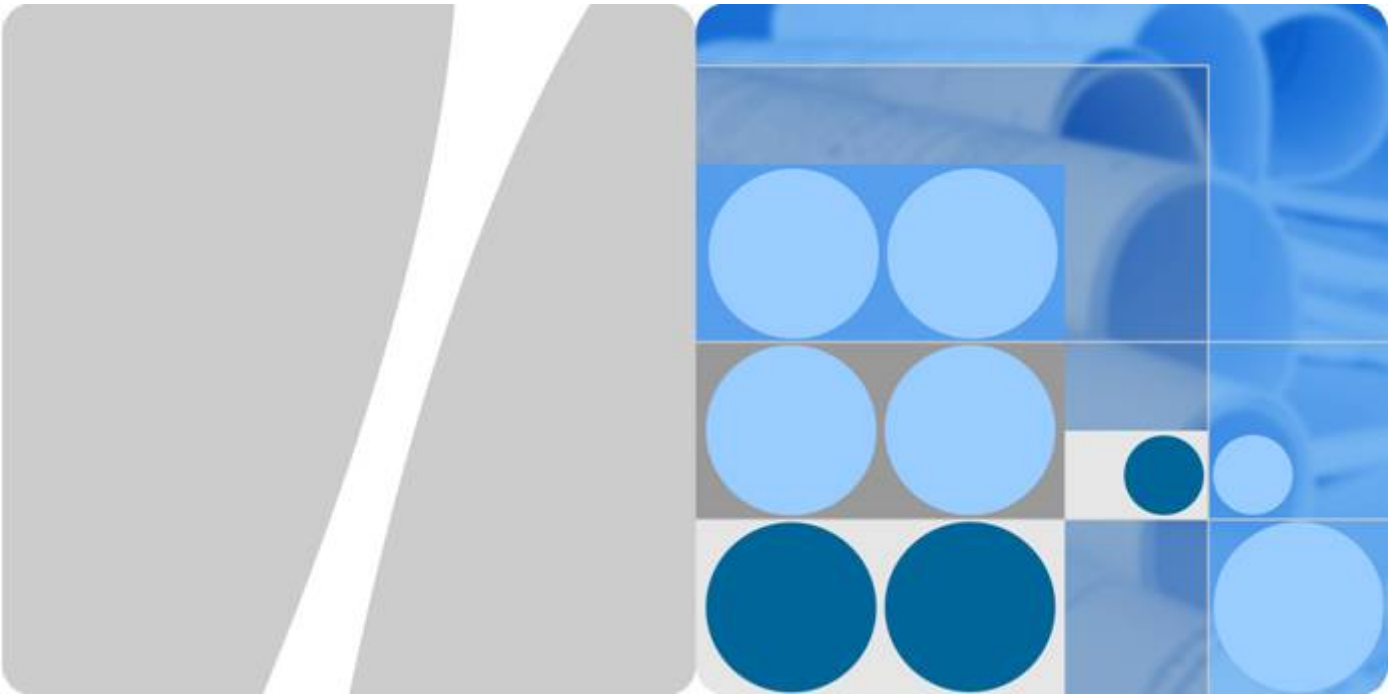

Huawei HiLens

Product Introduction

Issue 01

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Huawei Technologies Co., Ltd.

Address: Huawei Industrial Base
Bantian, Longgang
Shenzhen 518129
People's Republic of China

Website: https://www.huawei.com

Email: support@huawei.com

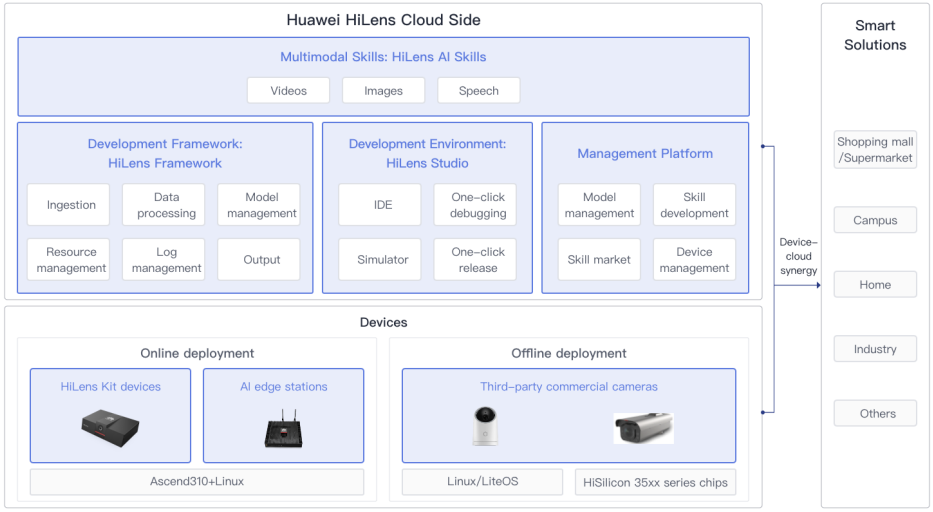
Contents

1 What's Huawei HiLens?

Huawei HiLens is an AI application development and runtime management platform featuring device-cloud synergy. Used with ModelBox, an open-source AI application development and reference framework, Huawei HiLens allows you to quickly deploy models trained by Huawei Cloud ModelArts to many different types of devices and manage them online. Huawei HiLens also provides a rich set of developer tools and plugins to facilitate AI development, as well as a skill market where users can quickly obtain the applications they need through subscription.

Huawei HiLens is a multimodal AI development platform featuring a device-cloud synergy. It provides a cloud-based development framework called HiLens Framework, a cloud-based development environment called HiLens Studio, a web-based management console, and multimodal AI skills. You can develop skills or purchase out-of-the-box skills and deploy them onto HiLens Kit and Atlas 500 devices to enable intelligent applications. (A skill can be seen as an AI application ready to run on a camera or another end user device, and it consists of a model and the code needed to run the model.)

Figure 1-1 HiLens (Basic Edition) architecture



- Management console

Provides functions such as model management and skill development for you to manage models and skills on the cloud and install skills to devices in just one click.

- Development framework: HiLens Framework

  Encapsulates basic components of video analysis algorithms, such as image processing, inference, and logging. You can develop your own skills with minimal coding.

- Development environment: HiLens Studio

  A multi-language integrated development environment, including the code editor, compiler, and debugger. You can compile and debug skill code in HiLens Studio.

- Multimodal AI skills

  A rich selection of AI skills are available in the skill market and can be easily deployed onto end user devices, covering multiple commercial scenarios such as shopping malls, supermarkets, homes, and campuses.

2 Advantages

Device-Cloud Synergy, Cost-Effective

- Real-time inference on end devices and confirmation on the cloud later — a balance between latency and accuracy.
- Online deployment and update of algorithms and runtime parameters on end devices, fast iteration, and on-device accuracy improvement
- End devices analyze the collected data locally, so that much less data needs to be transmitted to the cloud, saving storage and bandwidth costs, and avoiding the impact of possible network outages.

Unified Management of Diverse Devices

- Supports the management of many different types of devices in tens of millions.
- Supports the deployment of AI applications in container images or software packages.
- Provides unified APIs for skill integration and management.

3 Functions

Huawei HiLens consists of a cloud-based management platform, devices.

Cloud-based Management Platform

- **AI Application Development**
  - Provides a unified skill development framework that encapsulates all basic components, offers unified APIs, and supports multiple deep learning frameworks, simplifying the development process.
  - Offers one-stop model training, development, debugging, deployment, and management, and seamlessly interconnects with user devices.
  - Allows users to import models trained by ModelArts or developed offline on the Model Management page of the HiLens console.
  - Allows users to publish the skills they developed directly deploy them on devices.
- **Skill Market**

  Allows users to select and subscribe to the skills they need and deploy them to devices in one click.
- **Device Management**
  - Allows users to manage registered devices on the Device Management page, including viewing and deregistering devices, and one-click updating of device firmware.
  - Allows users to manage skills installed on the devices, including viewing, deploying (installing), uninstalling, starting, and stopping the skills.
  - Provides different device management firmware (HiLens Agent) versions based on the type of devices used.

4 Application Scenarios

Huawei HiLens has two types of users: AI application developers and AI application users.

- **AI application developers**

  Typical AI application developers include college students and instructors, professional AI developers or enthusiasts, and enterprises with AI development capabilities. These users may use Huawei HiLens to develop and deploy their own AI applications to end devices, verify their AI models and algorithms, or to gain some knowledge and experience or make some money. They can develop AI applications on the HiLens management console. After an AI application is developed, you can easily deploy it to a device to see how it performs. They can also release it to the skill market for other users to use, or share it as a template so that other users may use it to create their own applications.

- **AI application users**

  Typical AI application users include AI software integrators, hardware vendors, AI deployment personnel, and AI O&M personnel. They can register their devices with the HiLens console, and then purchase skills from the skill market (such as skills for license plate recognition and safety helmet identification) and install them on their devices in one click.

These users can use Huawei HiLens in various application scenarios, including but not limited to the following:

Smart Home

Smart home cameras and homeware powered by HiSilicon Hi35*xx* series chips, as well as high-performance HiLens Kit devices powered by D chips can be used to improve intelligent video analytical capabilities. They can be used for:

- **Human figure detection**

  Detects human figures in homes, records the time when a figure appeared, and sends an alarm to the owner's mobile phone if nobody is supposed to be at home at this time of the day.

- **Identification of people falling events**

  Generates an alarm when detecting a person falling down. This is useful for elderly care.

- **Cry sound detection**

  Intelligently identifies baby cries and sends alarms to target mobile phones. This is useful for baby care.

- **Word detection**

  Generates an alarm when specified words (customizable) are detected, for example, "help".

- **Family album**

  Identifies and obtains video clips about your children to create an album that records their growth.

Smart Campus

AI skills are delivered through the HiLens console to edge stations that are powered by Ascend chips, enabling the edge devices to process certain data. This function can be used in the following scenarios:

- **License plate/Vehicle model identification**

  At the entrance and exit of a campus or garage, identifies license plates and vehicle models to implement intelligent access control.

- **Safety helmet detection**

  Finds out workers who are not wearing safety helmets and sends alarms to preconfigured destinations.

- **Abnormal sound detection**

  Detects suspicious sounds, such as glass breaking and explosion, and reports alarms.

- **Intrusion detection**

  Generates an alarm when a human figure is detected in a specified area.

Smart Shopping Malls and Supermarkets

Devices that can be used in shopping malls and supermarkets to support intelligent applications include HiLens Kit devices, AI edge stations, and commercial cameras. One HiLens Kit device can support the analysis of four to five channels of video. HiLens Kit devices are compact and can be placed indoors.

- **Customer foot traffic**

  Counts the number of people entering and exiting a shopping mall or supermarket in captured video images to analyze changes in customer foot traffic over different periods.

- **VIP detection**

  Identifies VIP customers accurately to help formulate marketing strategies.

- **Statistics on old and new customers**

  Counts the numbers of new and old customers in the entrance and exit.

- **Crowd heat map**

  The crowd heat map shows the density of customers in each area, from which you can analyze the product popularity.

Smart In-Vehicle Devices

Smart vehicle-mounted Android devices intelligently analyze the internal and external conditions of vehicles in real time. These devices are used for:

- **Driver fatigue monitoring**

  Monitors the driver's status in real time and generates an alarm when driver fatigue is detected.

- **Gesture analysis**

  Monitors a driver's gestures, such as making a call, drinking, looking around, smoking, and other behavior that might indicate distracted driving.

5 Billing

Huawei HiLens is a multimodal AI development platform featuring a device-cloud synergy. When you use Huawei HiLens, fees may be incurred for purchasing HiLens Kit devices, the device-cloud synergy development service, and for purchasing skills from the skill market.

HiLens (Basic Edition) Billing Items

The fees vary based on Huawei HiLens (Basic Edition) resources you have used. For details about the billing items, see **Table 5-1**.

Table 5-1 HiLens console (basic edition) billing items

Billing Item	Description	Billing Mode
HiLens Kit	Before using Huawei HiLens, you need to purchase HiLens Kit devices. HiLens Kit is a multimodal AI development suite that performs data analysis and inference over diverse data like images, video, and audio, with support for a device-cloud synergy. It can be used for intelligent surveillance, smart homes, AI education, smart manufacturing, smart stores, and more scenarios. For details, see **Introduction to HiLens Kit**. Currently, HiLens Kit devices support one-off purchase only.	One-off purchase

Billing Item	Description	Billing Mode
Skill	You will need to pay for commercial skills that you purchase from the skill market of Huawei HiLens (Basic Edition).	Only the yearly/monthly billing mode is supported. For details about the billing mode, see **Commercial Skill Billing Mode**.

- **Commercial Skill Billing Mode**

  You will need to pay for commercial skills that you purchase from the skill market of Huawei HiLens. Only the yearly/monthly billing mode is supported.

  Generally, the price of a commercial skill is in the form of $*X*/skill/channel/year. The price varies depending on the skill.

HiLens (Professional Edition) Billing Items

Table 5-2 shows the billing items of the HiLens console (Professional Edition).

Table 5-2 HiLens console (professional edition) billing items

Billing Item	Description	Billing Mode
Skill	You will need to pay for commercial skills that you purchase from the skill market of Huawei HiLens (professional edition).	Only the yearly/monthly billing mode is supported. For details about the billing mode, see **Commercial Skill Billing Mode**.

- **Commercial Skill Billing Mode**

  You will need to pay for commercial skills that you purchase from the skill market of Huawei HiLens. Only the yearly/monthly billing mode is supported.

  Generally, the price of a commercial skill is in the form of $*X*/skill/channel/year. The price varies depending on the skill.

6 Basic Concepts

Device, Cloud, and Edge

Devices include cameras and other user devices, cloud indicates Huawei Cloud, and edge refers to Huawei intelligent edge devices.

Skill

A skill is an AI application ready to run on a camera or another compute device. It consists of a model and logic code. The logic code is the skill's framework that governs how the skill behaves, including data reading, model import, model inference, and result output. The model is an AI algorithm trained using big data and handles inference while the skill is running.

- The application scenarios for HiLens skills include smart campus, smart home, smart vehicle-mounted terminals, smart shopping mall, and more.
- Skills are divided into two types by device: skills for Ascend chips and skills for HiSilicon Hi35*xx* series chips.

HiLens Kit

Huawei HiLens development suite, specifically, intelligent cameras that integrate Huawei HiSilicon Ascend chips and adopt deep learning to deliver high-performance inference and image and video analysis capabilities, helping users quickly install and deploy AI skills.

HiLens Framework

A development framework that encapsulates basic components and provides easy-to-use APIs, enabling developers to focus more on their service applications and improving experience and efficiency.

Skill Output

On the **Data Management** page of HiLens, you can download device data and see how your skills have performed.

Skill Template

Skill templates that come with the platform can be used to quickly develop new skills. A skill template contains the skill code and all the necessary parameter settings.

7 Permissions Management

If you want to assign different permissions to employees in your enterprise to access Huawei HiLens resources you purchased on Huawei Cloud, Identity and Access Management (IAM) is a good choice for fine-grained permissions management. IAM provides identity authentication, permissions management, and access control, helping you secure access to your Huawei Cloud resources.

With IAM, you can use your Huawei Cloud account to create IAM users for your employees, and assign permissions to the users to control their access to specific resources of various types. For example, some software developers in your enterprise need to use Huawei HiLens resources but must not be allowed to delete skills or perform any high-risk operations. To achieve this result, you can create IAM users for the software developers and grant them only the permissions required for using Huawei HiLens resources.

If your Huawei Cloud account does not need IAM users for permissions management, you may skip over this chapter.

IAM is free of charge. You pay only for the resources in your account. For more information about IAM, see **IAM Service Overview**.

Huawei HiLens Permissions

By default, new IAM users do not have any permissions assigned. To grant permissions to a user, add the user to one or more groups and attach permissions, policies or roles to these groups. The user then inherits permissions from the groups it is a member of. This process is called authorization. After authorization, the user can perform specified operations on Huawei HiLens based on the permissions.

Huawei HiLens is a project-level service deployed and accessed in specific physical regions. To assign HiLens permissions to a user group, specify the scope as region-specific projects and select projects for the permissions to take effect. If **All projects** is selected, the permissions will take effect for the user group in all region-specific projects. When accessing Huawei HiLens, the users need to switch to a region where they have been authorized to use Huawei HiLens.

You can grant users permissions by using roles and policies.

- Roles: A type of coarse-grained authorization mechanism that defines permissions related to user responsibilities. This mechanism provides only a

limited number of service-level roles for authorization. When using roles to grant permissions, you must also assign other roles on which the permissions depend. However, roles are not an ideal choice for fine-grained authorization and secure access control.

- Policies: A type of fine-grained authorization mechanism that defines permissions required to perform operations on specific cloud resources under certain conditions. This mechanism allows for more flexible policy-based authorization, meeting requirements for secure access control. For example, you can grant ECS users only the permissions for managing a certain type of ECSs. For the API actions supported by Huawei HiLens, see **Permissions Policies and Supported Actions** in the *Huawei HiLens User Guide*.

Table 7-1 lists all the system-defined roles and policies supported by Huawei HiLens.

Table 7-1 Huawei HiLens system policies

Policy Name	Description	Policy Type	Dependency
HiLens FullAccess	Administrator permissions for Huawei HiLens. Users granted these permissions can operate and use all Huawei HiLens resources.	System-defined policy	When you log in to HiLens, the agency information is checked in IAM. You need to grant the IAM ReadOnlyAccess permission policy. The permissions to apply for the open beta test (OBT), set alarm reporting, and set skill messages depend on the **SMN Administrator** role. To apply for the OBT, and set alarm receiving and skill messages, you must be granted the **SMN Administrator** role.

Policy Name	Description	Policy Type	Dependency
HiLens CommonOperations	Operation permissions for Huawei HiLens. Users granted these permissions can perform operations on Huawei HiLens, except deregistering devices and suspending skills.	System-defined policy	When you log in to HiLens, the agency information is checked in IAM. You need to grant the IAM ReadOnlyAccess permission policy. The permissions to apply for the open beta test (OBT), set alarm reporting, and set skill messages depend on the **SMN Administrator** role. To apply for the OBT, and set alarm receiving and skill messages, you must be granted the **SMN Administrator** role.
HiLens ReadOnlyAccess	Read-only permissions for Huawei HiLens. Users granted these permissions can only view Huawei HiLens data.	System-defined policy	When you log in to HiLens, the agency information is checked in IAM. You need to grant the IAM ReadOnlyAccess permission policy.

Table 7-2 lists the common operations supported by each system policy of Huawei HiLens (Basic Edition). Please choose proper system policies according to this table.

Table 7-2 Common operations supported by each system-defined policy or role of Huawei HiLens

Functional Module	Operation	Huawei HiLens FullAccess	Huawei HiLens CommonOperations	Huawei HiLens ReadOnlyAccess
Device	Obtain the list of devices.	√	√	√

Functional Module	Operation	Huawei HiLens FullAccess	Huawei HiLens CommonOperations	Huawei HiLens ReadOnlyAccess
management	Register a device.	√	√	x
	Obtain the list of skills installed on a device.	√	√	√
	Obtain the device configuration information.	√	√	√
	Update the device configuration information.	√	√	x
	Update the device information.	√	√	x
	Upgrade device firmware.	√	√	x
	Deregister a device.	√	x	x
	Uninstall a specified skill on a specified device.	√	√	x
	Start a specified skill on a specified device.	√	√	x
	Update the configuration information of a specified skill on a specified device.	√	√	x
	Stop a specified skill on a specified device.	√	√	x
	Obtain the configuration information of a specified skill on a specified device.	√	√	√

Functional Module	Operation	Huawei HiLens FullAccess	Huawei HiLens CommonOperations	Huawei HiLens ReadOnlyAccess
Skill development	Obtain the list and details of developed skills.	√	√	√
	Create a skill.	√	√	x
	Edit a developed skill.	√	√	x
	Release a developed skill to the skill market.	√	√	x
	Deploy a developed skill to a device.	√	√	x
	Delete a developed skill.	√	√	x
	Obtain the list and details of skill models.	√	√	√
	Obtain the list and details of model conversion jobs.	√	√	√
	Import a skill to Huawei HiLens.	√	√	x
	Create a model conversion job.	√	√	x
	Obtain the list and details of skill templates.	√	√	√
	Download a skill template.	√	√	x
	Add a skill template to favorites.	√	√	x
	Remove a skill template from favorites.	√	√	x

Functional Module	Operation	Huawei HiLens FullAccess	Huawei HiLens CommonOperations	Huawei HiLens ReadOnlyAccess
	Delete a skill model.	√	√	x
Skill market	Obtain the skill list of the skill market.	√	√	√
	Install a skill purchased from the skill market.	√	√	x
	Obtain the skill details in the skill market.	√	√	√
	Obtain the skill billing information in the skill market.	√	√	√
	Create a skill order in the skill market.	√	√	x
	Obtain the skill order list in the skill market.	√	√	√
	Download a skill from the skill market.	√	√	x
	Remove a released skill from the catalog of the skill market.	√	x	x
Product management	Update the product information.	√	√	x
	Obtain the list of products.	√	√	√
	Create a product.	√	√	x
	Delete a product.	√	√	x

Functional Module	Operation	Huawei HiLens FullAccess	Huawei HiLens CommonOperations	Huawei HiLens ReadOnlyAccess
	Distributes skill orders to products.	√	√	x
	Obtain the skill order list of a product.	√	√	√
	Update the skill order information of a product.	√	√	x
	Delete the skill order information of a product.	√	√	x

Helpful Links

- **IAM Service Overview**
- **Creating a User and Granting Permissions**
- **Permissions Policies and Supported Actions**

8 Related Services

ModelArts

ModelArts is an AI development platform that provides the AI compute infrastructure for Huawei HiLens. It processes datasets to train models for HiLens. You can import models on the HiLens management console. For more information about ModelArts, see **ModelArts**.

OBS

Huawei HiLens uses OBS to store data and models. OBS is secure, highly reliable, and inexpensive. For more information about OBS, see **Object Storage Service**.

SMN

Huawei HiLens uses SMN to subscribe to skill messages and receive alarms. For more information about SMN, see **Simple Message Notification**.

9 Accessing Huawei HiLens

The cloud service platform provides a unified management console.

You can visit the easy-to-use management console of Huawei HiLens for device management, skill development, and rich skills. You can complete end-to-end AI application development on the management console.

To use the Huawei HiLens management console, register with Huawei Cloud first. If you have already registered with Huawei Cloud, open the management console and choose **Service List > EI Enterprise Intelligence > Huawei HiLens** to access the HiLens console.

