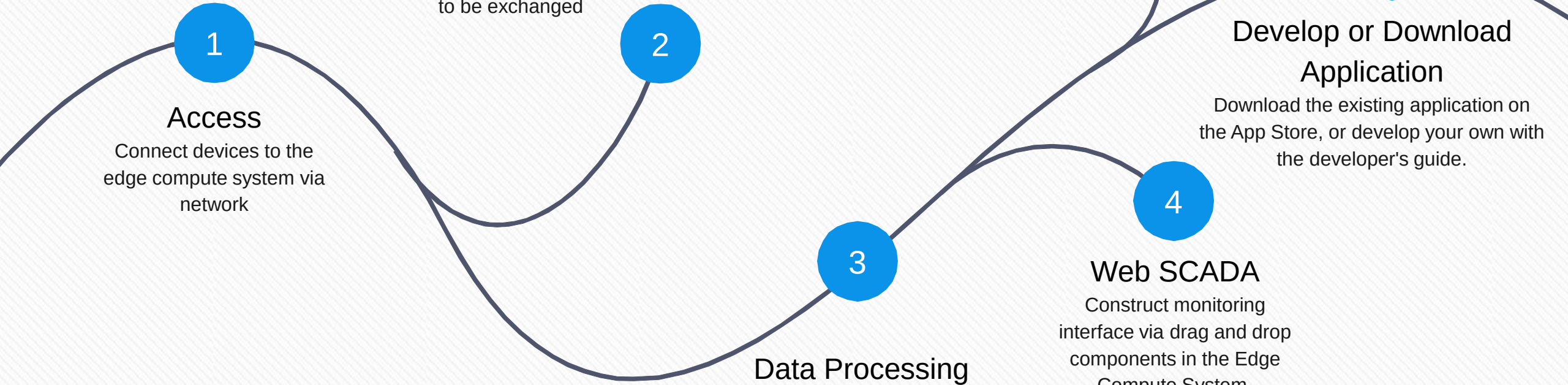
# Clear and easy deployment





1

## Access

Connect devices to the edge compute system via network

2

## Variable Configuration

User defines and configures the data to be exchanged

3

## Data Processing

Configure the data processing code online in the Edge Compute System.

4

## Web SCADA

Construct monitoring interface via drag and drop components in the Edge Compute System.

5

## Automation Configuration

User configures the scheduling policy between devices in a production line on-demand online.

6

## Develop or Download Application

Download the existing application on the App Store, or develop your own with the developer's guide.

# Values For Users

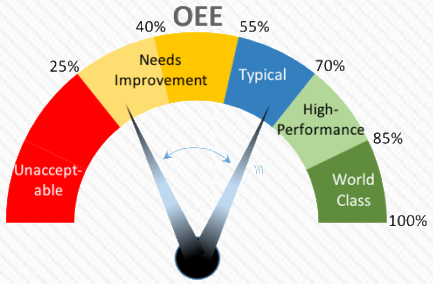
Remote Support
Higher Efficiency

Cost Down

Trace Faults
Via Data

Optimize Device
With Data

Efficiency
Visualization



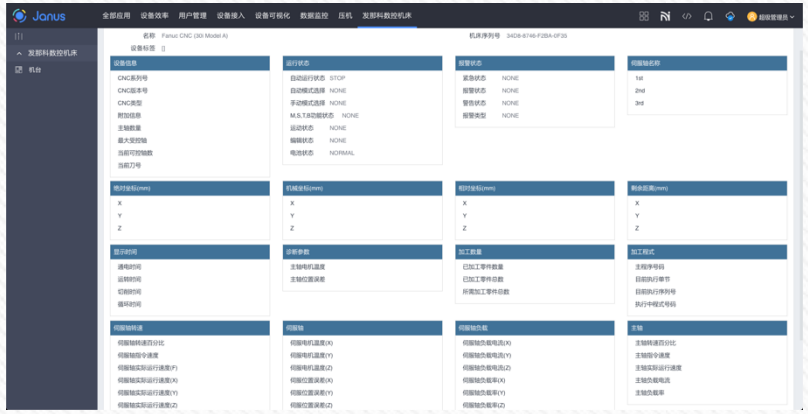

Higher Efficiency
Higher Quality

Extra Value From
Production Data mining

Intelligent
Manufacturing

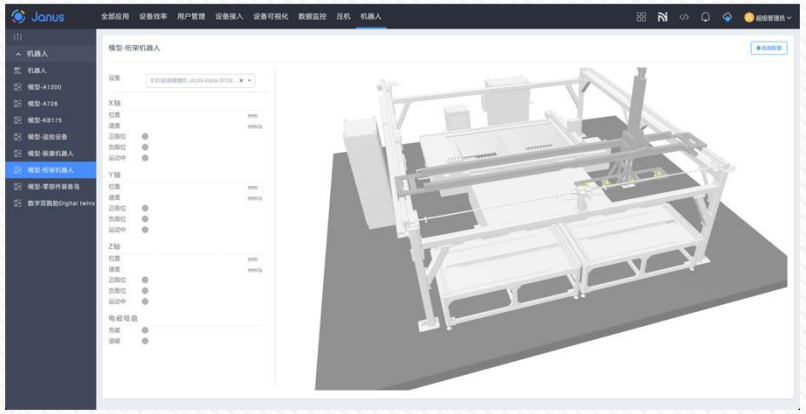
# Application scenarios





## CNC Center (Phone Screens)

Process File Management + Cutter Compensation Parameters Recommendation

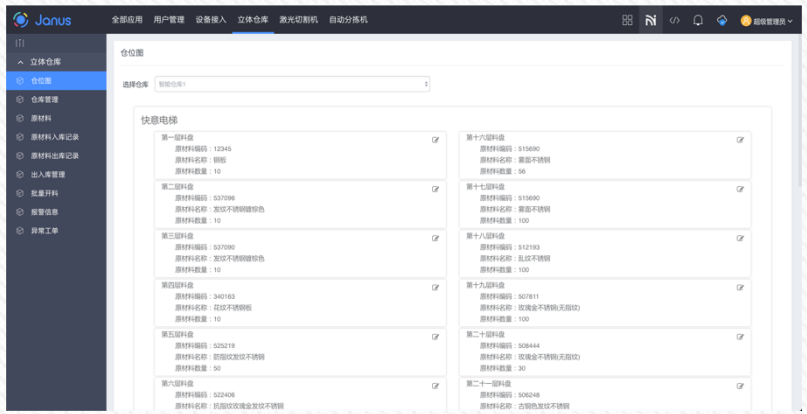


## Girder Robot (Automobile Parts)

Process File Management + Production Line Automation

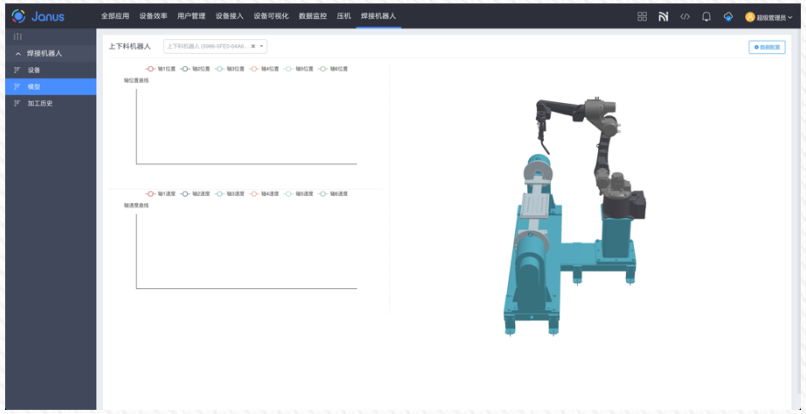
## Robot Assembly(3C Electronics)

Production Line Automation + Quality Tracing



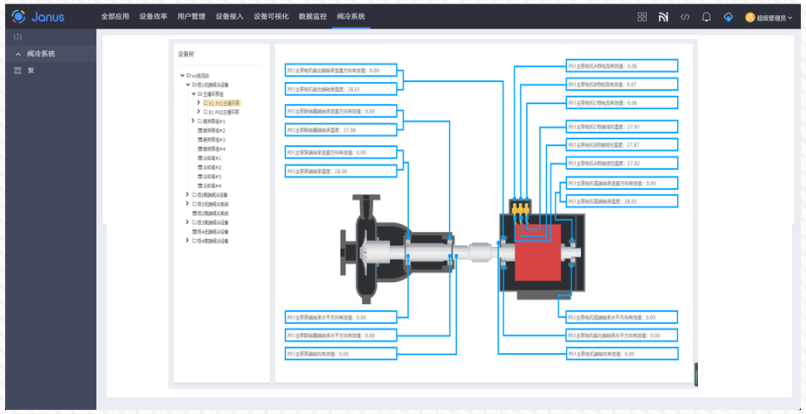
## Laser Cutting (Metal Work)

Material Scheduling Algorithm + Production Line Automation



## Welding（Metal Work）

Automatic Quality Check + Parameter Recommendations + Quality Tracing

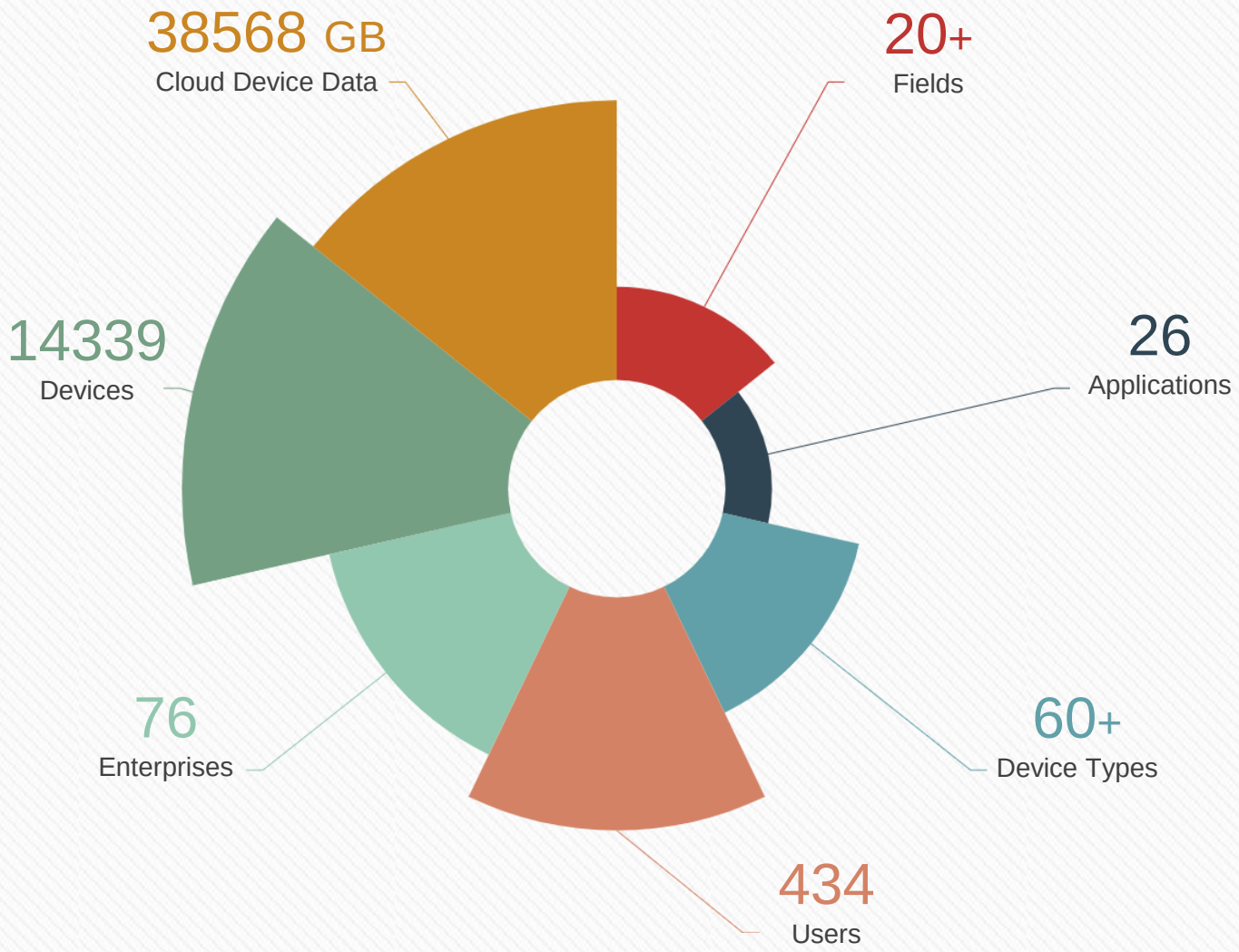


## Power Transformer Station Cooling Gauge (UHVDC)

Predictive Maintenance + Fault Diagnosis

# Platform Statistics








Data until 2020-01

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Cynovan

# About Cynovan



Cynovan is one of the first batches of enterprises that enters the Guangdong Industrial Internet Industry Ecosystem Supply Resource Pool. We have participated in multiple national major R&D projects, and involved in the establishment of the CNC Device Interconnect Standard lead by the National Industrial Machinery Electrical System Standard Committee. Neptune combines technologies like edge computing and cloud computing, providing extensive services around devices and data management for device manufacturers, service providers and end users.

In 2016, funded by Googol Technologies who excels in motion control and automation, Cynovan takes the core technologies of industrial control from Googol and combines them with Neptune as a fully-featured package that solves problems at the root of industrial devices.

### Position

The most industrial oriented Internet data application platform

### Vision

Become the leader of the integration of information and industrial technologies

### Mission

Bring new dynamics into the industrial field with information technology and data industry

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# Thanks for watching

Shenzhen Cynovan Technologies Co. Ltd