



Module 3 Cloud Native Application Architecture

Chapter 3 HUAWEI CLOUD DevOps Platform

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- DevOps is a trending topic in recent years. DevOps has a profound meaning and involves a wide range of technologies, which pose big challenges to enterprises. Therefore, being a master hand at DevOps is not an easy task.



Foreword

- This chapter describes the implementation of DevOps on HUAWEI CLOUD platforms.



Objectives

- After this course, you will be able to:
 - Describe the DevOps process.
 - Understand DevOps platforms on HUAWEI CLOUD and their functions.

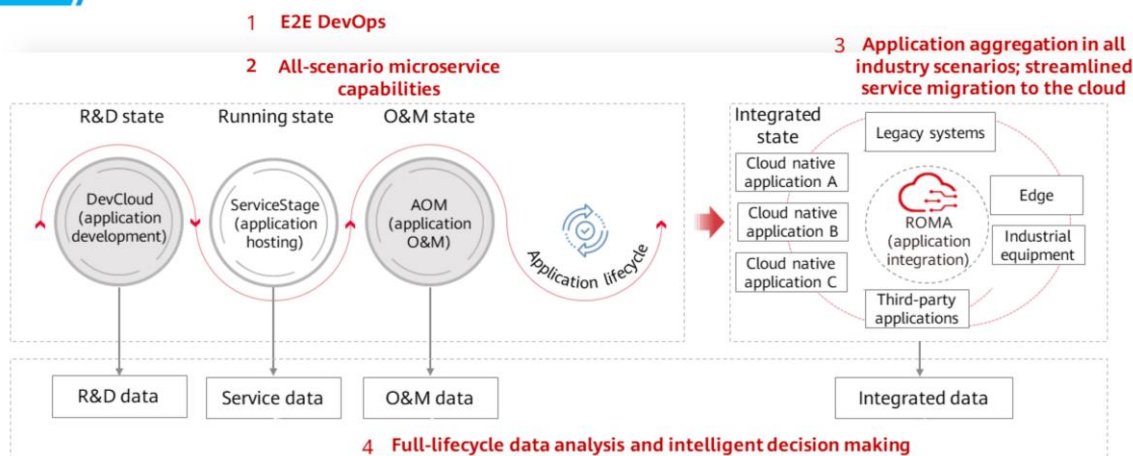


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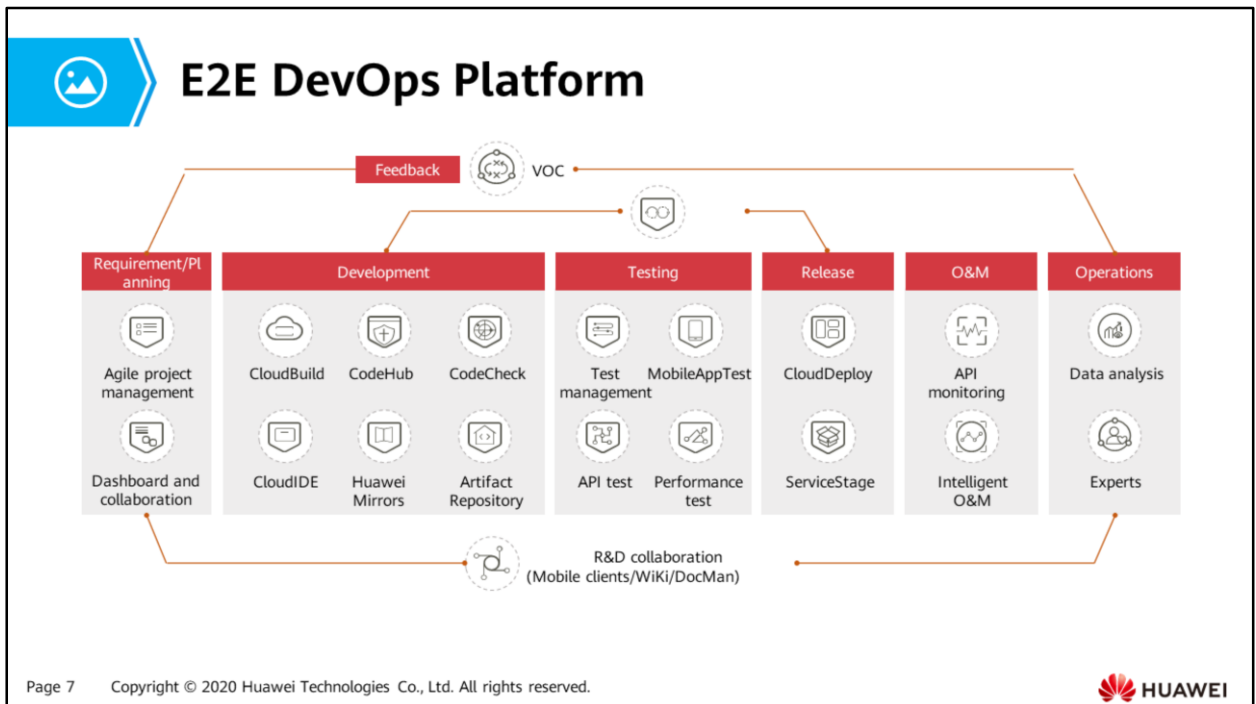
1. HUAWEI CLOUD DevOps Platforms
2. HUAWEI CLOUD DevOps Solutions



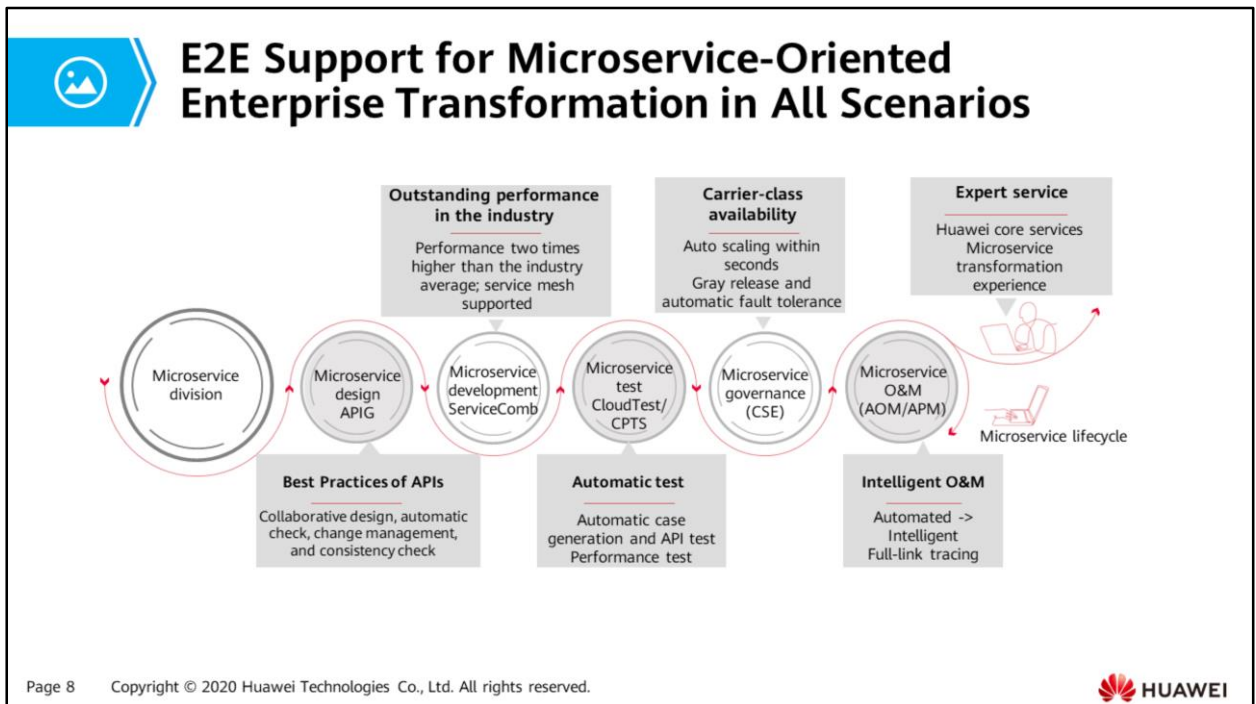
Full-Lifecycle Application Platform



- First, let's have a brief introduction to the HUAWEI CLOUD capabilities involved in this platform.
 - To address the challenges in enterprise and industry digital transformation, HUAWEI CLOUD launched the first full-lifecycle application platform that covers the entire lifecycle of applications.
 - The full-lifecycle application platform consists of four states from left to right as shown in the diagram.
 - Since 2016, HUAWEI CLOUD has launched services such as the application development platform DevCloud, application running platform ServiceStage, and application O&M platform AOM. These services used to be independent from each other in the past.
 - This time, we deeply integrate application models, service scenarios, operation processes, and APIs to adapt the services to enterprise scenarios and enhance scenario-specific support and experience.
 - The full-lifecycle application platform is built through seamless integration of DevCloud, ServiceStage, and ROMA, focusing on application development, hosting, O&M, and integration.
 - The core measure of enterprise digital transformation is reforming the application development, running, O&M, integration, operation model, and business model with cloud being the foundation.



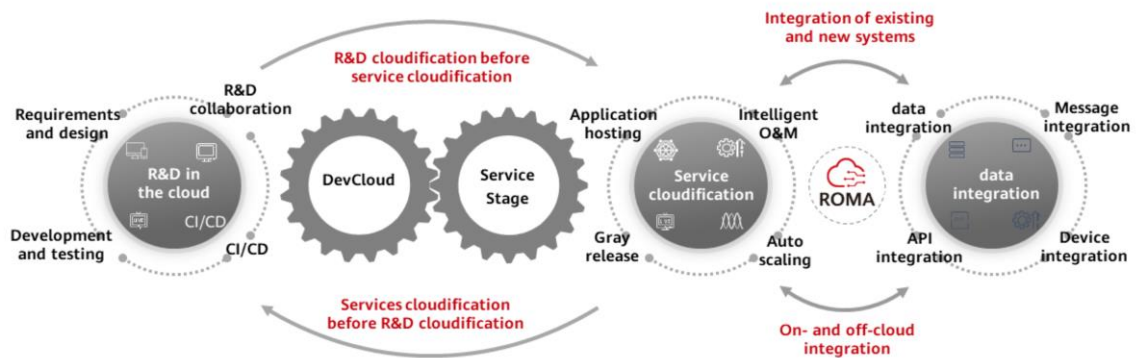
- In 2015, three services were launched for the first time. During 2016 and 2017, eight services have been rolled out. By now, more than 15 services have been rolled out.
- The entire application development process is covered.
- Industry standards: leading the development of DevOps standards in the industry; covering all major DevOps standard capability domains.
- Market progress: adopted by 30+ city campuses, 24 universities in Project 985, 300,000 professional developers, and 400,000 projects.
- Domains covered:
 - Requirements, development, test, release, O&M, and operations
 - Leading the development of DevOps standards in the industry; covering all major DevOps standard capability domains.
 - Adopted by 30+ city campuses, 24 universities in Project 985, 300,000 professional developers, and 400,000 projects.



- Providing capabilities such as microservice design, Huawei microservice development framework, registration and discovery, microservice test, governance, and O&M.
- Expert service:
 - Introduce microservice services, design, ServiceComb, test, CSE, and O&M one by one.
 - Cloud Performance Test Service (CPTS) is a cloud service that provides API and E2E performance tests of applications, which are built based on HTTP, HTTPS, TCP, UDP, WebSocket, RTMP, or HLS. The rich capability of test model definition can be used to restore scenarios of large-scale concurrent service access, helping users identify application performance problems in advance.
 - CloudTest is a one-stop test platform that allows developers to conduct API and performance tests and manage these tests in the cloud. Developed on the basis of the DevOps agile testing concept, CloudTest helps developers improve management efficiency and deliver high-quality products.



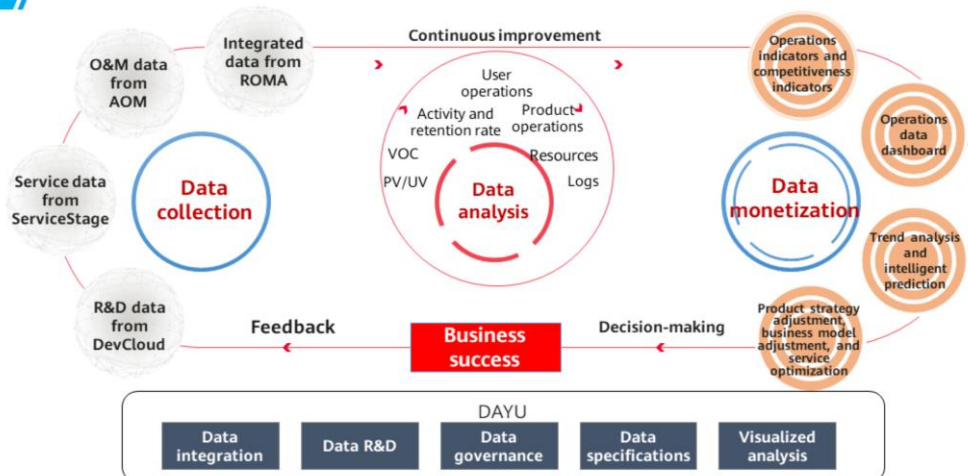
Smooth Digital Transformation for Enterprises



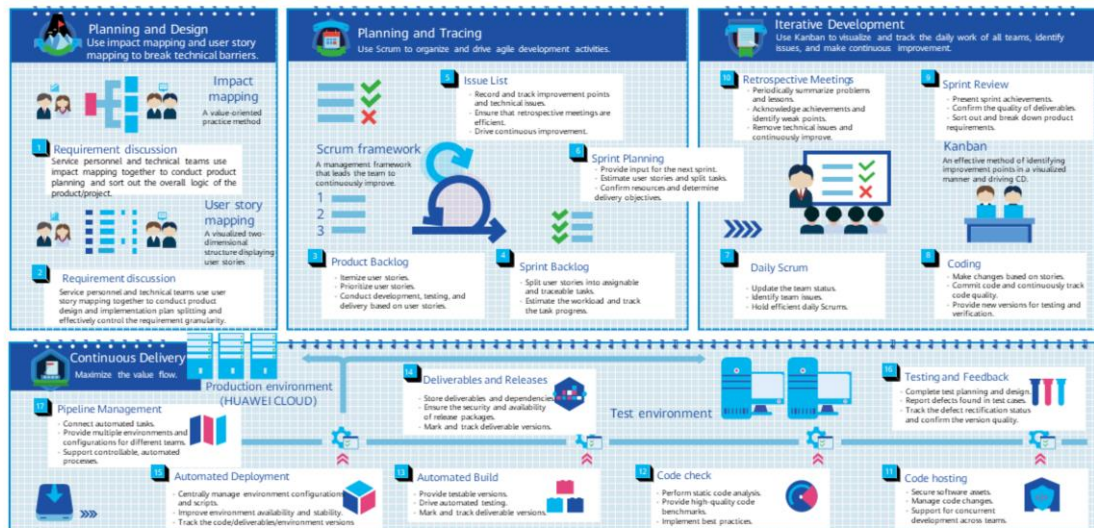
- Enterprise digital transformation is a complex systematic project, involving changes in the R&D process, R&D model, business model, organization, and culture.
- The transformation cannot be accomplished overnight. It should be smoothly implemented step by step through continuous sprint and improvement.
- Mature and stable approaches are provided as follows:
 - DevCloud: stories of R&D cloudification
 - ServiceStage: stories of service cloudification
 - ROMA: an integration platform



Full-Lifecycle Data Aggregation and Analysis



- The ultimate goal of enterprise digital transformation is business success.
- We hope to help enterprises continuously improve, gradually form a virtuous cycle, and implement operation data-driven improvement, and value-driven investment.
- Continuous aggregation of full-lifecycle data: various types of data
- Analysis of a massive amount of data: based on Huawei DAYU
- Cultivating data monetization capabilities: 4 points



- HE2E is Huawei E2E DevOps implementation framework. Based on industry-leading practices and 30 years of R&D experience, we have developed a practical Agile development methodology, which is supported by the DevCloud tool chain.
- The diagram shows the HE2E DevOps implementation framework.
- This framework integrates the industry methodologies and practices with Huawei's DevOps experience, which are then implemented in the tool chain of Huawei DevCloud.
- Steps 1 and 2 in the diagram represent the process of product planning between service personnel (even customers) and technicians to sort out the overall product logic, implementing product planning and design, and controlling the requirement granularity and splitting.
- The essence of software development is to solve problems and deliver user value, not simply providing functions. Therefore, we need to identify what user requirements and root causes are. This is where impact mapping comes in.
- User stories are carriers of objectives and requirements. We tell stories based on user scenarios to facilitate information exchange between customers, service personnel, and developers. In this process, it is easy to get lost when scattered requirement items pile up. User story mapping can help you solve this problem. Major phases and their detailed activities can be sorted and displayed in a tree structure according to user scenarios. In this way, you can intuitively see both the objectives and their detailed requirements items.



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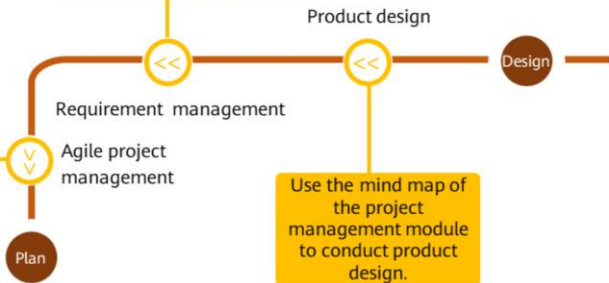
Design and Planning Phase

Use HUAWEI CLOUD DevCloud to conduct planning, design, and agile project management.


No.	Title	Sprint	Content Number	Order	Priority	Status	Created
1302986	Req02	--	sprint2	2	High	New	Star 15
1302985	Req01	--	sprint1	1	High	New	Star 15
1302984	Task_01	--	Task	1	High	New	Star 15
1302983	Task_02	--	Task	2	High	New	Star 15
1302982	Task_01	--	Task	1	High	New	Star 15
1302981	Sprint01	Sprint	sprint1	1	High	New	Star 15

Use sprint, progress tracking, and Kanban to assist the team in daily meetings and forming pull management.

Use sprints and hierarchical structure of epic, feature, and backlog to manage project requirements and plans.



- HUAWEI CLOUD DevCloud supports product planning, design, and agile project management.
- In the product design phase, you can design product framework using mind maps.
- Requirements are associated with product design. The hierarchical structure of epic, feature, and backlog allows you to manage the details of a requirement.
- Use sprint and Kanban to track the project progress and work item completion status.




Agile Project Management

Losing requirements


Delayed

Getting lost



Making the same mistake again

Blocked



01 Professional

- ✓ **Agile management:** Sprint plans and timelines help you accurately control project progress in a timely manner.
- ✓ **Mind map planning:** Product panorama planning makes requirement splitting and roadmap planning easier.
- ✓ **Standard and lightweight:** Standard Scrum and lightweight Dashboard templates are provided.

02 Connecting data, people, and experience

- ✓ **Dashboard for managers:** Customized statistical reports show the enterprise status and project progress.
- ✓ **Project document management:** Large-volume document hosting enables effective archiving of knowledge assets.
- ✓ **Wiki collaboration:** Team knowledge can be shared online to aggregate project experience in time.


03 Anytime and anywhere

- ✓ **Mobile app:** Viewing and working on your projects at anytime.

Visible

Controllable

Traceable




Inherited

Incorporated into tools

Smooth

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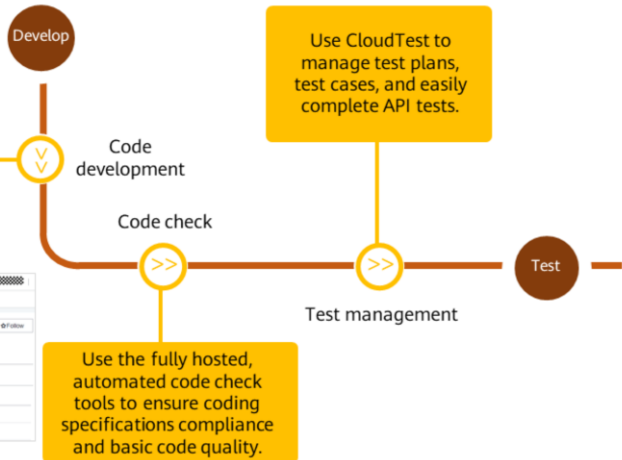
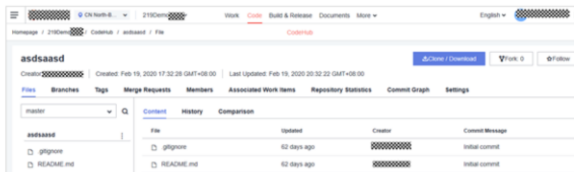
- ProjectMan is a cloud service that provides agile project management and collaboration for software development teams. It integrates Huawei's more than 30 years of advanced software R&D concepts and practices.
- Cloud-based deployment is based on the powerful infrastructure of HUAWEI CLOUD. It is out-of-the-box and allows team members to collaborate anywhere at anytime. In addition, it seamlessly integrates with other HUAWEI CLOUD DevCloud services to provide full-lifecycle management for applications and enable team collaboration for software development.
- Agile project management helps you solve problems listed on the left.
- There are two types of preset project templates: Scrum project template and Kanban project template.
 - Scrum projects follow the strict Agile Scrum methodologies and practices, which are suitable for agile software development teams.
 - Kanban projects use cards for interaction. It is suitable for lightweight and simple management of software development teams.
- Multiple basic features of software project management are provided. These features include project management, requirement planning and management, defect management, sprint plan management, customized workflow, progress tracking, statistics reports, dashboard, Wiki online collaboration, and project document hosting. ProjectMan enables E2E, efficient, transparent, and visible management.



Development and Testing Phase

Use HUAWEI CLOUD DevCloud to assist the team in code development, code quality check, and quality verification.

Use CodeHub to perform routine coding, branching/merging, and code walk-through.



- In the development and testing phase, DevCloud provides support for code management and code quality control.
- CodeHub is a Git-based online code hosting service for software developers. It is a cloud code repository with functions such as security management, member and permission management, branch protection and merging, online editing, and statistics. The service aims to address issues such as cross-distance collaboration, multi-branch concurrent development, code version management, and security.
- CodeCheck is a cloud-based management service that checks code quality. Developers can easily perform static code and security checks in multiple programming languages and obtain comprehensive quality reports. CodeCheck also provides suggestions on correcting encoding bugs and analytical breakdowns to identify potential problems before the code is compiled to run, effectively controlling quality throughout the process.
- CloudTest is a one-stop test platform that allows developers to conduct API and performance tests and manage these tests in the cloud. Developed on the basis of the DevOps Agile testing concept, CloudTest helps developers improve management efficiency and deliver high-quality products.



CodeHub

Security

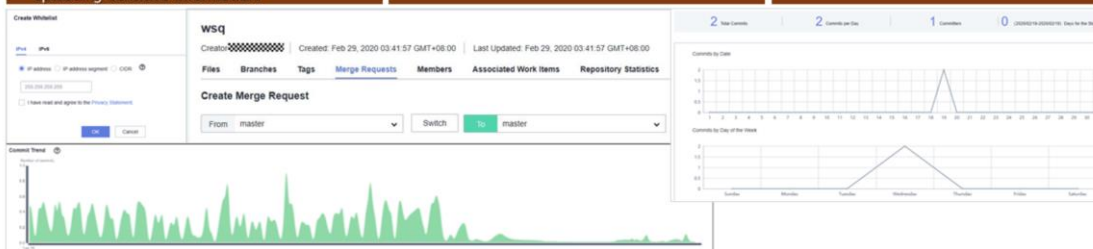
- IP address whitelists can be configured to ensure access security.
- Access logs can be obtained for audit.
- Encrypted storage is supported to prevent code leakage.
- Git-Crypt enhances encrypted storage capability.
- Security and protection prevent users from uploading sensitive information.

Efficient Collaboration

- Git-Flow workflows are supported.
- Enhanced code review: permission control, code owners, scoring mechanism, collaboration notification, and problem closure mechanism
- Pipelines are automatically associated to ensure commit quality.
- Coding in Web facilitates online code editing.

Contribution visualization

- Statistics of code language types
- Code volume growth trend
- Team contribution ranking
- Commit activity distribution
- Commit quality statistics



• CodeHub features:

- You can read, modify, and commit code online. CodeHub enables you to develop code anywhere at anytime.
- Online branch management, including branch creation, switchover, and merge. You can develop multiple branches concurrently and efficiently.
- Branch protection prevents branches from being committed or deleted by others.
- IP address whitelists allow you to perform region control. HTTPS is supported. In this way, unauthorized code pull is blocked to ensure data transmission security.
- Password reset frees you from worrying about forgetting passwords.

• Security:

- Security advantages of DevCloud and CodeHub



CloudTest : One-Stop Cloud Test Management and Automated Test Platform

One-stop cloud-based test platform

Integrates test management, API testing, and performance testing, and supports fast test case design, test execution, defect case submission, and report generation.

Efficient and automated testing

Allows you to quickly orchestrate test cases and perform performance tests, and supports multiple test types such as microservice tests and layered automatic tests.

Full-lifecycle tracking and visualization

Supports requirement-case-defect tracking and multi-role collaboration, and provides a multi-dimension quality assessment dashboard to facilitate efficient product acceptance.

Simple

Coding-free and easy to get started

No coding costs: simple orchestration scripts
No environment establishment: letting you focus on testing and quality assurance
Performance test: generating a report within 1 minute
API test: quickly verifying API quality

Professional

Born from industry's and Huawei's experience

Four API protocols, such as HTTP; advanced test scenario orchestration; **30+** preset check points in **seven** categories; multi-environment test parameter management; **thousands** of concurrent users to increase pressure
Three pressure increasing policies; **eight** performance indicators; automatic continuous pipeline testing

Efficient

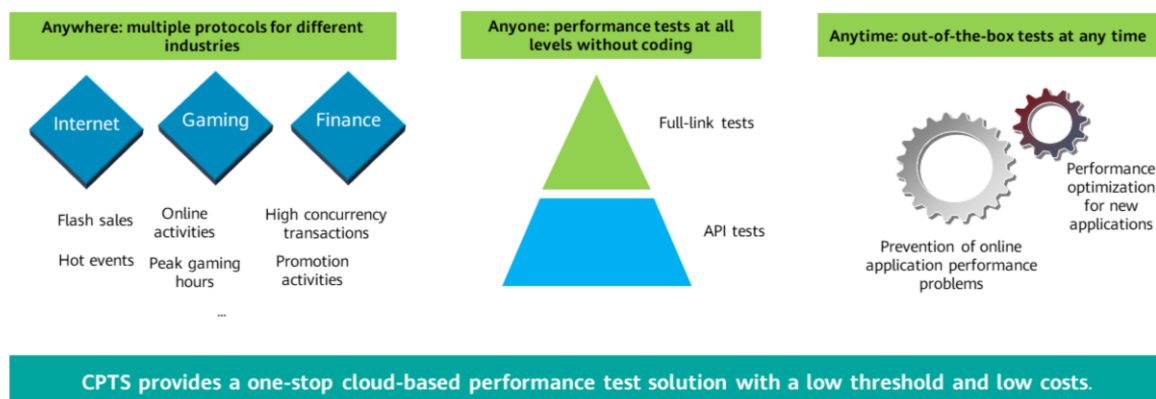
Integrated with DevOps agility and cloud computing

Real-time display of test results
Automated testing using pipelines in multiple environments
Cloud-based resource pool
Reuse of test assets

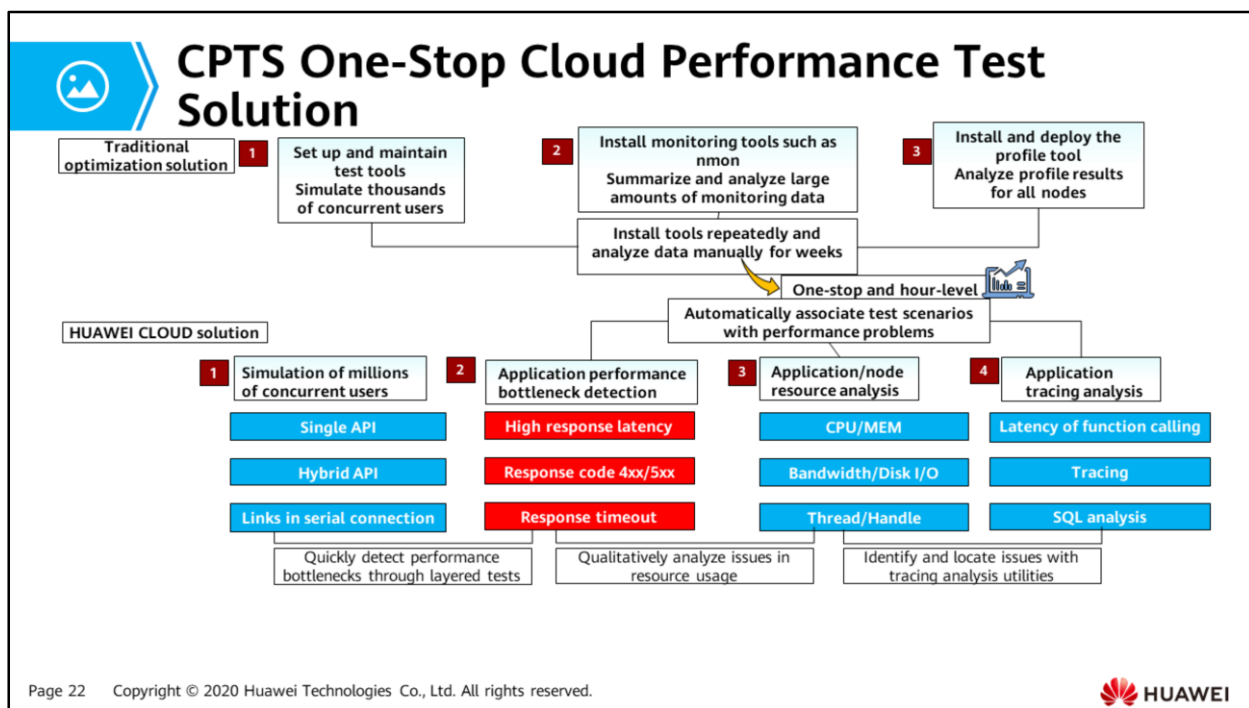
- What Is CloudTest?
 - CloudTest is a one-stop test platform that allows developers to conduct API and performance tests and manage these tests in the cloud. Developed on the basis of the DevOps agile testing concept, CloudTest helps developers improve management efficiency and deliver high-quality products.
 - Test management incorporates concepts such as full-lifecycle tracing, multi-role collaboration, agile test, and requirement-driven test, covering test requirement management, task assignment and execution, progress management, coverage management, result management, defect management, test reports and dashboard, and one-stop manual and automatic test management. Test management can be tailored for different teams and processes, supporting product quality evaluation from multiple perspectives, efficient test activity management, and quality product delivery.
- API test allows you to quickly orchestrate API test cases based on the API URL or Swagger files. It integrates pipelines, and supports microservice testing and layered automatic testing. No code compiling is required for test cases. The technical barrier is low. Therefore, these test cases can be used by different roles such as API developers, API consumers, test personnel, and service personnel. You can import the 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. HTTP and HTTPS supported; a visualized case editing interface; various preset check points and built-in variables; customized variables; parameter transfer; and continuous automated testing.



Huawei CPTS Service Design Concepts



- Application scenarios: Internet, gaming, and finance
 - Cloud Performance Test Service (CPTS) is a cloud service that provides API and E2E performance tests of applications, which are built based on HTTP, HTTPS, TCP, UDP, WebSocket, RTMP or HLS. The rich capability of test model definition can be used to restore scenarios of large-scale concurrent service access, helping users identify application performance problems in advance.
 - CPTS provides distributed pressure tests and is widely used in various industries, such as the Internet, digital marketing, Internet of Vehicles (IoV), and finance.
- E-Commerce Flash Sale Tests
 - E-commerce flash sale is characterized by large-scale user concurrency, multiple burst requests, and repeated access attempts. Guaranteeing the availability of websites under heavy load is key.
- Advantages
 - Scenario simulation: CPTS simulates millions of instantaneous concurrent requests in seconds, and simulates a heavy-load website in a test model.
 - Professional test report: CPTS provides statistics collected based on the response latency range, reflecting user experiences.
 - Retry for failed users: User-defined comparison of results calculated by using expressions enables login retry.
 - Figure 1 E-commerce flash sale tests



- Advantages:

- CPTS provides a one-stop performance test solution, helping you identify the performance bottlenecks of applications in advance.
- Cost-efficient simulation of ultra-high concurrency
- CPTS provides private test clusters for you. In such a test cluster, a single execution node can simulate virtual users in the tens of thousands, and the entire test cluster can simulate virtual users in the millions.
- CPTS simulates millions of instantaneous concurrent requests. In this way, enterprises can identify application performance bottlenecks in high concurrency scenarios and prevent system breakdown caused by a large number of access requests. CPTS is easy to operate and greatly shortens the test time.
- CPTS supports execution of multiple concurrent tasks. It enables you to test the performance of multiple applications at the same time, greatly improving the test efficiency.
- Flexible and fast performance test, achieving quick application rollout



Complete Performance Tests in Three Steps on UI without Coding

Test request definition

- **HTTP(S):**
Full-link pressure tests on websites
RESTful API calling
- **TCP/UDP:**
IoT API calling
Interaction with game servers
User-defined proprietary protocols based on the TCP or UDP load
- **WebSocket:**
Real-time interaction between stream pushing and pulling
- **RTMP/HLS:**
Streaming media: live broadcast and video on demand
- **MQTT (Q3):**
IoT connection data simulation

Test task definition

- **Intelligent analysis association:**
AOM resource monitoring and APM tracing association for analysis
- **Flexible pressure definition:**
Simulation of initiating millions of users in seconds
Automatic upper limit estimation through incremental model pressure tests
Insertion of fixed amount of data through specifying execution times of pressure tests
- **Multi-transaction association:**
Transaction allocation by proportion, simulating the user service accesses

Test resource preparation

- **CCE resource group:**
Elastic scaling of CCE test resource groups on demand
- **CCI resource group (Beijing1):**
Flexible creation of CCI test resource groups on demand (charged by the minute)
- **Shared resource group:**
Pressure test model debugging and small-scale pressure tests without the need to prepare resources

• Features

- CPTS provides tests for HTTP/HTTPS/TCP/UDP/WebSocket/RTMP/HLS-based applications with high user concurrency. It allows you to flexibly define multi-protocol packet contents, transactions, and test task models. CPTS also allows you to view performance statistics, such as concurrency, transactions per second (TPS), and response latency in real time or in offline mode. Additionally, CPTS performs management of test resource groups based on the changes in required performance test scales. This management includes creating and scaling of private test resource groups.

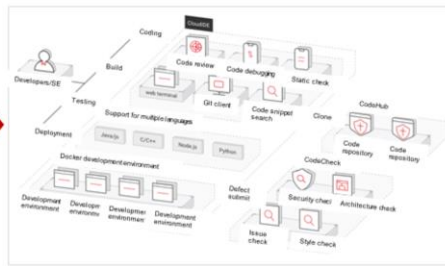
• Multi-protocol and high-concurrency performance tests

- Quickly define standard HTTP/HTTPS/TCP/UDP/WebSocket/RTMP/HLS packet contents. You can send pressure test traffic to different tested applications through simple adjustment. Based on the service requirements of tested applications, CPTS allows you to define any fields in HTTP/HTTPS/TCP/UDP/WebSocket/RTMP/HLS protocol packets, for example, configuring and editing the GET and POST methods of HTTP, as well as the uniform resource locator (URL), header, and body fields.
- Defining the behavior of virtual users for different test scenarios. You can specify the interval for sending requests of the same user by setting the think time, or define multiple request packets in a transaction to set the number of requests initiated by each user per second.



CloudIDE

- ❑ Large investments in local resources are required.
- ❑ Inconsistent local environments frequently cause problems.
- ❑ Environments are personal assets, which are difficult to share.
- ❑ Partners cannot participate in the project. It is not open.
- ❑ Non-transparent enterprise management brings high risk.



On-demand development environment

- Configurable computing and storage resources
- Support for multiple native technology stacks
- Automatic import of project code

Practical development experience

- Syntax highlighting in more than 40 languages
- Cloud-based build, running, and debugging
- Environment configuration on website terminals

Open solution platform

- Support for multiple development scenarios
- Openness and integration based on HUAWEI CLOUD capabilities
- Enterprise user permission control

All cloud-based

- Lightweight and all cloud-based mobile development capabilities
- Obtaining and configuring cloud resources in a few clicks

Faster

- Obtaining cloud container-based environments in seconds
- Environment standardization without complex configuration

Practical

- Support for multiple languages and practical coding experience
- Support for builds, running, debugging, and preview

Extendable

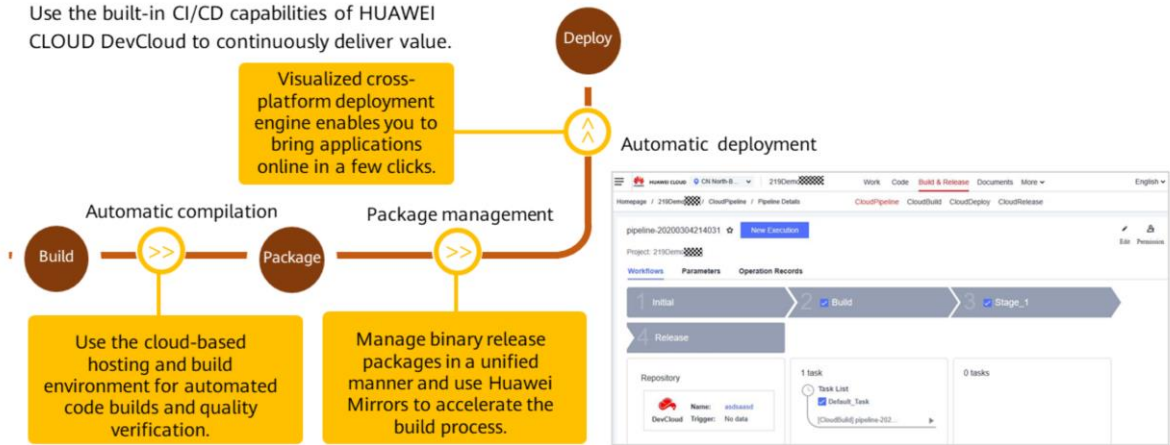
- Enterprise account permission and resource management and control
- Unified plug-in mechanism allows service expansion.

- A cloud-based development environment of DevCloud. It provides a workspace (including the editor and runtime environment) that can be configured as required and quickly obtained. It supports environment configuration, code reading, writing, building, running, debugging, and preview. It can connect to multiple code repositories.
- Application scenarios:
 - Application: service-oriented web application
 - Scenario characteristics: Developers cannot perform development due to the lack of local environment. Now developers can access CloudIDE on web page to develop anywhere at anytime.
 - Application: CloudIDE is suitable for container-based service-oriented web application development. It enables quick setup of a consistent development environment and online code developing at anytime.




Continuous Integration and Deployment

Use the built-in CI/CD capabilities of HUAWEI CLOUD DevCloud to continuously deliver value.

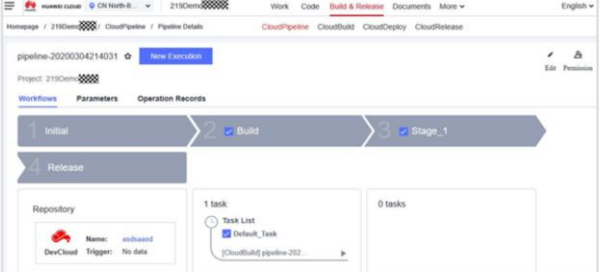



- Continuous integration (CI) refers to the delivery of an individual's work to the entire software development. It uses frequent integration to quickly detect errors. Continuous integration originates from Extreme Programming (XP) and is one of the first 12 practices of XP.
- Requirements of CI: comprehensive automatic testing. This is the basis for continuous integration and continuous deployment. In addition, it is important to select proper automatic testing tools; flexible infrastructure. Containers and virtual machines free developers and QA personnel from heavy burdens; version control tools, such as Git, CVS, and SVN. Tools for automatic build and software release processes, such as Jenkins and flow.ci; feedback mechanism. For example, if a build or test fails, the owner can be quickly notified to solve the problem as soon as possible to ensure a more stable version.
- HUAWEI CLOUD DevCloud enables enterprises to build CI/CD capabilities through automatic compilation, build, deployment, release, and pipelines.




CloudPipeline : Build Fast , Reliable , and Repeatable Pipelines

Visualized orchestration	Management task	Triggering mode	Management and control mode	Accurate identification of bottlenecks	Mobility
Stages Jobs Parallel or serial Sub-pipelines	Code check Compilation and build API tests Deployment	Code commits Scheduling Manual triggering	Quality guard Manual intervention	Visualization Task health	Mobile apps





Ford Model T assembly line (source: Internet)

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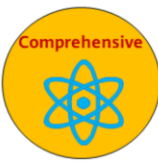


- CloudPipeline provides visualized and customizable automatic delivery pipelines to shorten the delivery period and improve delivery efficiency.
- CloudPipeline has the following features:
 - Five task types are supported: build, code check, sub-pipeline, deployment, and pipeline control.
 - Tasks in each pipeline stage can be executed in serial or parallel mode.
 - Execution status and execution logs can be reported.
 - Software packages can be downloaded.
 - Tasks can be executed independently.
 - Progress statistics is supported.
 - Parameter-based pipeline execution is supported.
 - Pipeline execution history is provided.
 - Subtasks can be queried.
 - Pipeline statistics is supported.
 - Pipelines can be executed periodically.




CodeCheck

Aug 2018	Aug 2017	Change	Programming Language	Ratings	Change
1	1		Java	16.881%	+3.92%
2	2		C	14.966%	+8.49%
3	3		C++	7.471%	+1.92%
4	5	▲	Python	6.992%	+3.30%
5	6	▲	Visual Basic .NET	4.762%	+2.19%
6	4	▼	C#	3.541%	-0.65%
7	7		PHP	2.925%	+0.63%
8	8		JavaScript	2.411%	+0.31%
9	-	▲	SQL	2.316%	+2.32%
10	14	▲	Assembly language	1.409%	-0.40%




Comprehensive

- Covering 7 of the top 10 mainstream programming languages
- Comprehensively evaluating code quality from seven perspectives: code security, defect, style, architecture, dependency package security, cyclomatic complexity, and code repetition.



Professional


- Providing professional preset rule sets based on Huawei's 30 years of experience
- Professional defect rectification suggestions are provided to help improve code quality.



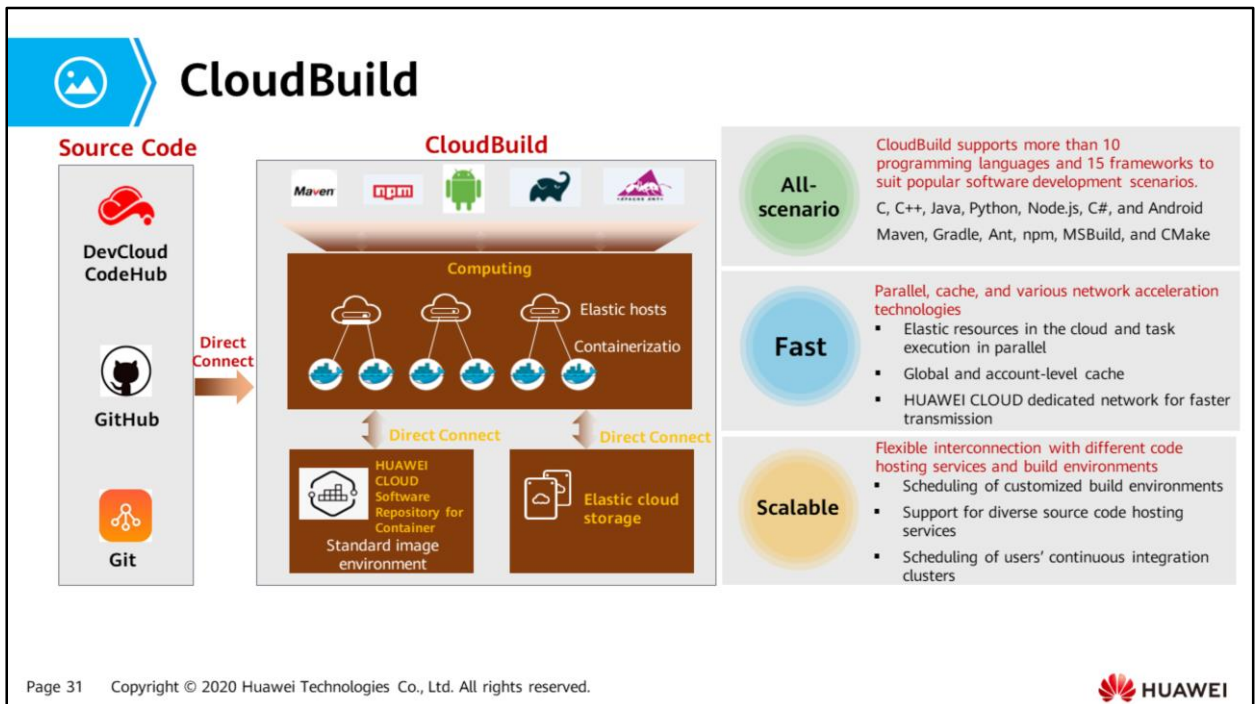
Accurate

- Customized rule sets allow you to tailor enterprise-level quality standards.
- Accurately locating defects to specific code lines.


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- CodeCheck is a cloud-based code quality management service for software developers. It supports mainstream development languages, such as Java, C/C++, Android (Gradle), PHP, Python, JavaScript, Web, and CSS. Code static check, architecture check, security check, issue check, quality scoring, and code defect rectification trend analysis can be performed online in multiple languages to facilitate code quality control.
- CodeCheck helps you quickly locate code defects and provides examples and rectification suggestions.
- You can switch to the code repository to perform online debugging in one click.
- Huawei typical check rule sets are provided, or you can customize your check rule sets to flexibly adapt to project requirements.
- Check the code in one click and fix defects in batches.
- CodeCheck has the following features:
 - Code check in multiple languages is supported.
 - Huawei's typical check rules are provided to support web security architecture and code check.
 - Check rule set customization
 - Code defects can be sorted by multiple dimensions to allow you prioritize your work.
 - Impact description, modification examples, and suggestions are provided for code defects.



- CloudBuild provides an easy-to-use code compile and build platform that supports multiple programming languages in the cloud. It helps enterprises improve build efficiency.
- What Is CloudBuild?
- Build is the process of converting source code into a target file and packaging the configuration file and resource file.
- HUAWEI CLOUD DevCloud CloudBuild is an easy-to-use code compile and build platform in the cloud that supports multiple programming languages. It helps enterprises with more efficient and faster continuous delivery. CloudBuild enables you to easily create, configure, run, and monitor build jobs, and automates code obtaining, building, and packaging.
- CloudBuild Features
 - Container-based build
 - DevCloud supports two types of container images:
 - System image: supports the build and packaging using popular languages and tools.
 - Custom images: HUAWEI CLOUD Software Repository for Container (SWR) and Docker Hub are supported. You can customize application images for multi-language compilation.



MobileAppTest

Various models and wide coverage

20,000+ Android/iOS real devices, covering 98% of mainstream models in the market.

95% of mainstream users covered referring to data from various channels.

Timely update of popular models.

Deep and fast test

Automatic test, easy submission of test packages, no need to provide scripts.

One hundred standard steps for each case, and quick report of expert review results within 24 hours.

Comprehensive reports and accurate fault locating

New online test reports bring better interaction experience.


Comprehensive, detailed online reports, rich screenshots, and log records.

Multi-dimensional filtering and segmentation, powerful association analysis, and quick fault locating.


Cost saving and less loss

Reducing the purchase, maintenance, and depreciation costs by 600,000 CNY.


Improving the test efficiency; accelerating product launch to avoid market opportunity cost loss.



Standard compatibility tests



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- MobileAppTest is a mobile compatibility test service provided by Huawei and TestBird. It provides top models and hundreds of test experts. Leveraging image recognition and app control recognition, the service generates compatibility test reports for apps. The test reports generated include system logs, screenshots, error causes, CPUs, and memory.
- The MobileAppTest has the following features:
 - Comprehensive models: Top models are provided, covering 98% of mainstream models; Quickly launching new mainstream models.
 - Automatic testing: No test script or manual case compilation is required. You only need to submit the Android and iOS application installation files and select the test package to generate a detailed test report.
 - Deep and fast tests: In-depth tests cover compatibility issues such as UI exceptions, crash, suspension, program exceptions, and black screen. You can quickly obtain a professional and complete test report by submitting a task.
 - Detailed online test reports can be downloaded by one click. Detailed test analysis, problem context, screenshots, and logs are provided.
 - It enables you to quickly locate and resolve problems. Detailed problem description is provided. It supports operation screenshots and log correlation analysis, impact ranking, and multi-dimensional problem filtering, such as terminal, to help accurately locate problems.



One-Click Automatic Deployment

Deploying applications on physical machines, VMs, and containers

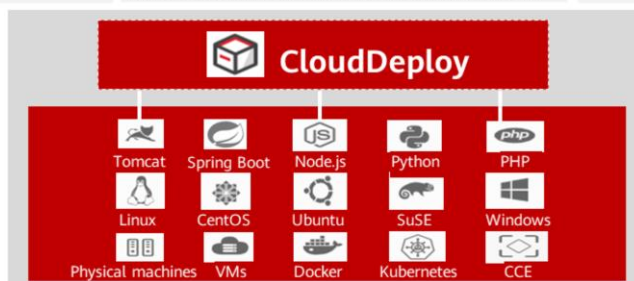
Applications can be deployed on physical machines, VMs, and containers, including private ones as long as they are connected. In addition, hosts can be deployed as agents. Containers can be deployed on HUAWEI CLOUD CCE and customers' private Kubernetes clusters.

Supporting deployment of multiple technology stack applications

CloudDeploy supports deployments of multiple technology stack applications, such as Tomcat, Spring Boot, and Node.js. Common templates, such as Spring Boot and Tomcat, are provided to facilitate deployment task creation. User-defined templates are supported and 25+ atomic steps are provided to assemble deployment tasks.

Integrated with the pipeline to streamline the deployment pipeline

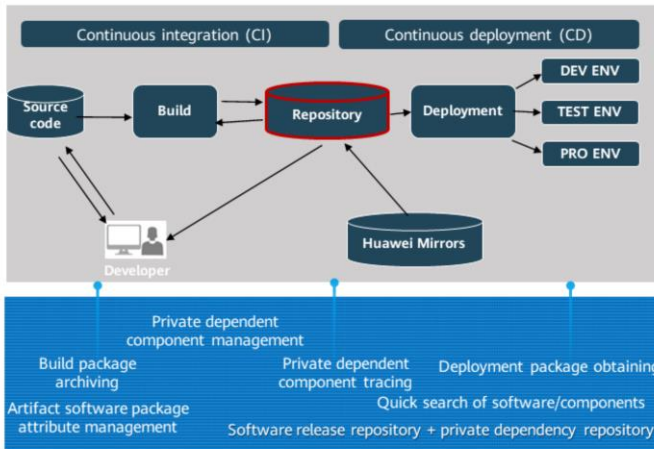
End-to-end DevOps process is made possible by associating CloudDeploy with CloudBuild, CodeCheck, and CloudTest through CloudPipeline.



- CloudDeploy provides visualized, one-click deployment services. It supports deployment on VMs or containers by using Tomcat, Spring Boot, and other templates or flexibly orchestrated atomic actions. It also supports parallel deployment and seamless integration with CloudPipeline, providing standard deployment environments and implementing automatic deployment.
- What Is CloudDeploy?
- CloudDeploy provides visualized, one-click deployment services. It supports deployment on VMs or containers by using Tomcat, Spring Boot, and other templates or flexibly orchestrated atomic actions. It also supports parallel deployment and seamless integration with CloudPipeline, providing standard deployment environments and implementing automatic deployment.
- CloudDeploy has the following features:
 - Tomcat, Spring Boot, PHP, CCE, and other templates are predefined for fast task creation. More than 20 atomic actions are provided for flexible task orchestration.
 - A deployment task can be deployed on multiple hosts and host groups. Logs are generated for each atomic action, enabling quick fault locating and rectification in the case of deployment failure.
 - You can define and save your own templates.
 - Parameters can be set and dynamically executed.



CloudRelease - Visualized Management and Tracing of Software Packages



Efficient and easy-to-use software artifact repository

Automatic archive of build packages

- ✓ The build products are automatically archived to the release repository.
- ✓ Compilation and build attributes are automatically associated with software packages.

Multi-format private repository

- ✓ Management of private Maven and Docker components
- ✓ One-click release of private components during compilation and build
- ✓ Tracking and notifying changes of private components in a timely manner


Seamless deployment integration

CloudDeploy can quickly obtain packages from the release repository for deployment.

Multi-view tracing

Two views are provided for users to trace the lifecycle of software packages: directory view and build view.

- A cloud service for software release and management. Secure software repositories allow you to manage software packages and their metadata, download release packages, and release software, achieving continuous delivery.
- CloudRelease helps software development enterprises manage the software release process in a standardized, visualized, and traceable way.
- CloudRelease focuses on and manages the to-be-deployed software packages (usually built by or packed from the source code) and their lifecycle metadata. The metadata includes basic attributes such as name and size, source code, build time, tests conducted, and deployment environment.
- The management of software packages and their attributes is the basis of release management. The common software development process is shown below:
- CloudRelease provides two types of repositories:
 - Software release repository: It is used to manage all software packages generated by building or packing and their lifecycle attributes.
 - Private dependency repository: Unlike open-source central repositories such as Maven Central Repository, the private dependency repository is used to manage an enterprise's public components. It supports multiple languages and dependency package management tools such as Maven and npm.



Huawei Mirrors

Component image developed in mainstream languages

Open-source component images that support **six mainstream** development languages are applicable to various development scenarios.

Common development tool images

30 common developer tool images are provided to meet requirements in various development scenarios.


Popular open-source OS images

22 popular open-source OS images are provided for developers to select; quick download methods are available.

Developers in Chinese mainland

Slow

Open-source components outside Chinese mainland



Faster

CDN acceleration and one-click configuration generation
CDN dedicated acceleration for registered users. Images are synchronized in a timely manner through the Hong Kong proxy egress. A communication forum is provided for you to get quick help when problems occur.


More comprehensive

One-stop mirror site, applicable to various development scenarios
Nearly 60 common development images are provided for free. Images cover development components, tools, and operating systems. An active forum is provided for discussion and quick help.

More secure

Cooperation with official community ensures reliable component sources.
The only Maven central image repository in Chinese mainland. Six officially certified OS images. All images are from the official community and are consistent.

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HUAWEI

- Mirrors is provided by DevCloud for quickly downloading a wide variety of trustworthy open-source components, operating systems (OSs), and DevOps tools.
- Mirrors is developed and maintained by the HUAWEI CLOUD DevCloud team. DevCloud is dedicated to building a cloud-based one-stop DevOps tool service that simplifies software development. Mirrors provides multiple types of software installation sources and ISO download services, covering seven languages including Maven, NPM, and PyPI, 20+ OS images including Ubuntu, CentOS, and Debian, and common tool images such as MySQL and Nginx. It is dedicated to providing users with comprehensive, high-speed, and trustworthy component download service.

CCE provided by HUAWEI CLOUD DevCloud ensures stable and efficient running and monitoring of applications.



- Cloud Container Engine (CCE) is a high-performance, high-reliability service through which enterprises can manage containerized applications. CCE supports native Kubernetes applications and tools, allowing you to easily set up a container runtime environment on the cloud.
- Easy to use
 - One-click creation of container clusters; one-stop deployment and O&M of containerized applications; Kubernetes and Docker out of the box; Deep integration of Istio
- High performance
 - Multiple types of heterogeneous infrastructures are supported, such as high-performance HUAWEI CLOUD VMs, BMSs, and GPUs. The bare-metal NUMA architecture and high-speed InfiniBand network cards yield three- to five-fold improvement in computing performance.
- Enterprise-grade functionality
 - High reliability through 3 masters on the cluster control plane; node and application deployment across AZs. High security as clusters are private to users and subject to role-based access control (RBAC).



Summary

- HUAWEI CLOUD provides software lifecycle management.
 - Requirements/Planning
 - Development
 - Testing
 - Release
 - O&M
 - Operations



Quiz

1. CloudDeploy of HUAWEI CLOUD DevCloud can be used to deploy application software packages only to HUAWEI CLOUD. In this way, customer loyalty can be enhanced. The pattern of promoting cloud with cloud can be established.
 - A. True
 - B. False
2. Apart from lightweight Dashboard templates, which of the following project management processes is provided by DevCloud?
 - A. Scrum
 - B. Agile
 - C. CMMI
 - D. IPD

- Answer for Q1:
 - B
- Answer for Q2:
 - A



More Information

- DevCloud
 - <https://support.huaweicloud.com/intl/en-us/devcloud/index.html>



Thank You
www.huawei.com