

CodeArts Check

Service Overview

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Contents

1 What Is CodeArts Check?	1
2 Service Features	4
2.1 Huawei-developed Code Check Engine	4
2.2 Five Mainstream Industry Standards and Huawei Programming Guidelines	5
2.3 Mainstream Programming Languages	5
2.4 Tens of Billions of LOC Scanned per Day	5
2.5 One-stop Issue Fixing	6
2.6 Three-Layer (Coding, Merging, and Version Release) Protection	6
3 Service Advantages	7
4 Application Scenarios	9
5 Constraints	10

1 What Is CodeArts Check?

CodeArts Check is a cloud-based service that checks codes. With years of experience in automatic static check and enterprise application, CodeArts Check provides rich check services on code style, common quality, cyber security risk, and other elements. It also includes comprehensive check reports, convenient bug handling, and many other efficient, easy-to-use functions for enterprises to effectively improve code quality.

The cloud service and IDE plug-in are two forms of CodeArts Check. In addition, it provides a feature package with in-depth security check.

CodeArts Check Functions

Table 1-1 CodeArts Check functions

Function	Description
Coding issue check	Use rule sets to check issues in your own code.
Code security check	Use rule sets to check code security risks and issues.
Code style check	Use rule sets to check whether your code matches the selected style.
Code health score	A comprehensive metric, which is related to the alarm impact, quantity, and code quantity. The code health score is automatically calculated.
Issue management	Handle issues found in code checks based on issue descriptions, status, check rules, file paths, source code, and fix suggestions.
Cyclomatic complexity	Evaluate code quality risks based on the code cyclomatic complexity report.
NBNC (non-blank non-comment)	Number of valid code lines excluding blank lines and comment lines.

Function	Description
Duplication rate	Evaluate code quality risks based on the duplication rate report.
Scheduled check	Use the function of scheduling code checks every week and every day to balance rest and coding.
Check result notification	After the check is complete, the messages are sent to notify related personnel of the check results so that they can handle issues in time.
Java code check	Check the Java code in projects online.
JavaScript code check	Check the JavaScript code in projects online.
CSS code check	Check the CSS code in projects online.
Web code check	Check the HTML code in projects online.
C++ code check	Check the C++ code in projects online.
Python code check	Check the Python code in projects online.
PHP code check	Check the PHP code in projects online.
C# code check	Check the C# code in projects online.

IDE Plug-in of CodeArts Check

It is a powerful assistant for developers to protect the code quality.

- Provides industry standard (including Huawei Cloud) check, one-click code style formatting, and automatic code fixing, adhering to the concepts of simplicity, high speed, and real-time monitoring.
- Checks code accurately and efficiently, and builds three-layer protection during coding, merging, and version release with cloud services jointly.
- Displays all built-in lightweight IDE rules that are a subset of cloud rules in the cloud, implements security scan shifting left, and covers 30+ defect categories.
- Supports Java, C, and C++. The IDE plug-in has been rolled out on four mainstream IDE platforms: VSCode IDE, IntelliJ IDEA, CodeArts IDE, and Cloud IDE.

Enhanced Package of CodeArts Check

The package identifies code security risks and vulnerabilities cc.

- Covers security check other than the yearly/monthly package (such as parameter value errors, encryption and data verification issues).
- Enhances security check and analysis for vulnerability detection items in the industry (such as cross-function check, cross-file check, taint analysis, semantic analysis).

2 Service Features

- [2.1 Huawei-developed Code Check Engine](#)
- [2.2 Five Mainstream Industry Standards and Huawei Programming Guidelines](#)
- [2.3 Mainstream Programming Languages](#)
- [2.4 Tens of Billions of LOC Scanned per Day](#)
- [2.5 One-stop Issue Fixing](#)
- [2.6 Three-Layer \(Coding, Merging, and Version Release\) Protection](#)

2.1 Huawei-developed Code Check Engine

Comprehensively Evaluating the Seven Characteristics of Code Quality

The core of CodeArts Check lies in engine, which helps you efficiently and accurately detect code issues at the early stage of development, and improves development efficiency and product quality.

- Stems from the collaboration of 40+ PhDs in China, 50+ experts in global research centers, and 10+ teachers in China and abroad, continuously improved by 150,000+ Huawei developers, with an average of 50 billion lines of code scanned per day.
- Covers mainstream development languages in the industry, and comprehensively analyzes code in terms of readability, maintainability, security, reliability, testability, efficiency, and portability.
- Integrates years of continuous thinking, exploration, and practices in code quality and trustworthiness improvement, and accumulates various check rules.

2.2 Five Mainstream Industry Standards and Huawei Programming Guidelines

Improved Code Compliance Driven by Mainstream Standards and Guidelines

Quality issues of software products often lead to unacceptable operational risks or high costs. It is important to establish standards for quality detection at the source code level, such as the ISO/IEC 5055 and CERT coding specifications.

- Uses CodeArts Check to check the code quality comprehensively.
- Filters identified coding specification issues, provides knowledge association between specifications and standards, helps you understand the issue type, severity, and details. In this way, you can quickly analyze and make rectification plans as required.
- Supports the industry mainstream programming standards and best practices, such as ISO 5055, CERT, CWE, OWASP top 10, and CWE/SANS top 25.

2.3 Mainstream Programming Languages

Multiple Programming Languages and 7000+ Built-in Check Rules for Out-of-the-Box Usability

CodeArts Check supports more than 10 mainstream programming languages, such as Java, C/C++, Python, C#, Go, JavaScript, TypeScript, CSS, HTML, and PHP, for embedded, web, and mobile application development.

- Built-in open-source tools, self-developed engine, and 7000+ check rules
- More than 10 rule sets, including those for comprehensive, critical, mobile field-android, and Huawei codestyle specification check.
- Custom rule sets based on rule library for various check needs

2.4 Tens of Billions of LOC Scanned per Day

Hyperscale Code Check for Large Enterprises

CodeArts Check excels at high-concurrency processing. It provides high-frequency code check services for more than 150,000 Huawei software developers, and daily scheduled check for all code repositories, scanning tens of billions lines of code per day.

- It has a series of high availability (HA) features, such as cross-AZ disaster recovery (DR), cross-region multi-active DR, overload protection, and service dependency and isolation, to provide reliable support for self-detection, self-isolation, and self-recovery of service faults.
- Fluctuating code check demands are well taken care of by the powerful elastic scheduling that allocates resources whenever needed and aims to achieve zero waiting time.

2.5 One-stop Issue Fixing

One-stop Issue Fixing with Higher Efficiency

Developers are tired of tools that are not easy to understand, issue distribution that is time-consuming and labor-intensive, and repeated handling of the same alarm in multiple versions. These lead to difficulties in issue analysis and fixing, affecting the initiative for tool use.

CodeArts Check provides the following capabilities to help developers efficiently and smoothly check code.

- Code defects are detected by line and fixed quickly according to the provided guides, including built-in coding specifications, compliant and noncompliant examples, and fix suggestions. Developers do not need to retrain specifications and fix skills.
- Issue owners are automatically matched based on the code commit information, improving the issue distribution efficiency, and enhancing specification and quality awareness of developers.
- The ignored issues that have been handled are automatically synchronized. Therefore, all same false positives in a repository only need to be handled once.

The preceding capabilities improve the efficiency of issue analysis and fixing during practices.

2.6 Three-Layer (Coding, Merging, and Version Release) Protection

Three-Layer Protection Against Bugs to Improve Both Efficiency and Quality

To improve code quality, code check should be integrated into the development phase, including automatic audit during coding and committing, and daily programming specification and code quality check.

- This is recommended by many excellent development modes, such as SDL (security development lifecycle) and DevSecOps.
- CodeArts Check provides various APIs, including those for task creation, setting, scanning, and report analysis. It allows you to seamlessly integrate CodeArts Check into self-built CI/CD or CodeArts. Check data can be displayed in customers' boards, making code quality visible and manageable.
- Flexible task management allows you to set excluded catalogs to avoid invalid scanning. CodeArts Check supports check in hybrid languages, simplifies deployment, and obtains comprehensive quality reports of whole version.

3 Service Advantages

Professional

- Provides more than 2000 typical check rules.
- Provides multi-dimensional quality statistics reports, such as quality gates.

Accurate

- Locates reported defects under fix guidance.
- Enables you to customize check rule sets to target at issues that you pay more attention to.

Comprehensive

- Supports multiple mainstream development languages, such as Java, C++, and JavaScript.
- Supports code guideline, security, code repetition rate, and cyclomatic complexity checks.
- Supports CWE, OWASP top 10, SANS top 25, CERT security standards.

Easy to Use

- Checks code in hybrid languages.
- Allows you to run configured tasks by one click, filter issues in batches, and quick handle issues by severity or category.

Code Security Check

Scenario

- Checks code quality and security issues automatically in the software development phase, supports built-in security guidelines, requirements, and software production workflows, helps enterprises secure software production.
- Provides in-depth code security check capabilities to help government cloud operators and large enterprises manage and control ISV software security quality and build a supply chain security system.

Capability

- Analyzes taints and checks across functions and files.
- Checks for top security vulnerabilities, such as injection and access key leakage.
- Supports programming specifications and is compatible with CWE, OWASP TOP 10, CERT and SANS TOP 25 checks.

4 Application Scenarios

Web Applications

- Application: Rule sets of web development languages such as Java and JavaScript are used for code review.
- Characteristics: Web services are oriented to the Internet and are vulnerable to DDoS attacks or information leakage.
- Scenario: Accept security levels during Internet service delivery.

Project Quality Control

- Application: Control risks in real time based on the code complexity, repetition rate, and quality score during delivery.
- Characteristics: Project managers agree that they should **secure quality from the front end in daily delivery**. However, there is often no effective tool platform. Currently, most quality work depends on backend testing.
- Scenario: Project managers control iteration delivery quality.

5 Constraints

CodeArts Check

This section describes the constraints on CodeArts Check, as shown in [Table 5-1](#).

Table 5-1 CodeArts Check constraints

Scenario	Constraint
Maximum number of custom rule sets per tenant	1000
Maximum number of code check tasks created by a tenant	50,000
Maximum duration of one check	12 hours