CodeArts

Service Overview

Issue 01

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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.

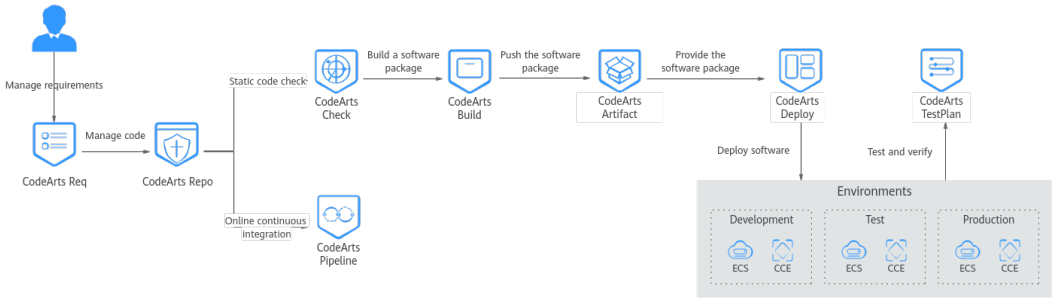
Architecture

CodeArts consists of the following services:

- CodeArts Req: Provides agile development teams with easy and efficient coordination services, including multi-project management, agile iteration management, Kanban collaboration, requirement management, defect tracing, document management, online Wiki, and statistics reports.
- CodeArts Repo: Provides Git-based distributed code management and collaborative development capabilities, including member management, permission control, code hosting, code check, code review, code tracing, and continuous integration. It helps enterprises of different scales improve R&D quality and efficiency.
- CodeArts Pipeline: A pipeline service that enables you to visualize and customize your delivery, improving delivery efficiency and quality.
- CodeArts Check: Makes it easy to perform static checks and security checks on code in multiple programming languages and obtain comprehensive quality reports. It also allows you to view grouped defects with fix suggestions provided, effectively controlling quality and helping achieve success.
- CodeArts Build: An easy-to-configure platform that supports multi-language parallel builds on the cloud. Its distributed acceleration helps enterprises improve build efficiency while lowering overall costs even at large scale.
- CodeArts Deploy: Supports deployment in hosts and containers by using multiple languages and technology stacks, including Tomcat and Spring Boot. The plug-in encapsulation and orchestration of deployment functions help you quickly and efficiently release software.
- CodeArts TestPlan: Covers the entire process of test plan, test design, test cases, test execution, and test evaluation, and aims to help enterprises with collaborative, efficient, and trustworthy test activities before product release.
- CodeArts Artifact: Manages source code build products, including Maven and npm. It can seamlessly interconnect with local build tools and on-cloud CI/CD so that you can manage software package lifecycle to improve release quality

and efficiency. CodeArts Artifact provides artifact package version management, fine-grained permission control, and other important functions.

Figure 1-1 Architecture



Access Methods

You can access CodeArts using either of the following methods:

- Console: After the registration is complete, access CodeArts using the **console**.
- APIs: Or access the following services using APIs.
  - **CodeArts Repo**
  - **CodeArts Pipeline**
  - **CodeArts Check**
  - **CodeArts Build**
  - **CodeArts Deploy**

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 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 Enterprises

- **Challenges**

  Facing rapid market changes and narrow product profit windows, enterprises cannot deliver high-quality products to customers in a timely manner because R&D tools cannot meet actual project requirements. In addition, the R&D capabilities of enterprises cannot be measured, and whether new projects can be delivered on time cannot be determined based on data.

- **Recommended Services**

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

- **Benefits**

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

Software and Solution Carriers

- **Challenges**

  For software and solution enterprises, communication is difficult among developers who work in different places and use different tools and environments. Customer requirements change fast, which requires fast responses and often causes rework. Enterprises urgently need tools for automated, continuous integration.

- **Recommended Services**

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

- **Benefits**

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

Traditional Industries

- **Challenges**

  Traditional enterprises know little about the Internet industry. Their management models and technologies are outdated, and R&D efficiency is

too low to cope with market requirements. Internet-based transformation becomes an impossible mission.

- **Recommended Services**

  CodeArts Req, CodeArts Repo, CodeArts Build, CodeArts Deploy, CodeArts TestPlan, CodeArts Artifact

- **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 during personal development. Well-designed teaching plans and contents cannot keep pace with the rapidly changing technical theories and cutting-edge trends of the IT industry. 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, and CodeArts Artifact

- **Benefits**

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

4 Features

Table 4-1 CodeArts service features

Service	Feature
CodeArts Req	Multi-project management, agile iteration management, milestone management, bug tracking, and multi-dimensional reports. **View details.** • Sprint plan and timeline enable effective management of project plans. • Scrum projects support tree, table, and card views. • Various project statistics charts are provided to inform you of the project progress at any time. • Online file library, batch document hosting, and information transfer without distortion
CodeArts Repo	Secure, reliable, and efficient distributed code hosting services, including code cloning, downloading, committing, pushing, comparing, merging, and branching. **View details.** • Git-based distributed version control improves cross-region, cross-team collaborative development efficiency. • Association with project tasks supports efficient project delivery. • Enhanced security capability, IP address whitelist, and auditing of code repository access logs are adopted. • Code commit statistics are collected by repository and time.
CodeArts Check	One-stop collaborative code check services. **View details.** • One-stop: standard programming languages, coding standards, and Software Development Life Cycle (SDLC) integration are supported. • Flexible and easy-to-use check methods: Checks can be triggered by code commits, scheduled, and performed across branches. • Collaborative: The service automatically assigns owners on tickets and provides suggestions on rectifying issues, allowing you to focus on handling new issues.

Service	Feature
CodeArts Build	A fast and secure cloud-based build service. **View details.** • Provides built-in build templates for mainstream languages such as C, C++, and Java, and supports custom build templates. • Supports execution plans such as code-triggered execution and scheduled execution. • The GUI is easy to configure, and users do not need to compile build configuration files. • Container images and common software packages can be archived. • Provides notifications when the build is complete. • Supports build in the Arm or x86 environment. • Provides built-in build environment images that support mainstream languages, and supports user-defined environment images. • Supports multiple build actions to flexibly orchestrate the build process.

Service	Feature
CodeArts Deploy	A visualized, one-click service for parallel deployment and seamless pipeline integration. **View details.** • Various deployment procedures are provided to meet different deployment scenarios. • Supports multiple deployment methods, such as using virtual hosts, physical hosts, and containers. • You can copy, delete, modify, and decompress files, and use common deployment capabilities such as Ansible, Shell commands, and Shell scripts. • The configuration is simple, and you do not need to write any deployment script. You can drag and drop deployment steps to flexibly orchestrate them. • Provides built-in system templates for Tomcat, Spring Boot, Django, and so on, and allows you to customize templates. You can use the deployment templates to develop a standard deployment process for quickly creating applications. The process is easy to share within the team. • Deployment to official and self-hosted resource pools is supported. • Provides error log analysis capabilities. If the application deployment fails, keywords in the error log will be matched with FAQs and detailed troubleshooting solutions will be provided. • You can customize parameters. During application deployment, you can specify parameter values and use them to replace the corresponding parameters in the task. • Allows you to manage hosts and host clusters. You can add, delete, modify, and query hosts (clusters), delete hosts in batches, and verify connectivity in batches. Host connectivity supports EIP direct connection and proxy connection. • Both applications and host groups support the two-dimensional matrix of roles and permissions in a project.

Service	Feature
CodeArts TestPlan	Industry's first one-stop automatic test factory solution, covering test design, test cases, test management, and automatic API testing. It streamlines the entire test process, including test planning, test design, test case management, test execution, and test reporting. It provides defect reporting and quality dashboards to evaluate product quality from multiple dimensions. It helps you efficiently manage test activities and ensures high-quality product delivery. **View details.** • Test design: uses heuristic mind maps to design and review test cases, which is more intuitive and efficient. You can directly import XMind files to generate four-layer (feature-scenario-function-case) online mind map test design and edit the mind map online, and generate test cases in batches in one click. Test design in all domains includes function, API, and security tests. You can use a test policy template to quickly create test cases or customize a template to form your own test assets. • Test Management: In this mature test case management system, you can design and execute test cases, submit defects, and view quality reports to improve efficiency. The change history can be recorded to avoid false positives or negatives, facilitate tracing and auditing, and standardizing the test process. It integrates concepts such as full-lifecycle tracing, test planning, multi-role collaboration, agile testing, and requirement-driven testing. It provides one-stop management functions from test requirements, test task assignment and execution, test progress control, test coverage measurement, test result management, defect management, quality reporting, and test dashboard displaying. It also provides customization capabilities for different team scales and processes. • APITest: allows you to quickly orchestrate API test cases based on the API script template generated by API URLs or Swagger files. It integrates pipelines and supports microservice tests. You do not need to code test cases. The technical barrier is low. Different roles such as API developers, API consumers, testers, and service personnel can run tests with ease. You can import a swagger API definition in a few clicks to automatically generate a script template, based on which you can orchestrate and manage automated test cases of APIs. APITest supports HTTP and HTTPS, a visualized case editing interface, various preset check points and built-in variables, customized variables, parameter transfer, and continuous automated testing.

Service	Feature
CodeArts Artifact	A cloud service that provides software developers with artifact management functions, such as software repositories, release package download, and release package metadata management. Secure, reliable software repositories allow you to manage software packages, enhance software release quality and efficiency, and continuously release products. **View details.** • Multiple file operations are supported, such as renaming, batch deletion, batch restoration, upload/download, and search. • Build attributes are automatically associated with software packages, and build products are automatically archived to release repos. • Software packages generated by CodeArts Build can be quickly archived to release repos, and CodeArts Deploy tasks obtain software packages from release repos. • It supports multiple artifact repositories such as Maven, npm, Go, PyPI, RPM and Debian, and supports capabilities such as creating repositories, uploading and downloading artifacts, and searching for artifacts.

Service	Feature
CodeArts Pipeline	It provides visualized continuous integration and continuous delivery (CI/CD) software pipelines that can be orchestrated. It helps enterprises quickly realize continuous delivery and efficient automation in DevOps, shortens the time to market (TTM) of applications, and improves R&D efficiency. **View details.** • Custom orchestration: You can manage and orchestrate multiple types of tasks, such as build, code check, child pipeline, deployment, delayed execution, manual review, and API test, based on application scenario requirements. • Visualization: You can create, edit, delete, and query execution status on the GUI. You can switch to the corresponding automated task page to view details such as logs. • Permission management: You can set permissions control of pipelines for specified accounts. Permissions are controlled based on the account role. Each role is granted with different operation permissions, including viewing, editing, executing, and deleting pipelines. • Execution history: You can view the historical execution records of the pipeline in last 31 days. • Notification: You can set the notification for an event, including whether to send pop-up and email notifications. • Selected execution: One or more tasks in the pipeline can be executed separately. • Runtime parameter configuration: You can customize parameters. When executing a task, you can specify parameter values. The corresponding parameters are replaced with the specified values in the task. • Serial/parallel execution configuration: Tasks in the same stage can be executed in serial or parallel mode based on your requirements.

NOTE

If the data you enter or upload to CodeArts may contain sensitive information, encrypt them for security purposes.

5 Notes and Constraints

General Constraints

Table 5-1 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	The recommended resolution is 1920 x 1080 or higher.
Regions where CodeArts is available	EU-Dublin **NOTE** • CodeArts is available in the default regions, excluding **IAM projects** (sub-regions).

Subservice Constraints

Table 5-2 Subservice constraints

Service	Constraint
CodeArts Req	See **Constraints**.
CodeArts Repo	See **Constraints**.
CodeArts Check	See **Constraints**.
CodeArts Build	See **Constraints and Restrictions**.

Service	Constraint
CodeArts Artifact	See **Constraints**.
CodeArts Deploy	See **Constraints**.
CodeArts TestPlan	See **Constraints**.
CodeArts Pipeline	See **Constraints**.

6 Billing

Billing Mode

CodeArts uses yearly/monthly billing and provides the basic edition, capacity package, parallel package, CloudTest basic package, and CodeCheck enhanced package.

Before using CodeArts, you must purchase the basic edition package. If the basic edition cannot meet your requirements, you can purchase preceding packages as required on top of the basic edition.

- Basic edition package

  The basic edition provides quotas for CodeArts Req, CodeArts Repo, CodeArts Check, CodeArts Pipeline, CodeArts Build, CodeArts Deploy, CodeArts TestPlan, and CodeArts Artifact. For details about the billing rules and quotas, see **Pricing Details**.

- Capacity package

  The capacity package contains 5 GB storage space for CodeArts Req, CodeArts Repo, and CodeArts Artifact respectively.

  Capacity packages are yearly/monthly and can be purchased together. The number of packages that can be purchased is subject to the purchase page.

- Parallel package

  A parallel package contains one shared parallel job, which can be used in CodeArts Build, CodeArts Deploy, and CodeArts Pipeline.

  Parallel packages are yearly/monthly and can be purchased together. The number of packages that can be purchased is subject to the purchase page.

- CloudTest basic package

  The basic package includes:

  – Test Management: manages test plans and cases, enables use case branching, and supports a maximum of 10 million cases

  – APITest: 30 concurrent test cases, 24 concurrent suites, and a maximum of 20 concurrent test cases for each suite. The test duration is not limited.

  The basic package is charged by the number of users. The maximum number of users is the number of users who have purchased the Basic Edition.

- CodeCheck enhanced package

To use security-related code check rules, purchase this package. The enhanced package supports one additional parallel job.

CodeCheck enhanced packages are yearly/monthly and can be purchased together. The number of packages that can be purchased is subject to the purchase page.

Changing Specifications

CodeArts allows you to increase or decrease the number of users. For details, see **Purchasing CodeArts**.

NOTE

"Purchased users" means the maximum number of users supported by CodeArts.

The number of CodeArts users refers to the number of unique members in a tenant's all projects in a region. This number includes the tenant's own members added to projects and those invited from other tenants. Administrators can view the tenant's members in all projects on the **All Account Settings** > **Work** > **Projects and Members** page.

Expiration and Renewal

After a package expires, renew it immediately, or it will be frozen and cannot be used. Click **Renew** on the console.

Unsubscription

To unsubscribe from CodeArts, click **Unsubscribe** on the console.

7 Permissions Management

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 projects in your account, including creating, deleting, and modifying projects, and creating workspaces.

By default, users with the **Tenant Administrator** permission have tenant-level permissions. You can also grant project permissions to users without this permission. 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 eight system roles for R&D processes, such as IPD and DevOps. You can also create custom roles and assign them different permissions.

Table 7-1 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.
Test manager	Responsible for testing, including managing test plans, test cases, test execution, and bug tracking, guiding and supervising test personnel.
O&M manager	Responsible for project O&M, including project deployment, monitoring, and fault locating and rectification.
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.
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 repository or pipeline, for example, viewing, executing, updating, and deleting a pipeline.

Instance-level permissions are configured by the creator of the corresponding instance. For details, see the description about how to configure permissions for relevant tasks.

