CodeArts

Service Overview

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Contents

1 What Is CodeArts?

CodeArts is a one-stop platform that provides out-of-the-box cloud services for requirement delivery, code commit, check, build, verification, deployment, and release throughout the entire software lifecycle.

Figure 1-1 CodeArts service portfolio
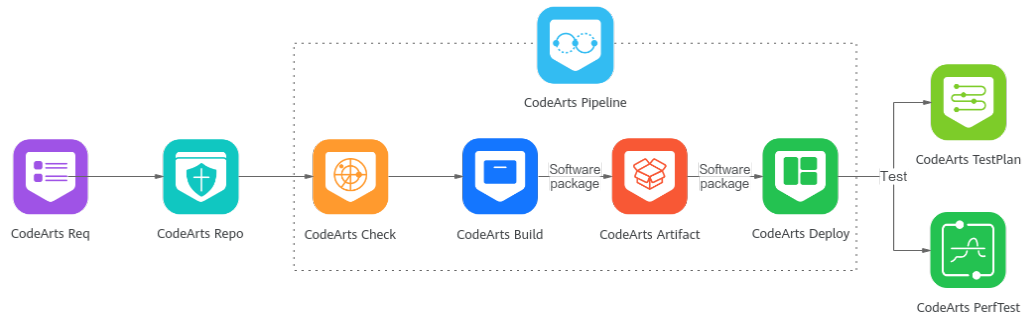
Table 1-1 CodeArts service portfolio

Service	Description
CodeArts Req	A team collaboration service that helps agile development teams to manage sprints and requirements, track defects, and collaborate with Kanban across projects.
CodeArts Repo	Provides Git-based distributed code management and collaborative development capabilities, including member management, permission control, code review and tracing.
CodeArts Pipeline	A visualized, customizable continuous delivery pipeline service.
CodeArts Check	A cloud-based code quality management service that offers multi-language static code check and security check, comprehensive quality reports, defect fixing suggestions, and trend analysis.

Service	Description
CodeArts Build	Provides fast, low-cost, and easy-to-configure multi-language builds with large-scale distributed acceleration.
CodeArts Artifact	Manages source code build products, including Maven, npm, and PyPI. It can seamlessly interconnect with local build tools as well as on-cloud continuous integration and deployment services. It supports artifact version management, and fine-grained permission control.
CodeArts Deploy	Deployment in hosts and containers by using multiple languages and technology stacks, including Tomcat and Spring Boot.
CodeArts TestPlan	Covers the entire testing process from plans and test cases to execution and evaluation.
CodeArts PerfTest	Performance testing on application APIs and links by using HTTP, HTTPS, TCP, and UDP.

2 Advantages

One-Stop Software Development Pipeline

- Full-lifecycle software development services, including CodeArts Req, CodeArts Repo, CodeArts Pipeline, CodeArts Check, CodeArts Build, CodeArts Deploy, CodeArts TestPlan, and CodeArts Artifact
- Out-of-the-box, cloud-based development, full-process visualization, and efficient remote collaboration

Built-in R&D Security

- Security guidelines and protection capabilities from application design, development, test, and running to secure the application R&D supply chain
- Capabilities to check code quality security, web vulnerabilities, host vulnerabilities, open-source vulnerabilities and compliance, and mobile application security

Huawei R&D Practice Capabilities and Guidelines

- Huawei has accumulated many years of R&D best practices and supports multiple mainstream R&D modes, such as IPD, DevSecOps, agile, Lean Kanban, and CI/CD.
- Covers multiple application development scenarios, such as embedded applications, cloud services, microservices, and mobile applications. Provides built-in Huawei R&D guidelines, such as requirement management, code check, and test management.

High-Quality, Efficient, and Agile Delivery

- Supports customization and automation of code check, build, test, and deployment tasks, and provides continuous delivery pipelines with visualized orchestration, one-click application deployment, and zero wait for release.
- Incorporates guidelines and experience into CodeArts Req, CodeArts Check, CodeArts TestPlan, and CodeArts Pipeline, effectively improving application R&D quality and detecting issues as early as possible.

3 Application Scenarios

Internet/SaaS Service Providers

- **Challenges**

  In response to rapid market changes and fierce competition, products need to be continuously iterated and upgraded. However, there are no unified continuous delivery tools to ensure timely product launch and collect and close customer feedback.

- **Recommended Services**

  CodeArts Req, CodeArts Repo, CodeArts Check, CodeArts Build, CodeArts TestPlan, CodeArts Deploy

- **Benefits**

  New functions and features are released at any time every day, shortening the period for feedback closed-loop management.

Software and Solution Providers

- **Challenges**

  - R&D environments and tools are not unified, and offices are in different locations, making communication difficult.
  - Rapid changes of customer requirements often cause rework. Quick responses to such changes are needed.
  - There are no automated continuous integration tools.

- **Recommended Services**

  CodeArts Req, CodeArts Repo, CodeArts Build, CodeArts TestPlan, CodeArts Deploy, CodeArts Pipeline

- **Benefits**

  Efficient collaboration among developers and controllable project development period allows you to quickly respond to customer requirements.

Traditional Enterprises Seeking "Internet Plus" Transformation

- **Challenges**

  Traditional enterprises are unable to effectively measure the software progress, productivity, and quality due to their poor development capabilities.

In addition, project management cannot be visualized, and there are no effective tools or methods to manage upstream and downstream partners, hindering the transformation to Internet Plus.

- **Recommended Services**

  CodeArts Req, CodeArts Repo, CodeArts Check, CodeArts Build, CodeArts Deploy, CodeArts TestPlan

- **Benefits**

  Visualized requirement management allows you to accurately measure the software development process and enables efficient collaboration between upstream and downstream partners.

Universities and Training Institutions

- **Challenges**

  Influenced by exam-oriented education, students prone to accept theoretical knowledge in class but can hardly solve problems using the knowledge. Most students are not aware of the importance of hands-on abilities, professional quality, and team cooperation. Teachers' well-designed teaching plans and contents cannot keep pace with the rapidly changing technical theories and cutting-edge trends of the IT industry. In addition, there is no unified and standardized process or platform for subject competitions, experiment project promotion, and comprehensive training.

- **Recommended Services**

  CodeArts Req, CodeArts Repo, CodeArts Check, CodeArts Build, CodeArts TestPlan, CodeArts Deploy

- **Benefits**

  You can learn software development in practice and cultivate talent with practice projects.

4 Notes and Constraints

General Constraints

Table 4-1 General constraints

Item	Constraint
Browser	The following popular browsers are supported: ● Chrome: the latest three versions ● Firefox: the latest three versions ● Edge (default for Windows 10): the latest three versions Chrome and Firefox are recommended for better experience.
Resolution	1920 × 1080 or higher recommended
Authorization	Not supported for enterprise projects and region-specific projects. For details about how to assign permissions by enterprise project and region-specific project, see **Creating a User Group and Assigning Permissions**.

Subservice Constraints

Table 4-2 Subservice constraints

Service	Constraint
CodeArts Req	See **CodeArts Req Constraints**.
CodeArts Repo	See **CodeArts Repo Constraints**.
CodeArts Pipeline	See **CodeArts Pipeline Constraints**.
CodeArts Check	See **CodeArts Check Constraints**.

Service	Constraint
CodeArts Build	See **CodeArts Build Constraints**.
CodeArts Artifact	See **CodeArts Artifact Constraints**.
CodeArts Deploy	See **CodeArts Deploy Constraints**.
CodeArts TestPlan	See **CodeArts TestPlan Constraints**.
CodeArts PerfTest	See **CodeArts PerfTest Constraints**.

5 Specifications

CodeArts uses yearly/monthly billing, and provides the Free, Basic, Pro, and Enterprise edition packages to meet the requirements of different user scales.

Each package contains resources of CodeArts Req, CodeArts Repo, CodeArts Pipeline, CodeArts Check, CodeArts Build, CodeArts Deploy, CodeArts TestPlan, and CodeArts Artifact. The functions and resource specifications of each service vary depending on the package edition. For details, see **Specifications**.

Table 5-1 CodeArts package overview

Item	Free	Basic	Pro	Enterprise
Users	50	5–9,999	5–9,999	5–9,999
Duration	1 month	1–9 months, 1–3 years	1–9 months, 1–3 years	1–9 months, 1–3 years
Changing user numbers	Not supported	Supported	Supported	Supported
Changing duration	Not supported	Supported	Supported	Supported
Resource extension	Not supported	Supported	Supported	Supported
Value-added features	Not supported	Not supported	Supported	Supported

6 Permissions Management

CodeArts fine-grained permissions management combines the capabilities of Identity and Access Management (IAM) and CodeArts to help you flexibly set different permissions for IAM users under your tenant account.

The capabilities include IAM fine-grained permissions management and CodeArts authentication.

- IAM fine-grained permissions management: IAM users are authorized by user group using system-defined permissions.
- CodeArts authentication: The three-layer permission model enables you to manage operation permissions of IAM users using roles.

IAM Fine-Grained Permissions

New IAM users do not have any permissions assigned by default. You need to first add them to one or more groups and then attach policies or roles to these groups. The users then inherit permissions from the groups and can perform specified operations on cloud services based on the permissions they have been assigned.

Table 6-1 lists all the system-defined permissions for CodeArts.

Table 6-1 System-defined permissions for CodeArts

Service	Role/Policy Name	Description	Type	Details
CodeArts Console	DevCloud Console FullAccess	Full permissions for the CodeArts console.	System-defined policy	For details, see **CodeArts Console Permission Description**.
	DevCloud Console ReadOnlyAccess	Read-only permissions for the CodeArts console.	System-defined policy	

Service	Role/Policy Name	Description	Type	Details
CodeArts Req	ProjectMan ConfigOperations	Full permissions for CodeArts Req.	System-defined policy	For details, see **Cloud-Service-Level Permissions**.
CodeArts Pipeline	CloudPipeline Tenant Extensions FullAccess	Full permissions for extensions of CodeArts Pipeline.	System-defined policy	For details, see **Tenant-level Permissions**.
	CloudPipeline Tenant Pipeline Templates FullAccess	Full permissions for templates of CodeArts Pipeline.	System-defined policy	
	CloudPipeline Tenant Rule Templates FullAccess	Full permissions for policy settings of CodeArts Pipeline.	System-defined policy	
	CloudPipeline Tenant Rules FullAccess	Full permissions for rule settings of CodeArts Pipeline.	System-defined policy	
CodeArts PerfTest	CodeArts PerfTest Administrator	CodeArts PerfTest administrator, who has full permissions for this service.	System-defined role	See **Permissions**.
	CodeArts PerfTest Developer	CodeArts PerfTest developer, who has full permissions for their own resources, but has no permission for those of other users under the tenant.	System-defined role	

Service	Role/Policy Name	Description	Type	Details
	CodeArts PerfTest Operator	CodeArts PerfTest operator, who has read-only permissions for this service.	System-defined role	
	CodeArts PerfTest Resource Administrator	CodeArts PerfTest resource administrator, who has full permissions on test resources in this service.	System-defined role	
	CodeArts PerfTest Resource Developer	CodeArts PerfTest resource developer, who can view and use test resources in this service, but cannot create, update, or delete infrastructure resources.	System-defined role	

CodeArts Authentication

CodeArts provides a permission model that contains the tenant, project, and instance levels.

The application scope of this model is as follows: tenant-level permissions > project-level permissions > instance-level permissions.

If the permission configuration in this model conflicts, this permission priority is used: instance-level > project-level > tenant-level.

- Tenant-level Permissions

  These permissions take effect for all CodeArts projects in your account, including creating, deleting, and modifying projects.

  By default, users with the **Tenant Administrator** role have tenant-level permissions. They can also grant other users the permissions required to create projects. For details, see **Project Creators**.

● Project-level Permissions

These permissions take effect for the current project, including editing and archiving projects, configuring roles and permissions, and configuring members. You can also configure operation permissions for each service, including the permissions to create, submit, and copy raw requirements in CodeArts Req, and the permissions to commit and merge code in CodeArts Repo. These permissions take effect for all instances of the service.

CodeArts provides role-based access control (RBAC). By default, new users do not have permissions assigned. You need to add a user to a project, and assign roles to the user. The user then has the permissions specified in the roles and can perform specified operations on cloud services based on the permissions.

CodeArts provides multiple system roles and also supports custom roles. You can create desired roles with specified operation permissions for CodeArts Req, CodeArts Modeling, CodeArts Repo, CodeArts Check, CodeArts Build, CodeArts Artifact, CodeArts Deploy, CodeArts TestPlan, and CodeArts Pipeline.

By default, users with the **Tenant Administrator** role are project administrators.

Table 6-2 Built-in project roles in CodeArts

Role Name	Description
Project administrator	The general owner of a project who manages all settings and members of the project, including creating, deleting, and modifying projects, assigning and canceling permissions of other roles.
Project manager	A primary owner of a project who manages requirements, plans, progress, and risks of the project, and coordinates work in the project team.
Product manager	Responsible for product design and planning, including defining product requirements, prototypes, and user stories, communicating and collaborating with developers and testers.
Test manager	Responsible for testing, including managing test plans, test cases, test execution, and bug tracking, guiding and supervising test personnel.
System engineer	Responsible for the system architecture and infrastructure of a project, including designing, setting up, and maintaining project resources such as servers, networks, and databases.
Committer	Reviews and merges code committed by developers.
Developer	Writes, commits, merges, and branches code, creates and runs services such as CodeArts Pipeline and CodeArts Build.
Tester	Executes test cases, reports bugs, and verifies fixes.

Role Name	Description
Participant	Participates in a project and creates work items.
Viewer	Views a project and cannot perform any operations in any services.

- Instance-level Permissions

  These permissions take effect for a specific code repository or pipeline of a project, for example, permissions required to view, execute, update, and delete a pipeline.

  Instance-level permissions are configured by the creator of the corresponding instance. CodeArts allows you to configure instance-level permissions for services listed in the following table.

  By default, users with the **Tenant Administrator** role can manage instances in a project.

Table 6-3 CodeArts instance-level permissions

Service	Instance	Configuration Method
CodeArts Repo	Code repository	**Permission Management**
CodeArts Pipeline	Pipeline	**Configuring Pipeline Permissions**
CodeArts Build	Build task	**Configuring Role Permissions**
CodeArts Deploy	Application	**Configuring Permissions for Different Roles**

7 Concepts

This chapter describes the basic concepts of CodeArts.

Project

A CodeArts project consists of a series of coordinated and controlled activities in a certain process. The objective of a project is to meet specific requirements under specific time and resource restrictions.

In a project, you can manage requirements, code, and artifacts, check and build code, deploy and test applications.

Agent Pool

An agent pool is a collection of custom executors.

You can select your own execution resources (namely, agents) in an agent pool to perform check, build, deployment, pipeline, and API test tasks. Agent pools improve task execution efficiency and eliminate the need for public resources.

Agent host

An agent host is a host with installed agent software for code check, build, deployment, pipeline execution, and API testing.

Service Endpoint

A service endpoint is an extension that connects CodeArts to a third-party service.

For example, when your CodeArts tasks need to obtain project source code from a third-party GitHub repository or need to run with Jenkins, you can create an endpoint to connect to each service.