

CodeArts Req

Best Practices

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Contents

1 CodeArts Req Best Practices.....	1
2 Best Practices of Scrum Projects.....	3
2.1 Practice Overview.....	3
2.2 Requirement Management.....	3
2.2.1 Understanding the Four Keywords of Agile Requirement Management.....	4
2.2.2 Making Effective Requirement Management and Planning When Software Project Requirements Change Frequently.....	9
2.2.3 Managing Requirements in a Structured Manner.....	12
2.2.4 Managing Requirement Priorities.....	16
2.2.5 Avoiding Missing Important Requirements.....	18
2.3 Sprint Plan.....	21
2.3.1 Properly Planning the Sprint Timebox.....	21
2.3.2 Moving Task Cards in the Kanban After Requirements Change in Sprints.....	24
2.4 Sprint Development.....	25
2.4.1 Managing Unexpected Tasks in Software Development Teams.....	25
2.4.2 How Can I Deal With Unclaimed Tasks in My R&D Team?.....	33
2.5 Agile Review.....	36
2.5.1 How to Have Daily Scrums.....	37
2.6 Member Management.....	45
2.6.1 How Do I Cultivate and Manage New Members of My Project Team When the Team Members Change Frequently?.....	45
2.6.2 How Do I Manage the Permissions of Project Members?.....	46
2.7 Appendix.....	47
2.7.1 Reference Documents.....	47
3 Using IPD-System Device Projects to Manage RRs of a Smart Watch R&D Project	48
4 Using IPD-System Device Projects to Manage Defects of a Smart Watch R&D Project.....	58
5 Using IPD-System Device Projects to Perform a Baseline Review (BR) on a Smart Watch R&D Project.....	66
6 Using IPD-System Device Projects to Manage Feature Trees of a Smart Watch R&D Project.....	77

7 Huawei E2E DevOps Practice: Managing Requirements.....	86
7.1 Overview.....	86
7.2 Preparations.....	90
7.3 Managing Project Plans.....	92
7.4 Managing Project Configurations.....	95

1 CodeArts Req Best Practices

Table 1-1 Common best practices of CodeArts Req

Practice	Description
Managing Raw Requirements of an IPD-System Device Project (Smart Watch R&D)	<p>A hallmark of a successful product lies in its ability to meet customer requirements. Unlike traditional requirement management tools that only play a role in the R&D phase, CodeArts Req covers both customer and market requirements by providing a complete process from customer requirement collection, high-value requirement decision-making, to delivery and acceptance. It makes real-time requirement progress transparent and improves market requirement flow by 70%.</p> <p>In CodeArts Req's raw requirement (RR) management, you can submit customer requirements to the target organization. This organization can then make decisions, conduct analysis, and manage delivery and acceptance of these requirements in real time. This process accelerates the delivery of customer requirements and enhances the market competitiveness of your products.</p>
Managing Defects of an IPD-System Device Project (Smart Watch R&D)	<p>Defect management is a critical part in product lifecycle management. Both hardware and software development will encounter countless defects. Poor defect management will affect the product quality. Based on years of experience in quality and operation management, Huawei has developed a set of effective defect best practices. It provides a unified, efficient, and visualized defect tracking platform to ensure that each defect can be closed with high quality and efficiency.</p> <p>A company plans to launch a smart watch. However, the R&D will take a long period, and requires collaboration of multiple departments and teams. How can the company transfer defects among organizations and ensure that the defects can be finally closed? Now, let's look at some defect lifecycle management practices.</p>

Practice	Description
Baseline Management for an IPD-System Device Project (Smart Watch R&D)	<p>A product goes through a complex R&D process from planning to release. CodeArts Req helps to manage these processes by requirement baselines, change requests of controlled fields, change reviews, and change management. Baseline changes must reach specified gate thresholds before going to the next stage to keep teams on the right track.</p> <p>A company plans to launch a smart watch, which requires collaboration across departments and teams. R&D requirements have been assigned to each production and research team after rounds of communication and clarification on requirements. To ensure that products are delivered on time and with high quality, all R&D and production teams need to devotedly carry out tasks based on specified requirements. Therefore, baseline control for requirements is necessary and baselined requirements cannot be modified randomly. The following uses this company as an example to describe how to implement requirement baseline control.</p>
Feature Tree Management for an IPD-System Device Project (Smart Watch R&D)	<p>Kanban in CodeArts Req is a lightweight, flexible, and simple team collaboration method widely used in the industry. It visualizes project requirements, defects, and tasks, so that everyone can clearly understand the status of each task. The team can update the work progress by moving work cards to expose risks and issues in a timely manner.</p> <p>You can create a Kanban project to plan requirements for the project. You can create, assign, and process work items to plan and deliver project requirements. This section describes how to use a Kanban project for planning. A mall management project is used as an example.</p>

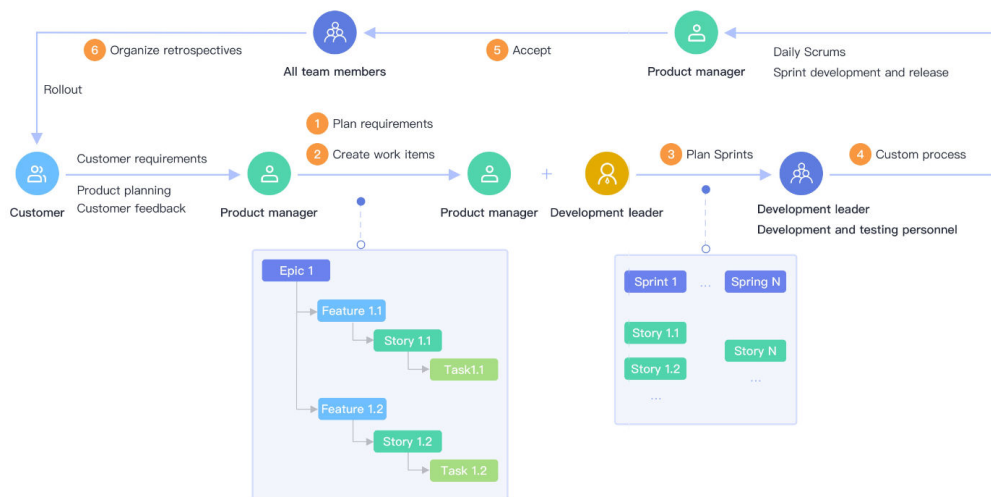
2 Best Practices of Scrum Projects

2.1 Practice Overview

Scrum applies to R&D management platforms in agile development mode. It enables short-term continuous delivery and quick response to requirements and market changes.

A complete Scrum sprint process involves four phases: requirement planning, sprint planning, sprint development, and agile review. **Figure 2-1** shows the overall process.

Figure 2-1 Scrum sprint process



Based on identified common issues, this section presents the best practices for the main phases of the Scrum process.

2.2 Requirement Management

2.2.1 Understanding the Four Keywords of Agile Requirement Management

Background

What is the relationship between concepts related to agile development, such as epic, feature, story, and task? How can we flexibly use these concepts to make agile requirement management more efficient? This section analyzes these four keywords in detail.

What Are Epic, Feature, Story, and Task?

Epic, Feature, Story, and Task indicate requirement granularities in descending order, which are used to divide requirements. They can be regarded as requirement placeholders. Their meanings can be used as a reference for requirement division.

- **Epic:** project vision and goal. It holds significant strategic value for an enterprise, because its implementation, usually lasting several months, brings about the corresponding market position and returns.
- **Feature:** a product function or feature that delivers benefits. Features are more specific and intuitive than epics in customers experience, possessing business value. It usually takes weeks to complete sprints.
- **Story:** a user story. A story is a user's detailed description of product functions. It puts features into a product backlog for continuous planning and adjustment. Stories with high priorities are prioritized for delivery and hold significant user value. Stories must comply with the INVEST principle (Independent, Negotiable, Valuable, Estimable, Small, and Testable). It takes several days to complete stories, usually in a sprint.
- **Task:** a specific task to be completed by team members. At the Sprint planning meeting, stories are assigned to members, and members break down the stories into tasks and estimate the workload. The whole process is usually completed within one day.

What Is the Relationship Between Epic, Feature, Story, and Task?

Epic-Feature-Story-Task manages requirements in a structured manner. It breaks down requirements layer by layer to build bottom-up dependencies, as shown in [Figure 2-2](#).

Figure 2-2 Relationship between epic, feature, story, and task

Requirements change in development. We need to continuously adjust requirements to keep them and our team on the right track towards the goal. To this end, we must align requirements with the epic and ensure that stories and tasks which requirements belong to are associated with their upper layers.

For more information about structured requirement management, see [Managing Requirements in a Structured Manner](#).

How Can We Flexibly Use These Concepts to Make Requirement Management More Efficient?

This section splits and displays the requirements of a case based on CodeArts Req to provide a detailed description of epic, feature, story, and task.

Case:

The turnover of a large store dropped sharply due to the impact of the Internet.

To keep its consumers and maintain the market position and share, the market decides to build its own online store in six months.

- **Step 1: Determine and create an epic.**

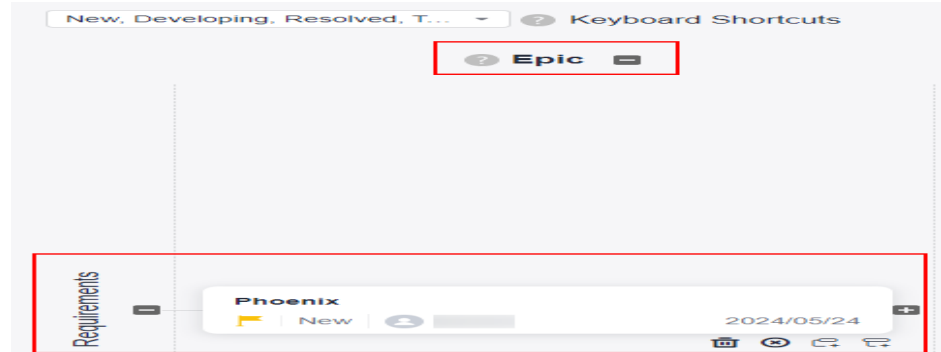
As described above, granularity and meaning must be taken into consideration before requirement confirmation.

Is a product an **epic**? Is each service module of a product an **epic** or **feature**? These questions need to be answered.

- A product is usually of strategic significance. Therefore, it is suitable to take a product as an epic. However, it does not apply to all products. The product itself and its granularity matter. In this case, the online store cycle is 6 months, and the goal is to maintain market share. In view of granularity and strategic sense, it is suitable to take the online store as an epic.
- Whether each service module is an epic or feature depends on the actual situation. For example, building a smart city is a vision, which includes large service modules, such as smart transportation, smart government, and smart community. Therefore, it is better to use epic as a placeholder.

Create a Scrum project in CodeArts and name it "Large online store". On the page for requirement planning page, create an epic.

Figure 2-3 Creating an epic

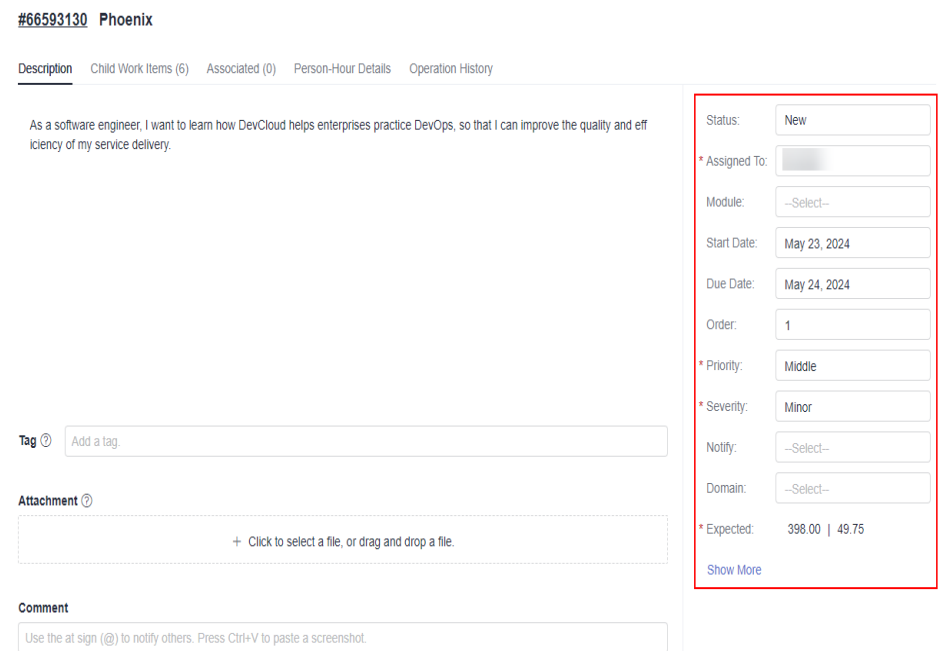


After the creation, click the store to go to the editing page. Fill in the description. You can use the template provided by CodeArts.

- **As:** As for this epic, the user is the entire company.
- **I want:** The desired result is to build an online store.
- **So that:** The goal is to keep consumers and maintain market position and share.

Set the start time, end time, priority, importance, and estimated workload of this epic. The information is essential to understanding the product and project. Therefore, you need to fill in the information in detail.

Figure 2-4 Writing an epic

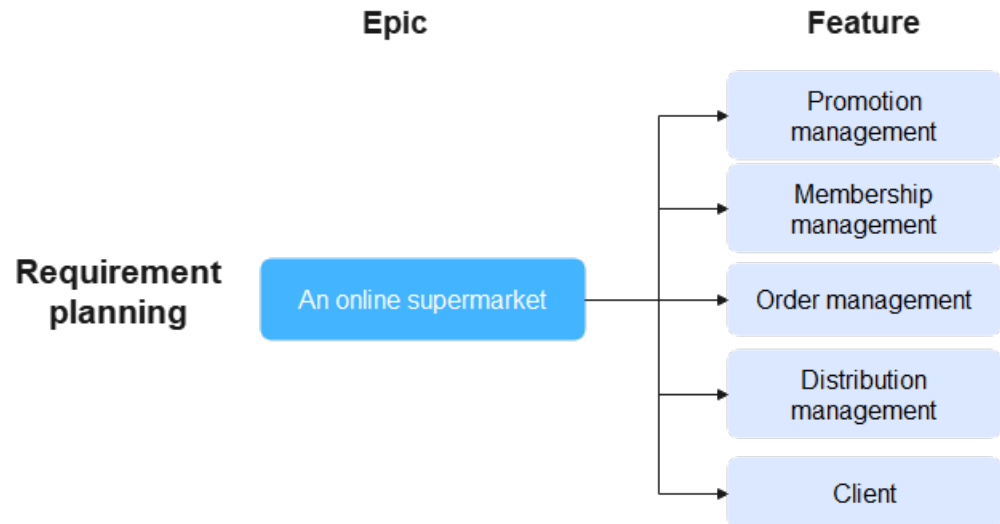


- **Step 2: Break down the epic into features.**

The customer requires that five functional modules (promotion management, member management, order management, delivery management, and client) be delivered within six months. A team sprint is two weeks. Each module

requires two or three sprints. In view of granularity and meaning, it is suitable to take five modules as features.

Figure 2-5 Splitting the epic into features



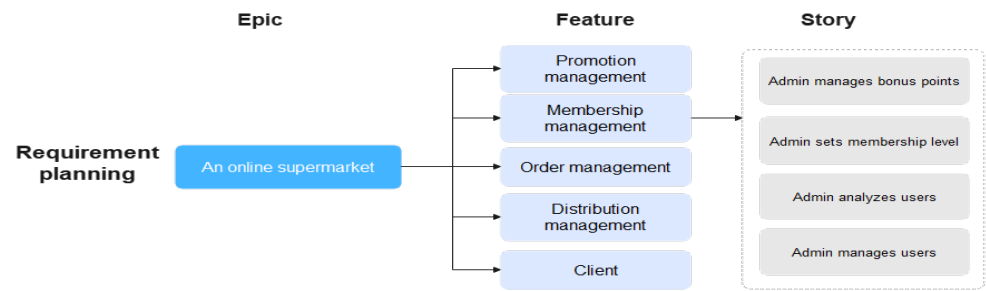
After the creation, you can edit the information on the details page. The information items on the page are the same as those on the epic page.

- **Step 3: Break down features into stories.**

Agile development is gradually detailed. It is not required that all requirements be detailed at the same time. Only the stories of the current sprint and one or two future sprints should be detailed. The story of a future sprint can be general. Stories in the current Sprint must comply with the INVEST principle. The development team needs to complete delivery at the end of the Sprint.

Member management, as a feature, has a higher customer priority. Therefore, member management needs to be broken down into stories and added to the product backlog in the requirement review. After the breakdown, the following functions related to the administrator need to be included: bonus point management, member level management, user analysis, and user management. These specific functions can be taken as stories. Note that it is better to deliver stories in a sprint. If the delivery fails, further break down the stories. Only delivered stories are valuable. Stories that cannot be delivered are a waste for the current Sprint. The stories after the breakdown are shown in [Figure 2-6](#).

Figure 2-6 Breaking down features into stories



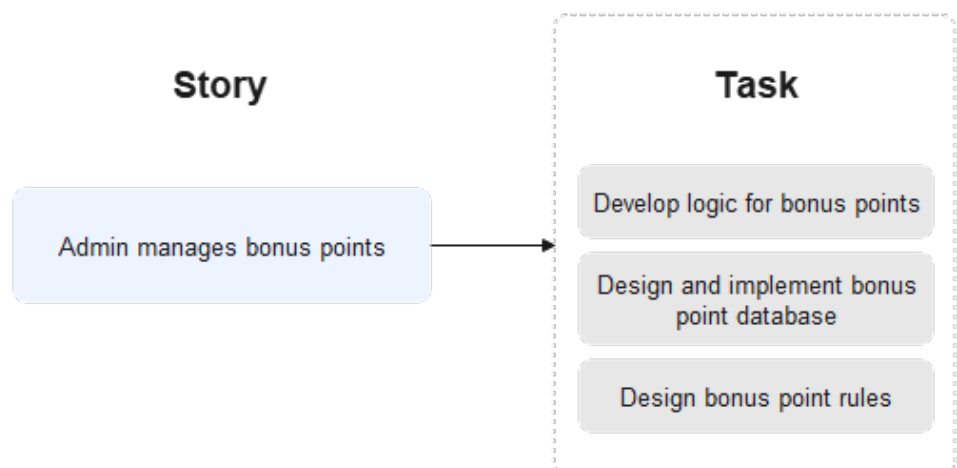
- **Step 4: Break down stories into tasks**

At the Sprint planning meeting, the team and PO need to jointly select the stories to be completed in the Sprint from the product backlog according to the priority and put them into the sprint backlog. After claiming the story, team members break down the story into tasks for further estimation.

So how can we **distinguish stories from tasks**?

- **Story** focuses on value and needs to be completed in a sprint. The completion must comply with the INVEST principle and usually takes several days. Story is more of a noun. For example, bonus point management as a story can be described as follows: As an administrator, I can manage bonus points of members to provide different value-added services based on consumption levels.
- **Task** focuses on value realization. Story functions are implemented based on tasks. A task is more of an action that usually takes one to eight hours. For example, bonus point management as a story needs to be implemented through service logic development, bonus point rule design, and bonus point database design. These are tasks, as shown in [Figure 2-7](#).

Figure 2-7 Breaking down stories into tasks



In this way, the online store requirements are broken down into epics, features, stories, and tasks.

Summary

When using "Epic-Feature-Story-Task" to manage requirements, pay attention to the following aspects:

1. In agile development, requirements are gradually refined and broken down in a top-down manner.
2. Epics and features are large-granularity requirements. They are users' expectations for products and descriptions of functions and features.
3. You need to break down features into smaller stories. Future requirements (possibly in three or more sprints) do not need to be further divided. In some sprints, break down stories into smaller ones.
4. In a sprint, stories are broken down into tasks.
5. All the rough and detailed stories are placed in the product backlog. The entire list must be detailed appropriately, emergent, estimated, and prioritized (DEEP). The list must be sorted out and prioritized periodically to ensure that high-priority requirements are implemented and delivered first.
6. Keep contact with customers during the whole process to ensure that the functions to be implemented align with their actual needs.

This document uses a user scenario to help understand the meanings and usage of "Epic-Feature-Story-Task". You need to take characteristics of the product and service into consideration during development.

2.2.2 Making Effective Requirement Management and Planning When Software Project Requirements Change Frequently

Overview

This section describes how to make effective management and planning for frequent project requirement changes in terms of background, problem analysis, and solution.

Background

Frequent requirement changes are the biggest constraint for both project-based software and product-based software development. According to *China DevOps Status Report 2019*, more than half of enterprises believe that frequent requirement changes are the main culprit behind delayed software delivery. Therefore, it is imperative to solve or mitigate the impact of frequent requirement changes.

Problem Analysis

Customer collaboration models, personnel capabilities, and R&D processes vary with enterprises. Such variation causes different symptoms and root causes of frequent requirement changes. As a result, measures should be taken case by case. Based on our observation and communication with enterprises, we summarize the following scenarios:

- Requirements are disordered and frequently changed, making it difficult to manage.
- Requirement priorities are continuously adjusted, disrupting the development plan.
- Requirements are missing.

The following is the detailed analysis of some scenarios:

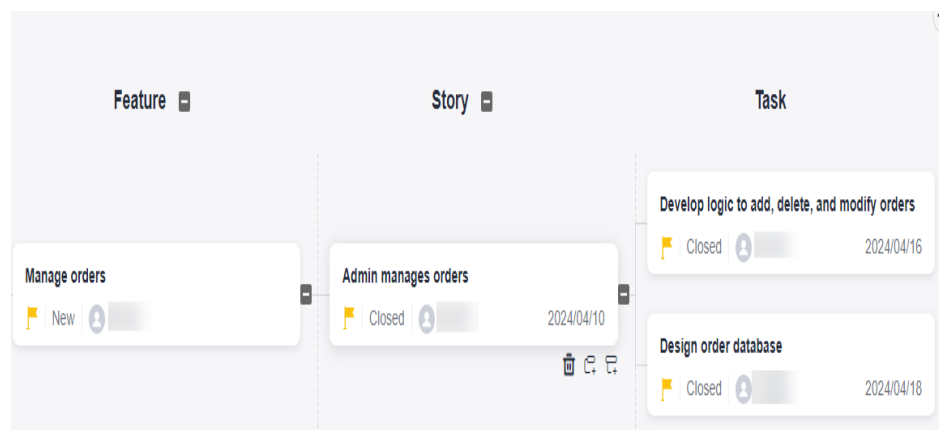
- **Scenario 1: A software project has a clear structure at its early stage, but the requirements change frequently and in detail at the later stage. How can the requirements be effectively managed and planned?**

Project team members are troubled by unclear and incomplete requirements at the early stage. As a result, the requirements need to be modified at the later stage.

In this case, requirements are not correctly planned. Requirement levels are not clearly divided and there is no standard mechanism. For example, a customer plans a user login function, as shown in the following figure. The customer plans to release the task of administrator login in the first version. Later, a mobile number login requirement is added. This task is set to be released in the second version. As a result, a story contains multiple tasks released in different versions (or sprints), which is inconvenient for management. In this case, the key to this problem is **managing requirements in a structured manner** and root causes are:

- a. Failed to distinguish fragmented requirements that are continuously generated during project implementation and iterative system/product functions and features
- b. Misunderstood and misused the "Epic-Feature-Story" requirement structure provided by CodeArts.

Figure 2-8 Requirement structure



- **Scenario 2: Some leader wants to upgrade requirements in a software project. How can we deal with it in the agile R&D mode?**

Upgrading requirements means raising their priorities in implementation. Therefore, this problem is about **requirement priority management**. To solve this problem, we need to understand:

- Why does the leader need to upgrade requirements? If it is reasonable, the team needs to optimize the work arrangement process to minimize the impact on R&D and improve the response speed and capability.

- How often does this happen? Frequent requirement upgrades are a bad norm. The team needs to consider the causes and how to adjust the process, system, collaboration model, or personnel capabilities. For occasional requirement upgrades, find a solution accordingly. There is no need to adjust processes and regulations.
- Is there anything in common of the requirements to be upgraded? For example, are they related to a customer or a function domain (such as refund)? We can figure out solutions based on commonalities.
- **Scenario 3: Some urgent requirements are often added due to external reasons.**

These requirements are unexpected and definitely important. Therefore, it is about managing requirement priorities.

It is a problem of **missing important requirements**, which is caused by the failure to predict requirements. To deal with this problem, the team needs to know:

 - What are the external causes? Check whether these causes have something in common and take corresponding solutions.
 - Is there anything in common of the added requirements? If yes, handle them accordingly.
 - How temporary is the addition? If the team can adjust and respond more quickly so that the temporary requirements do not affect the team, this problem is no longer a problem.
 - Why does not the team adjust the process or work style? Is it unuseful, or does not the team know how to adjust the process or work style?

Solution

Based on the root causes obtained in the preceding analysis, the problems to be solved can be classified as follows:

1. **How can we manage requirements in a structured manner?**
 2. **How can we manage requirement priorities?**
 3. **How can we avoid missing important requirements?**
- **How can we manage requirements in a structured manner?**

First, we do not need structured requirement management in all circumstances. Structured requirement management is required only when there are a large number of interrelated requirements and implemented requirements need to be managed and maintained. In this case, the team needs to use the Scrum project template in CodeArts, whose "Epic-Feature-Story" structure and requirement planning function are helpful for structured management. So what is this structure based on? The answer is **product or system functions and features**. Information such as versions, customers, and modules that software project management focuses on can be implemented through different attributes or even tags of requirements.

Simply speaking, perform the following steps:

- a. Establish a CodeArts project for products or systems.
- b. Establish an "Epic-Feature-Story" requirement structure.
- c. Manage different modules and versions using the attributes of work items.

For details, see [Managing Requirements in a Structured Manner](#).

- **How can we manage requirement priorities?**

Requirement priority management helps determine the sequence of requirement fulfillment, thereby maximizing the return and minimizing the risk or investment. To properly manage priorities, we need to:

- a. Determine the priority model, such as [Kano Model](#). The model includes factors to be considered and comprehensive judgment principle of the factors.
- b. Prioritize requirements based on specific factor quantification and sorting criteria. For example, cost-benefit approach determines the requirement sequence by revenue and profit.
- c. Adjust requirement priorities.
- d. Improve the priority model. Adjust the model or the implementation details based on the feedback.

For details, see [Managing Requirement Priorities](#).

- **How can we avoid missing important requirements?**

We can take measures based on different time points, that is, before, during, and after important requirement missing. According to the Pareto principle, we need to ensure that: (1) For general problems, there are solutions for software project members to follow. (2) In special cases, there is an emergency mechanism that guides on-site handling, and a troubleshooting review.

- a. In-event: Solve the problem using a common or special solution.
- b. Post-event: Perform a review based on the model or approach to form a new common practice or special handling method.
- c. Pre-event: Specify how to distinguish between common and special situations and develop corresponding handling methods or emergency mechanisms.

For details, see [Avoiding Missing Important Requirements](#).

2.2.3 Managing Requirements in a Structured Manner

Why Do We Need to Manage Requirements in a Structured Manner?

We do not need structured management of software project requirements in all circumstances. If it is a transaction management requirement on the recording and status tracking during implementation, which does not need continuous tracking and requirement association maintenance afterwards, structured requirement management is not required. In this case, both the Scrum and Kanban project templates of CodeArts can be used to manage requirements and software projects. Structured requirement management is required only when there are a large number of interrelated requirements and implemented requirements need to be managed and maintained. In this case, we need to use the Scrum project template in CodeArts, whose "Epic-Feature-Story" structure and requirement planning function are helpful for structured management.

What Is Structured Requirement Management Based on?

Software R&D is either project-based or product-based. In general, the former is temporary or short-term, while the latter is long-term or requires continuous maintenance and update of functions and features. We can achieve project objectives and deliver the required functions and features by continuously improving the software product or system. This means that our structured requirement management needs to be based on product or system functions and features. Information such as versions, customers, and modules that software project management focuses on can be implemented through different attributes or even tags of requirements.

Using CodeArts for Structured Requirement Management

The recommended procedure is as follows:

- **Step 1: Create a CodeArts project.**

Create a CodeArts project for a product or system. All requirements of the product or system are managed in the CodeArts project.

- **Step 2: Establish an "Epic-Feature-Story" requirement structure.**

- a. Epic needs to carry business value, that is, an epic needs to be meaningful to the enterprise itself.

Service modules of a product or system, such as the user center, shopping cart, and delivery management, can be an epic. For example, it is suitable for a cloud-based freight company to take the fuel card service as an epic so that functions related to the fuel card can be used as features.

- b. Feature needs to bring benefits to users. That is, users can understand and recognize the value of a feature. Generally, a feature can be directly perceived and operated by users.

Features are what service modules are broken down into. Simply speaking, a feature is a service or user process. If the user center is taken as an epic, user information, order management, or address management can be a feature. If the fuel card service is taken as an epic, purchasing a fuel card or managing fuel cards can be a feature.

- c. A feature is usually large and complex. Therefore, it needs to be broken down to small-granularity stories to carry a specific user operation.

For example, viewing all orders, filtering orders, changing user aliases, and customize profile pictures are stories.

- d. Tasks, at one level lower than stories, are mainly used for work division and collaboration. That is, stories that can be assigned to specific people do not need to be broken down.

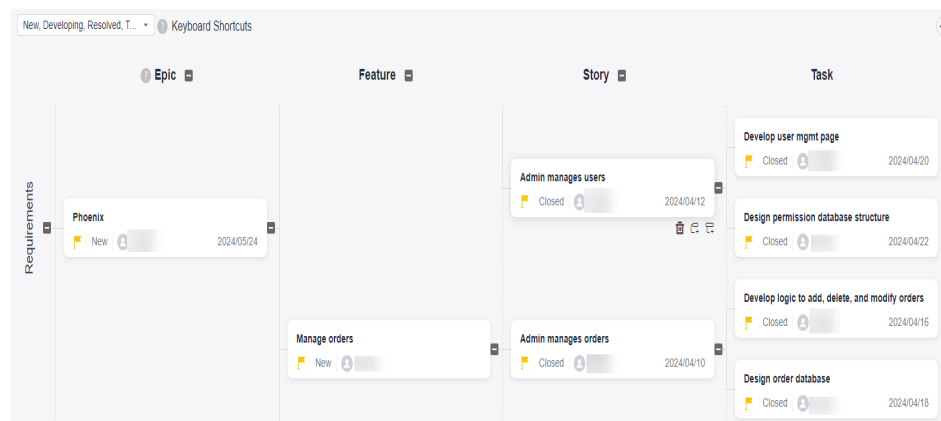
Tasks are specific work that engineers need to do, which are irrelevant to the business value, user value, and single operations of users. Generally, stories are broken down into tasks based on specific components and modules (such as front end, background, and database) or work processes (such as UCD, development, test, and deployment).

The following figure is an example:

- Epic: user center
- Feature: address management

- Story: address creation
- Task: [Web client] page entry and address editing form or [Database] user address data table design and implementation

Figure 2-9 Requirement planning




- **Step 3: Manage different modules and versions based on work item attributes.**

Figure 2-10 shows the attributes on the work item details page.

- **Module:** web client.
- **Release Version:** 1.0.1.2.

Figure 2-10 Attribute example

Status:	<input type="text" value="New"/>
* Assigned To:	<input type="text"/>
Module:	<input type="text" value="Promotion management"/>
Start Date:	<input type="text" value="May 23, 2024"/>
Due Date:	<input type="text" value="May 24, 2024"/>
Order:	<input type="text" value="1"/>
* Priority:	<input type="text" value="Middle"/>
* Severity:	<input type="text" value="Minor"/>
Notify:	<input type="text" value="--Select--"/>
Domain:	<input type="text" value="--Select--"/>
Release Ve..	<input type="text" value="1.0.2"/>
Developer:	<input type="text" value="--Select--"/>
* Expected:	<input type="text" value="398.00 49.75"/>
Actual: 	<input type="text" value="0.00 0.00"/>
Done Ratio:	<input type="text" value="0"/>


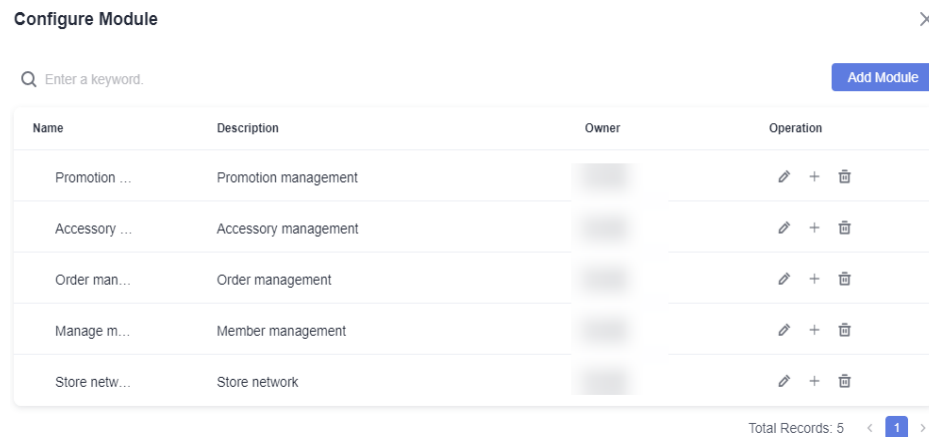
To maintain a module list, click  next to the **Module** field on the editing page of the work item. In the displayed window, you can add, modify, or delete a module.

Figure 2-11 Editing a module

In the backlog view of work item management, after adding the **Module** field in the **Select Field** window, you can easily view the modules related to the work item and filter the modules.

2.2.4 Managing Requirement Priorities

Four-Step Management

Requirement priority management helps the requirement manager determine the sequence of requirement fulfillment, thereby maximizing the return while minimizing the risk and investment. To properly manage priorities, we need to:

1. Determine the priority model. Seemingly simple, priority is actually a value based on comprehensive judgment of multiple factors. These factors and judgment principles constitute the priority model.
2. Prioritize requirements. Calculate requirement priorities using the priority model.
3. Adjust requirement priorities.
4. Improve the priority model. If requirement priorities are adjusted frequently, analyze and improve the priority model as needed. In cases that the requirement has been delivered or released, but its actual usage or value of the function does not meet the expectation, review the requirement analysis to identify whether the analysis or the priority model is incorrect, and make corresponding adjustments.

Determining the Priority Model

Cost-benefit analysis (CBA) is the simplest priority model. The Eisenhower Matrix and **Kano model** are also priority models. Simple or complex, all these models can help determine requirement priorities. Select one as needed.

Note that the priority model should not be too complex at the beginning. Otherwise, high costs of requirement management exert an adverse impact on requirement development and delivery. A simple, useful model should always be preferred. It is recommended that enterprises start with a simple model and improve the model continuously.

- A simple model means a few factors to be considered. For example, CBA contains only two factors, which is simpler than other models with more factors.
- A simple model also means a narrower value range or a lower precision requirement. For example, it is simpler to predict the profit as high, medium, or low than in the unit of CNY10,000.

Archive the selected model and make it accessible to all or related personnel. For example, it is a good practice to record the model in CodeArts Wiki.

Prioritizing Requirements







In CBA, the expected market revenue and R&D investment are used as the benefit and cost respectively. Calculate the difference or ROI. For example, there are two requirements to be prioritized. For requirement A, the estimated profit and R&D investment are CNY100,000 and CNY30,000 respectively, so the estimated profit is CNY70,000 and ROI is 233%. For requirement B, the estimated profit and R&D investment are CNY50,000 and CNY40,000 respectively, so the estimated profit is CNY10,000 and ROI is 25%. It is clear that the priority of requirement A is higher than that of requirement B. Now, consider another two requirements: for requirement C, the estimated profit is CNY70,000 and ROI is 50%, and for requirement D, the estimated profit is CNY10,000 and ROI is 500%. How can we determine the priorities of these four requirements?

In this case, we need to introduce weights to calculate a comprehensive value, as shown in the following table:

Requirement	Estimated Revenue (CNY10,000)	Estimated Cost (CNY10,000)	Estimated Profit (CNY10,000)	Profit Weight	Profit Weighted Value	ROI	ROI Weight	ROI Weighted Value	Comprehensive Value	Priority Sequence
Requirement A	10	3	7	0.1	0.7	233%	1	2.33	3.03	2
Requirement B	5	4	1	0.1	0.1	25%	1	0.25	0.35	4
Requirement C	21	14	7	0.1	0.7	50%	1	0.5	1.2	3
Requirement D	2	1	1	0.1	0.1	500%	1	5.0	5.1	1

According to the results in the preceding table, we need to add requirements D, A, C, and B to the development plan in sequence. In CodeArts, the **Order** field (1–100) can be used to display priority.

Figure 2-12 Story priorities

ID	Title	Priority	Sprint	Order
66595...	 Admin manages accessories	 Middle	Sprint3	1
66595...	 Admin collects accessory data	 Middle	Sprint3	2
66595...	 User searches for products	 Middle	Sprint3	3

Adjusting Requirement Priorities

Adjusting requirement priorities is simple. Just reset the value of the **Order** field in CodeArts. More importantly, however, you need to record the priority adjustment in CodeArts Wiki, including why the adjustment is required, how the adjustment is performed, and any specific considerations. It can be used as a reference in retrospective meetings after each sprint for review.

Improving the Priority Model

The priority model must change to the evolving market, users, and products. We can review and analyze the requirement priority model to find out what can be enhanced. The review can be conducted regularly (for example, once a month) to go over all the requirements involved, or requirements with adjusted priorities or problems. Also, the review can be conducted irregularly and problem-driven. For example, if a large number of requirement priorities are adjusted in a day, a review meeting can be scheduled for that day or the next day to analyze the cause.

To achieve a good review effect, we must restore the situation when the problem occurs as much as possible. Therefore, the records in CodeArts Wiki are very important. The retrospective meeting should provide as much information as possible to participants for a better discussion.

During the review, we need to identify the root cause. We need to find out whether the model design (such as factors and dimensions) is incorrect, whether the value or weight is incorrect (perhaps due to difficulties in estimating the revenue for specific requirements), or whether process management is wrong (such as incorrect priorities due to premature estimation without sufficient information), and make targeted improvements.

2.2.5 Avoiding Missing Important Requirements

Guidelines

We need to find out why these urgent and important requirements cannot be predicted earlier. Also, we need to know:

- What are the external causes? Check whether these causes have something in common and take corresponding solutions.
- Is there anything in common of the added requirements? If yes, handle them accordingly.
- How temporary is the addition? If we can adjust and respond more quickly so that the temporary requirements do not affect the team, this problem is no longer a problem.
- Why do not we adjust the process or work style? Is it unuseful, or do not we know how to adjust the process or work style?

Procedure

We can take measures based on different time points, that is, before, during, and after the event.

1. In-event handling

Take the following measures as required:

- For important, non-urgent requirements, add them as usual. If they are frequently missed, consider whether the practice of requirement analysis and planning is correct. If yes, strengthen structured requirement management and make a global plan.
- For important, urgent requirements, adjust the current development sequence and prioritize these requirements. Then, conduct a review on two aspects: requirement priority and structured requirement management, and make improvements to avoid similar situations.
- For unimportant requirements, handle them as usual. Determine whether to prioritize them based on their urgency and impact. If this situation occurs repeatedly, it is advised to perform an analysis on structured requirement management and discuss improvement solutions.

2. Post-event handling

Post-event handling is actually a review. The key to the review is to perform deduction and analysis based on the formulated model and specifications. We need to find out whether there is a problem with the implementation, the model is too simple to cover the special requirements, or the judgment deviation is huge due to inadequate skills. Only when the correct root cause is found can the problem be solved. Therefore, we need to conduct a careful review.

So how do we conduct a review? There are books in the industry for our reference. For example, the MOI model proposed by Gerald Weinberg in *Becoming a Technical Leader* is a good review approach.

- M: Motivation. Are people not motivated to do it?
- O: Organization. Is it so disorganized or undisciplined that people do not know what they should do?
- I: Idea/Innovation. Is there a lack of ideas or ideas on how to solve these problems?

Due to limited capabilities, experience, and number of problems, we may not be able to reach an accurate conclusion or find an effective solution. However, on the one hand, we can take measures that have been clearly defined and observe the effect for continuous improvement. On the other hand, we can take some temporary measures.

- a. Reserve time: If it is difficult to analyze why requirements are always missed and cannot be handled in a targeted manner, we might as well adopt a vague approach. For example, we can obtain the work records of a past period of time, evaluate the workload consumed by the unexpected requirements of each sprint in this period, and calculate the average value. Reserve a certain amount of time based on the value for unexpected requirements during subsequent sprint arrangement.
- b. Break down requirements: When we need to adjust the work sequence due to unexpected requirements, it is very likely that the impacts cannot be avoided due to the large granularity of requirements. Therefore, we should break down the requirements as much as possible, making it more flexible to adjust the requirement work sequence.

To calculate the reservation time, use the "Epic-Feature-Story" structure of CodeArts to aggregate unexpected requirements. For example, create a special epic named "Unexpected Requirements" and features to carry the unexpected requirements (shown as stories) in each sprint. Record the workload. After the sprint, calculate the number of unexpected requirements and the workload.

Figure 2-13 Sprint planning

ID	Title	Sprint
66593...	Epic Phoenix	--
66593...	Feature Client	--
66593...	Story User searches for products	Sprint3

The **Module** field can also be used to record and collect statistics on unexpected requirements. For example, create a module named "Unexpected Requirements" to mark all unexpected requirements, and filter or view reports based on the module to calculate the workload of unexpected requirements.

Figure 2-14 Sprint content

Sprint3 Planned Duration: May 06, 2024 - May 17, 2024 Statistics

+ Create Work Item Apply Q acker: Story | Task | Bug Sprint: Sprint3 Enter keyword or add filter

ID	Title	Closed On	Status	Assigned To
66593...	Bug Function search button not working	Jun 03, 2024 19:2...	Closed	
66593...	Task Search for functions being developed	Jun 01, 2024 19:2...	Closed	
66593...	Story User searches for products	May 14, 2024 19:2...	Closed	

3. Pre-event handling

After the in-event handling and post-event review, we need to think of preventive measures. We need to perform structured requirement management and requirement priority management, publicize related regulations, allocate personnel, and develop capabilities. In this way, the impact of unexpected requirements can be effectively avoided or reduced.

2.3 Sprint Plan

2.3.1 Properly Planning the Sprint Timebox

Background

A team of around seven members uses the Scrum framework. The sprint timebox that the team currently uses is one week. The sprint goals are not always achieved at the end of a sprint. Many work items need to be completed across sprints.

Problem Analysis

Sprint goals are not well achieved, which is currently a problem for sprints. There are several following causes:

Team members face many exploratory work items that require learning costs for those unfamiliar with the work content. As a result, it takes longer to complete work items than usual. The workload of each user story is also heavy, mostly more than 24 hours. The Product Owner (PO) has very high standards on the work item completion, and the review is strict. Unqualified work items are often redone in the sprint. The current team sprint is one week, and the four major events are based on the Scrum framework. The average duration of the sprint planning and review meetings is about 2 hours.

The main factors that affect sprint goal achievement are listed in [Table 2-1](#).

Table 2-1 Factors affecting sprint goal achievement (1)

No.	Factor	Analysis
1	Many exploratory work items	Since the status quo is difficult to change, learning costs are mandatory. Team members can share knowledge. As their capabilities improve, learning costs will gradually be reduced.
2	Members unfamiliar with the work domain, requiring learning costs	
3	Large user stories	Due to the particularity of work items, user stories are generally large. Split them into smaller stories or create tasks under each user story. Achieve sprint goals at the task level.
4	High completion standards by PO	Further understand and clarify the completion standard by PO, including Acceptance Criteria (AC) and Definition of Done (DoD), in the sprint planning.
5	Short sprint	The team sprint is initially set to one week. If the goal is not achieved as expected, adjust the sprint.

No.	Factor	Analysis
6	Prolonged sprint planning and retrospective meetings	Generally, the sprint planning of a one-month sprint lasts eight hours. Therefore, it is recommended that the planning meeting of a one-week sprint last two hours. Similarly, the retrospective meeting of a one-month sprint normally does not exceed three hours. Therefore, it is a severe timeout for a retrospective meeting of a one-week sprint to take two hours.

Solution

On the one hand, a short sprint leaves little time for work item completion, with team member busy preparing for planning, review, and retrospective meetings. It is difficult to develop emergency handling capabilities and build a stable team. On the other hand, a long sprint goes against the concept of timebox. Therefore, if the team often fails to achieve the sprint goal in a one-week sprint, try to extend the timebox to two weeks. At the same time, adjust the size of user stories to improve the efficiency of the four events.

The sprint timebox extension has many favorable influences, as shown in [Table 2-2](#).

Table 2-2 Factors affecting sprint goal achievement (2)

No.	Factor	Influence of Sprint Extension From One to Two Weeks
1	Many exploratory work items	There is sufficient time reserved for learning, exploratory work, and emergencies.
2	Members unfamiliar with the work domain, requiring learning costs	
3	Large user stories	The planning meeting is more comprehensive and detailed. User stories are broken down into smaller ones, and tasks are created under each user story. Sprint goals are achieved at the task level.
4	High completion standards by PO	The completion standard by PO, including AC and DoD, are fully understood and clarified in the planning meeting.
5	Short sprint	Team members feel more confident in an empowering atmosphere, with an increase in the sprint goal completion rate.
6	Prolonged sprint planning and retrospective meetings	Meetings are held more efficiently.

Sprint timebox recommendations:

- One to two weeks
R&D teams that are committed to time-sensitive products and flexible services require prompt adjustment and regular self-check.
- Two weeks
Teams with a relatively stable pace and large stories, which require more time for review and rectification.
- Three to four weeks
Teams with a stable pace and requirements.

More about Timebox

In Scrum, the development process is known as a sprint, which is an iteration or cycle usually lasting a month. Sprint is set in a timebox, that is, the sprint has fixed start and end time.

- **Timebox advantages:**
 - a. Timeboxing is used to control the number of works in progress (WIPs). WIP is a list of work items that have been started but are not yet completed. The development team only focuses on work items that they think can be completed within a sprint, so timeboxing restricts the number of WIPs for each sprint.
 - b. Timeboxing requires the team to prioritize the tasks so that they can dedicate their time to quickly completing high-value work.
 - c. Timeboxing displays the progress by showing how many timeboxes are required to finish the development of a complex feature. This also allows a team to learn exactly how much remains to be done to deliver the entire feature.
 - d. Timeboxing has an end date to prevent endless work.
 - e. A sprint has to be finished within a timebox, which means the deadline is definite and cannot be changed. This can motivate a Scrum team to go all out to complete the work of a sprint on time. Without this time pressure, the Scrum team would not have a sense of urgency.
 - f. Timeboxing can improve predictability. The team can predict the amount of work that can be completed in the next sprint.
- A short sprint duration features easier planning, quick feedback, limited errors, and high return on investment (ROI). It helps maintain the enthusiasm of team members and provides more effective checkpoints. The following describes more details about its benefits:
 - a. It is easier to plan the workload for a short work period than a long one. Plans are also more accurate and executable.
 - b. Fast feedback can help abandon inappropriate product paths and development methods to avoid more cost of poor quality (COPQ). Most importantly, it allows teams to quickly identify and leverage business opportunities that can easily slip by.

- c. Mistakes made during one to two weeks are limited. Even though an entire sprint is a failure, the incurred loss is acceptable. Repeated short-term sprints are good chances for frequent trial-and-error, feedback, and adjustments.
- d. Shorter duration means earlier and more frequent delivery and more opportunities for quick production to generate more ROI.
- e. Short duration helps maintain a high level of enthusiasm. The motivations and interest of a team decline over time. If a project lasts for too long without presenting any results, team members will gradually lose interest. The frequent and quick delivery of runnable products can fill team members with a sense of satisfaction and fuel them to keep working till reaching the sprint goal.
- f. In traditional waterfall development, milestones such as analysis, design, coding, testing, and operation are often less accurate metrics. Scrum provides more meaningful checkpoints (sprint reviews) at the end of each sprint, where team members make judgments and decisions based on the workable features that are demonstrated. With more checkpoints for review and correction, teams can better cope with complex projects.

2.3.2 Moving Task Cards in the Kanban After Requirements Change in Sprints

Background

This section describes how to move task cards in the Kanban in normal cases and after requirements change in sprints.

Moving Task Cards in Normal Cases

One of the main purposes of using the Kanban is to control the number of WIPs. Pull movement is required to effectively control the number of WIPs and prevent overstock of work items.

Note that a set of moving rules should be customized before the move. The rules are adjusted to satisfy the team.

Moving Task Cards After Requirements Change

- **Rejecting the change**

To keep the team going all out for the sprint goal after the sprint backlog and goal are confirmed, requirement changes proposed by the PO are generally not accepted. The PO is responsible for sorting out the sprint backlog. To be specific, the PO should prepare the product backlogs for the next one to three sprints and then develop the sprint backlog based on priority. Therefore, it is recommended that the team reject frequent requirement changes. Requirement rejection also strengthens the PO's control over requirements. Therefore, it is better for the team to move cards in the Kanban normally in this case.

- **Embracing the change**

It is unrealistic to completely reject requirement changes. Sometimes, high-priority requirements are subject to changes. For example, if time-sensitive

requirements cannot be completed in this sprint, we will fail to get in on the ground floor. However, we must comply with the "NO CHANGE" principle. That is, after receiving a requirement change, analyze the requirement and the impact on the current sprint instead of directly accepting or rejecting the change. In this case, check the following items:

- Requirements with no value
Reject the requirements with no value and do not move cards on the Kanban after negotiating with the PO. Here we will spare you the details about where these requirements come from.
- Requirements with few changes and little impact
Accept the change of high-priority requirements with little impact on the sprint, but evaluate workload and perform an exchange. To put it simply, replace low-priority requirements that have not been implemented from the Kanban and move them to the product backlog. This is a process of product backlog refinement. Then, add cards of high-priority requirements to the Kanban. When replacing requirements that have been partially done, move them back to the **Product Backlog** column if we seek to meet feature requirements, or move them to the **Done** column if the team needs to collect statistics on the workloads on the physical Kanban. In the second situation, if the electronic Kanban also works, move the requirements to the **Product Backlog** column.
- Requirements with many changes and great impact
For changes in high-priority requirements that have great impact on the sprint, stop the current sprint and plan a new sprint. For example, if the requirement in the current sprint is of no value or the changed requirement requires a large amount of workload, you should stop the sprint. Then arrange the card on the Kanban based on the latest sprint backlog.

2.4 Sprint Development

2.4.1 Managing Unexpected Tasks in Software Development Teams

Background

How does the development team manage unexpected tasks? Many software development teams struggle with managing unexpected tasks, such as training support. These tasks can directly impede the team's progress and efficiency, and indirectly hinder the achievement of sprint goals and the overall project success. Therefore, it is crucial for development teams to reduce or address unexpected work effectively.

Problem Analysis

We can classify the scenarios into the following two types.

Scenario	Analysis
Mixing support and development tasks, with unexpected tasks occurring as a norm	Support tasks are mixed with regular development tasks, causing developers to often switch work content. This makes management more difficult and wastes time as developers have to constantly switch tasks back and forth. Therefore, the root cause is the development team mode. In this mode, problems and risks need to be handled as they arise.
Primary development work, with unexpected emergencies or normal requirement changes	Development team members lack clear and transparent rules on handling emergencies, leading to unpreparedness. The root cause is backlog management. To be specific, the team needs to figure out how to update the backlog for unexpected work items, that is, how to deal with requirement changes and temporary tasks.

- **In the first scenario**, development and support tasks need to be handled simultaneously without clear priorities, complicating task management.
- **In the second scenario**, customers often submit unexpected, urgent tasks to the development team. The extra workload adds to the risk of failing to achieve the sprint goal.

The development team needs to find a way to handle trivial, unexpected support work and improve work efficiency.

Solution

More and more development teams are adopting Agile, from which CodeArts is inspired. The following solutions, including Scrum, are based on Agile:

- For the first scenario, divide developers into two groups, one for development and the other for emergencies. The development group focuses on development while the other group stands ready to unexpected work (also responsible for easy, loosely coupled development). Both groups shall comply with rules of the development team to manage work items.
- The second scenario is more common. The following describes how to set work priority and deal with requirement changes systematically.

Solutions for the second scenario:

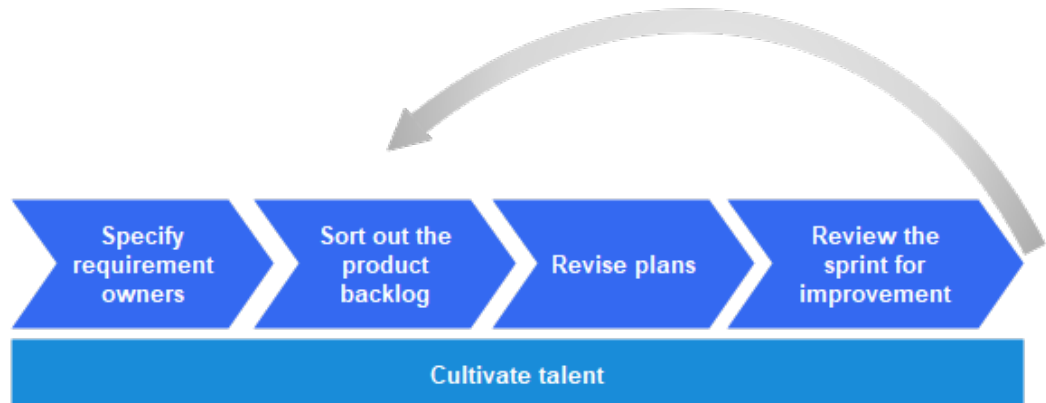
Managing work items is essential for the development team. Therefore, before creating work items, we need to determine who is responsible for work items (that is, the source of work items), and make a plan for work item implementation.

1. Specify the product manager as the unique requirement source.
2. Sort out the product backlog and prioritize work items.
3. Revise the plan based on the capabilities of the development team and update the sprint goal.

4. Review and find where enhancements are needed.
5. Analyze sprints for continuous improvement and cultivate talent to build a cross-functional team.

The following diagram displays the solution.

Figure 2-15 Solution diagram



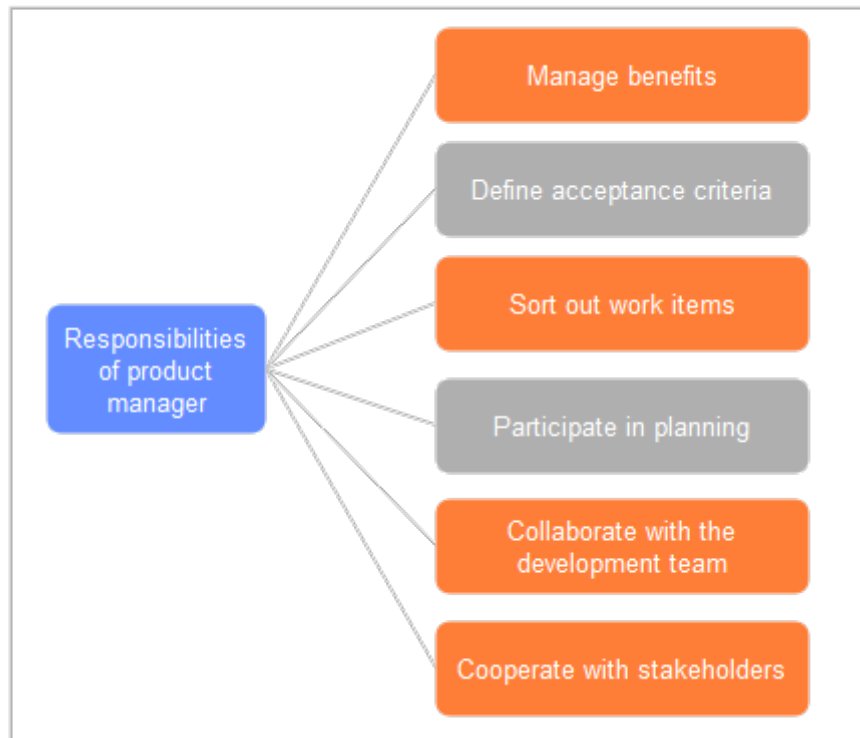
1. **Specify the requirement owner.**

Specify the requirement owner as the unique requirement source. In CodeArts, the **project manager** is the requirement owner. The requirement owner needs to:

- Have a good understanding of the requirements of stakeholders, customers, and users in the project (including the unexpected work items mentioned above) and their priorities. From this perspective, the product manager acts as the requirement owner.
- Communicate with the development team about the features to be developed and the development sequence. The requirement owner also must ensure that there are clear feature acceptance criteria. From this perspective, service analysts and testers act as the requirement owner.

Moreover, the requirement owner must be able to make economical decisions for more benefits at the version, sprint, and backlog levels. In the following, the product manager (like product owner in Scrum) is used for requirement owner.

The following figure shows the main responsibilities of a product manager.

Figure 2-16 Main responsibilities of the product manager

The highlighted responsibilities in **Figure 2-16** are related to the unexpected work in a sprint. The product manager needs to clearly communicate with stakeholders to determine the priority of each unexpected task and whether it must be completed in this sprint based on business value and management benefits. Once it is determined that these unexpected tasks are of high priority and must be completed in this sprint, the backlog needs to be sorted out.

2. Sort out the backlog.

Sorting out the backlog means placing high-priority tasks in the sprint backlog. For details about the sprint backlog, see [More Details About Sprint Backlogs](#).

- **Backlog** is a prioritized list of expected product functions.
- **Work items** are the to-dos in a backlog. For users and customers, most work items are valuable features and functions. Work items also include defect rectification, technical improvement, and knowledge acquisition, and any work that the product owner considers valuable (even unexpected valuable work).
- **Sorting** refers to three important activities: establishing and refining, evaluating, and prioritizing work items.

Change the backlog structure by sorting out activities.

Figure 2-17 Backlog structure

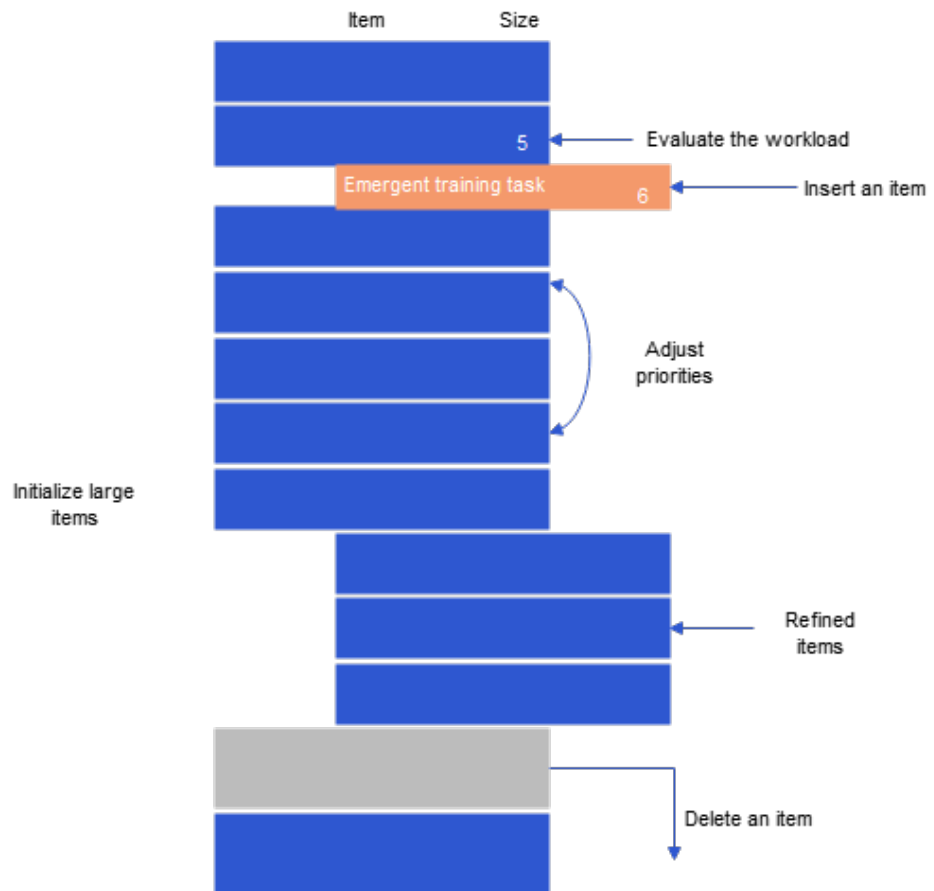


Figure 2-18 shows the sorting result in CodeArts.

Figure 2-18 Requirement sorting

ID	Title	Sprint	Priority	Status	Assigned To	Expected
66595...	Story Admin manages accessories	Sprint3	Middle	New		20.00
66595...	Story Admin collects accessory data	Sprint3	Middle	New		50.00
66595...	Story User searches for products	Sprint3	Middle	New		32.00
66593...	Story User searches for products	Sprint3	Middle	Closed		32.00
66593...	Bug Function search button not working	Sprint3	Middle	Closed		8.00
66593...	Task Search for functions being developed	Sprint3	Middle	Closed		24.00

The red boxes in Figure 2-18 show the sorting by the product manager. The unexpected training task is properly prioritized and the workload is evaluated. In addition, the task of querying product names is broken down. As the final decision-maker of sorting, the product manager is responsible for sorting out unexpected work. A good product manager can coordinate stakeholders to arrange enough time for sorting based on the characteristics of the development team and project type. In addition, the development team needs to estimate the workload of unexpected work and help the product manager prioritize work items based on technology dependencies and resource constraints. If an unexpected training task has a high priority, it will be added to the backlog of the current sprint.

3. Revise the plan.

Revise the plan based on the capabilities of the development team and update the sprint goal. Before revising the plan, we need to know what is a plan in Agile development and what are the differences between plans in Agile and traditional development modes.

As the Agile Manifesto advocates responding to changes instead of always following the plan, **the Agile development focuses on responding to changes while the task-driven development tends to follow the plan.**

Sequential development is plan-driven. The plan is the authoritative information source of how and when work is done. Therefore, the plan is always followed. In contrast, Agile prefers revising plans based on real-time information, rather than sticking to a potentially incorrect plan.

Agile development is not about following a predetermined plan or prediction, but revising the plan based on the valuable economic information that emerges in the process. Therefore, you can adjust the plan after sorting out work items. Work items in the original plan may be moved to the next sprint. The capacity of a fixed development team remains unchanged in a sprint. Adding unexpected work items without removing others will definitely bring pressure to the team and disrupt the delivery pace. Therefore, the equivalent exchange principle shall be followed, which means that the replaced work has the same workload as the unexpected high-priority work.

Figure 2-19 Equivalent exchange principle

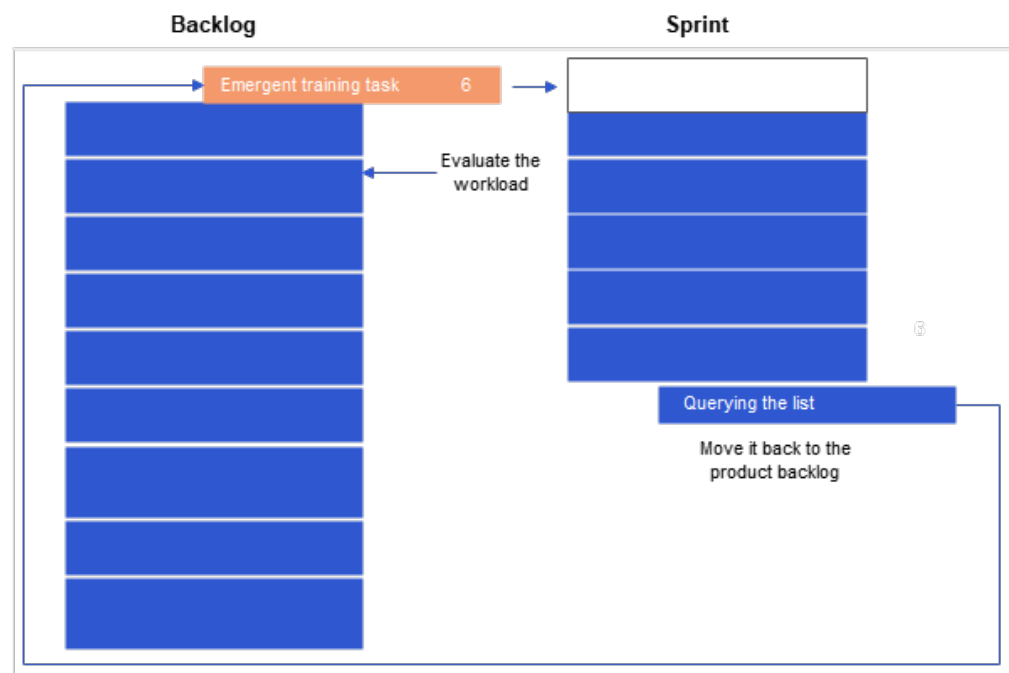


Figure 2-20 and **Figure 2-21** show the exchange details in CodeArts.

Figure 2-20 Equivalent exchange 1

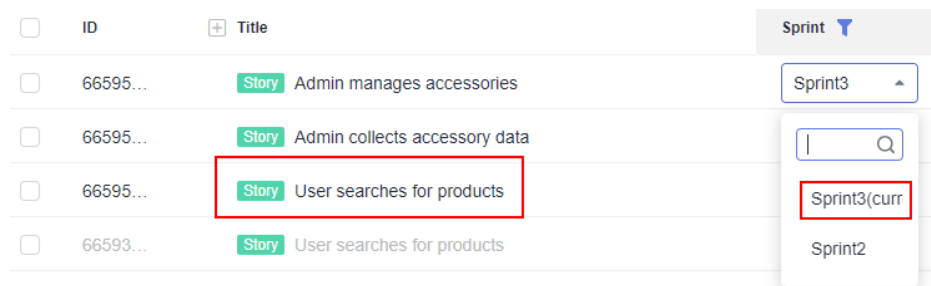
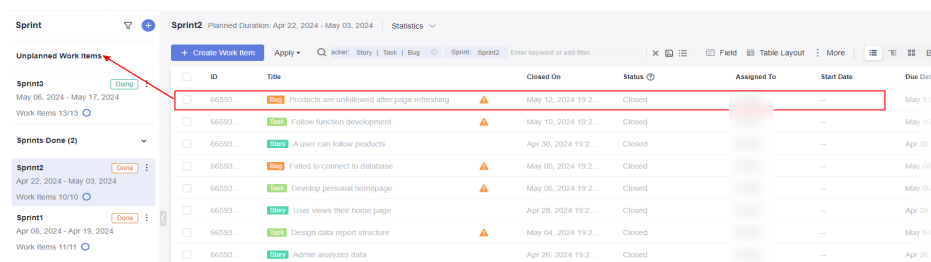


Figure 2-21 Equivalent exchange 2



Finally, move the low-priority work item with a similar workload back to the backlog. The equivalent exchange of work items is completed in CodeArts.

4. Review the sprint for improvement.

Conduct a sprint retrospective to improve the process based on the needs of the development team, thereby boosting morale for higher output efficiency. Analyze the unexpected work in sprints for continuous improvement. In Agile development, prioritizing changes over following the plan is important, but the development team needs to go out for the sprint when there are no interference (unexpected work). Therefore, we should think about why there would be interference in each sprint and find a solution.

Figure 2-22 and Figure 2-23 are a good practice of CodeArts, which can provide objective data for review. Unexpected work items added to the sprint backlog can be managed in **Modules** of CodeArts. That is, create a module for unexpected tasks before creating a user story, and then select this module in the user story. This is to measure and analyze such unexpected work in subsequent sprints (which can be sorted by module to facilitate measurement and analysis) for continuous improvement.

Figure 2-22 Creating a module for unexpected work



Figure 2-23 Creating a user story

#66595073 User searches for products

Description Child Work Items (0) Associated (0) Person-Hour Details Operation History

As a software engineer, I want to learn how DevCloud helps enterprises practice DevOps, so that I can improve the quality and efficiency of my service delivery.

Status:

* Assigned To:

Module:

Sprint:

Start Date:

Choose **Statistics > Create Report > Custom Report**. On the page that is displayed, set **Analysis Dimension (X-axis/Table row values)** to **Sprint** and **Measure (Y-axis/Table cell values)** to **Actual person-hour**. Select **Module** on the page displayed after clicking **Add Filtering Criterion**. Click **Save** to analyze the statistics in diagrams and tables.

Figure 2-24 Diagram display



Figure 2-25 Table display

Sprint Compare Chart List ↗ ⋮

Sprint	Actual Person-hour
N/A	0
Sprint3	14
Sprint2	15
Sprint1	0

Total Records: 4 < 1 >

5. Cultivate talent.

At the same time, cultivate talent to build a cross-functional team. We not only seek to handle emergencies, but achieve higher efficiency.

It is obvious that we should find the right person for each task (including unexpected tasks). If the person is unavailable, find another to complete the task in time. Each team member is responsible for making wise decisions when faced with uncertainties. A development team composed of T-shaped talent can always find someone to tackle tasks, achieving a higher efficiency.

More Details About Sprint Backlogs

The sprint backlog (called "sprint" in CodeArts) is a set of product backlog items selected for the Sprint. Plans to deliver the product increment and achieve the sprint goal are also included.

When a new work item emerges, the development team needs to add it to the sprint backlog. As the work is performed or completed, the remaining workload is estimated and updated. When a part of the plan loses development significance, it can be removed. During a sprint, only the development team can modify the sprint backlog. The sprint backlog shows the status of works planned by the team during the sprint in a visible and real-time way. The development team has full ownership of the backlog.

The sprint backlog is created in the sprint planning, where development team members proactively claim the tasks that suit and interest them. Task completion duration is measured in the unit of hour. It is recommended that tasks be completed within 16 hours. A task requiring 16 hours should be further broken down. Task information includes the owner, workload, committed completion time, and remaining workload on any day of the sprint. Only the development team can modify the task information.

2.4.2 How Can I Deal With Unclaimed Tasks in My R&D Team?

Background

In traditional development mode, project managers assign tasks to individuals. In agile development, however, teams claim tasks.

During transformation, many enterprises have always found some tasks unclaimed during sprint planning.

Problem Analysis

Compared with the traditional development mode, we need to know why tasks are claimed in agile development. In Agile, neither the *Agile Manifesto* nor the *Scrum Guide* has the word "assign", but uses a term "self-organizing", as follows:

- The best architectures, requirements, and designs come from self-organizing teams (12 principles of the *Agile Manifesto*)
- Self-organizing teams choose how to do the work themselves, rather than being directed by someone outside the team (*Scrum Guide*).
- The development team is self-organized. No one (not even the Scrum master) tells the development team how to turn product backlog into increments of potentially releasable functionality (*Scrum Guide*).

So what is self-organizing?

Literally, "self-organizing" is the act of organizing scattered individuals or objects to create a systematic whole. The person responsible for arranging them is the organizer themselves. In agile development, a self-organizing team is a team with self-management, self-driving, and self-learning capabilities. Such a team has the following characteristics:

- Team members proactively take on tasks instead of waiting for leaders to assign tasks.
- The team is managed as a whole.
- The team still needs coaching and guidance, but not command and control.
- Team members communicate closely with one another.
- The team actively finds and addresses problems, working together to solve them.
- The team continuously improves their skills and encourages exploration and innovation.

For more details about "self-organizing", see [Reference Documents](#).

According to the *Agile Manifesto* and *Scrum Guide*, when we practice agile development, the development team takes the initiative. The team changes from being controlled to being self-organizing, and the development task shifts from being assigned to being claimed. Claiming tasks allows people to take initiative, and autonomy motivates them to be creative and solve problems. Strong self-organizing brings high performance, great results, and a positive work environment for both teams and individuals. In addition, individuals know themselves the best and are good at assigning tasks to themselves. Compared with the conventional approach of assigning development tasks, this method is more reasonable.

Then, go back to how can I deal with unclaimed tasks in the team?

Before that, it is important to clarify one thing: during the sprint planning, it is not necessary to claim all development tasks. In the *Scrum Guide*, it is noted that "tasks are claimed on demand during Sprint Planning and Sprints." A task is claimed based on your goals during the daily scrum. In addition, Mike Cohn advised against claiming development tasks during the sprint planning. This can lead to a shift in focus from team collaboration to individual work, which violates the intention of agile development and hampers flexibility.

Generally, the reasons why no one claims a development task are as follows:

- **Difficult development tasks:** If a task is too difficult for most team members to handle, they may worry about working overtime and are unwilling to claim the task.
- **Development tasks beyond scope:** When the content of a development task is beyond the scope of the team members, for example, the development members do not know how to do testing, they might feel limited in their ability to claim the task.
- **Afraid of criticizing and judging:** The tasks can be challenging. Team members are afraid to fail the task and let the whole team down.

So how should we solve this problem?

Solution

The Scrum master is crucial in an agile scrum team. One of their responsibilities is to help the team become self-organizing, enabling them to approach sprint development tasks with a positive mindset. In addition, when no one is willing to claim a task, the Scrum master should help the team figure out the reasons and then take measures accordingly. The following provides solutions based on the three situations in the analysis.

- **Difficult development tasks**

If the development task is too difficult, the Scrum master should organize a team to effectively break down the task and use the probe Spike technology to explore solutions for making the task easier. Then a team claims the task. Or encourage members with average technical skills and expertise to work together through pair programming.

In CodeArts, you can split difficult user stories into child work items. In addition, you can set **Assigned To** and **Notify** in the basic information to keep track of pair programming partnerships.

Figure 2-26 Story content introduction

The screenshot displays the 'Story content introduction' page in CodeArts. At the top, it shows the story ID '#66595075 Admin manages accessories' and the status 'New'. Below this, there are tabs for 'Description', 'Child Work Items (2)', 'Associated (0)', 'Person-Hour Details', and 'Operation History'. The 'Child Work Items (2)' tab is active, showing a table with two rows of child work items:

No.	Title	Status	Sprint	Current Handler
66595484	Develop task	New	Sprint3	[Red Box]
66595433	Research work	New	Sprint3	[Red Box]

Below the table, there are fields for 'Tag', 'Attachment', and 'Comment'. On the right side, there are several configuration fields: 'Status' (New), '* Assigned To:' (Red Box), 'Module' (--Select--), 'Sprint' (Sprint3), 'Start Date' (Select a date), 'Due Date' (May 10, 2024), 'Order' (1), '* Priority' (Middle), '* Severity' (Minor), 'Notify:' (Red Box), 'ParentId' (Feature) Manage access..., 'Domain' (--Select--), and '* Expected' (20.00 | 2.50). A 'Show More' link is also present.

In addition, pay attention to and update the development task during the daily scrum, assess potential risks, and help the team resolve problems promptly. In the Sprint retrospective, analyze this type of situation, output a list of team-based standard procedures, and record the solution in the team Wiki. Huawei Cloud CodeArts provides the Wiki feature to sort out and record the working methods for the team.

- **Development tasks beyond scope**

Agile promotes cross-functional teams, but cross-functional teams do not mean that one person can do everything. The cross-functional teams here usually are T-shaped talent with multiple skills (Each team member has expertise in one area and knowledge in other areas). The Scrum master should organize and manage the member technology matrix with the team. They should also identify the areas where the team lacks expertise and facilitate knowledge sharing among team members. Regular activities like technology sharing sessions can help team members learn new skills. This encourages team members to do other tasks during the sprint. Additionally, members with specific expertise and those who are interested can collaborate as a team to do tasks using pair programming. This allows for the enhancement of individual skills and technology knowledge. By developing T-shaped capabilities among team members, they can have more choices when claiming tasks, back up the team, and reduce the occurrence of unclaimed tasks. In addition, the Scrum master also needs to focus on daily risk assessment and guide the team in reviewing tasks and updating the team Wiki.

- **Afraid of criticizing and judging**

The tasks can be challenging. Team members are afraid to fail the task and let the whole team down. The Scrum master should express the idea of teamwork, guide and highlight Scrum values, respect the background and experience of each team member, choose development tasks, and give credits to team members who have the courage to try. In our workplace, we can put slogans (such as "respect others" and "team over individual") on walls and whiteboards. This helps shift the team's mindset and encourages them to take on more challenging tasks over time. And the Scrum master should fully support those who are willing to challenge difficult tasks. During Sprint retrospective, make sure the focus is to discuss ways to improve works rather than criticizing and judging others.

Summary

The preceding three situations where no one claims the task are common. However, every company or team faces different circumstances in their projects. Therefore, it is impossible to list all the situations. You need to analyze your actual situation. For example, an agile team that has just transformed may prefer semi-assignment and semi-claiming for their development tasks. This is like China's economy aiming to be market-oriented with proper macro control. No matter which strategy we choose, team members should be motivated to actively claim tasks, arrange them as necessary, and promptly manage risks. If needed, we may need to seek support from other sources or leaders to ensure the iteration goal is not affected.

2.5 Agile Review

2.5.1 How to Have Daily Scrums

Background

Some project teams of the enterprise meet daily, yet the outcome is not up to par. Daily scrums are much of a formality. Usually after a daily scrum, members go back to their individual tasks. They care only about their own work, and other team members do not understand their work at all. It seems that the daily scrum makes no difference.

How can we have a proper daily scrum? What is the point of it? Do we have to do it? Many teams have been struggling with these questions.

Problem Analysis

There are two scenarios for daily scrum questions.

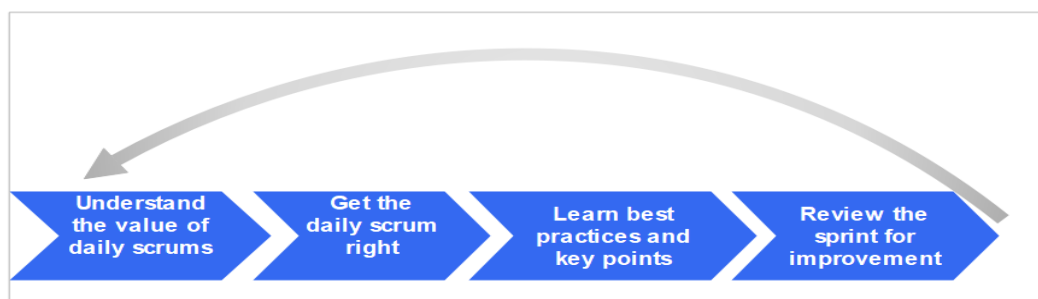
- **Scenario 1:** The team understands the importance of the daily scrum but is unhappy with its current status. They want to make the most of the daily scrum. Teams like these struggle because they are not very clear about the core value of daily scrums and how to effectively conduct them. To have better daily scrums, these teams need some specific measures.
- **Scenario 2:** The team is trying to hold a daily scrum and does not know its value. It seems that there is no difference between having a daily scrum and not having one. In this case, the team has no understanding of daily scrums, not to mention any best practices and benefits.

To sum up, a deeper understanding of the value of the daily scrum, that is, why it is necessary and what it signifies, is needed in both scenarios. Then, you need to know how to have a good daily scrum. Finally, some best practices and key points are needed to help teams with a good daily scrum.

Solution

How can we have a good daily scrum? Take the following steps.

Figure 2-27 Daily scrum flowchart



1. Understanding the value of daily scrums

Daily scrum is a short meeting held on each day by a team that remains standing. It reviews daily work and make adjustment, and self-organizing in advance.

During the daily scrum, every team member can grasp the big picture, learn about what has happened recently, track the progress towards the sprint goal, assess if any adjustments are required for the day's tasks, and identify challenges or obstacles. A daily scrum is an activity that reviews, synchronizes, and adapts to daily plans to help self-organizing teams better do their work.

Some teams think that daily scrums are used to solve problems or report project progress to managers. However, their core significance and value are often misinterpreted.

Daily scrums help team members stay focused on their right tasks every day. Team members usually do not shirk responsibility because they make commitments in front of their coworkers. Team members are motivated to ensure they meet their daily goals. The daily scrum also ensures that the Scrum master and team members can promptly address problems, cultivate team culture, and make everyone feel the team spirit. Some organizations that do not use agile methodologies sometimes do daily scrums.

The value, significance, and misunderstandings of daily scrums are summarized as follows.

Figure 2-28 Benefits and misunderstandings

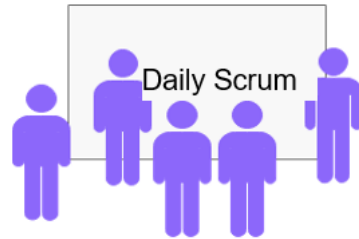
Benefits	Misunderstandings
<ul style="list-style-type: none">• Keep track of the big picture• Identify problems and obstacles• Review and adjust plans• Focus on right tasks• Cheer teammates up and increase the sense of responsibility• Do spiritual encouragement• Build a team culture• Remove obstacles quickly• ...	<ul style="list-style-type: none">• Solve problems in meetings• Report project progress to managers• ...

2. Getting the daily scrum right

How can we have a proper daily scrum?

Team members gather around the whiteboard on time (to increase the sense of ceremony) to plan their daily tasks.

Figure 2-29 Daily scrum illustration



Team members need to take turns speaking and answer the following three questions during the daily scrum:

- a. What did I do yesterday? (What have I done since the last daily scrum?)
- b. What do I plan to do today? (What will I do before the next daily scrum?)
- c. What problems and obstacles have I encountered? (What problems and obstacles have hindered or slowed my work?)

These three simple questions can prompt team members to review their work daily, create their own work plans, seek assistance in overcoming obstacles, and make commitments to the team. If the team does the daily scrum properly, they can achieve the following outcomes.

Figure 2-30 Daily scrum goals



- **Sharing team pressure**

Healthy agile teams are under pressure to work together. All team members promised to work together to finish the sprint work. Therefore, team members are interdependent and accountable to each other. Team

members cannot ignore some other member doing the same thing for many days without any progress and motivation to move forward. Their unfinished work will be an obstacle for other team members.

– **Fine-grained collaboration**

In daily scrums, team members should communicate efficiently with clear purposes. For example, if a member shares their plan for the day, another member can say, "Oh, so you are planning to do that today. I will need to rearrange my work priority. That is fine. Go ahead with your plan, I will make the necessary adjustments. I am glad you said that." This fine-grained collaboration allows team members to know how and when to collaborate with one another. An agile team should strive for higher efficiency and zero waiting time.

– **Prioritizing tasks**

In the daily scrum, every team member can stay updated on the ongoing and completed tasks. A healthy team needs to prioritize finishing tasks instead of constantly having tasks in progress. In the daily scrum, the team needs to prioritize their tasks so that they can focus on finishing these tasks as soon as possible. In other words, getting 10 things done is far more meaningful than doing 100 things.

– **Daily commitments**

At the daily scrum, team members need to make commitments to the team. In this way, team members know what will be delivered agilely and how to be accountable to one another.

– **Asking questions**

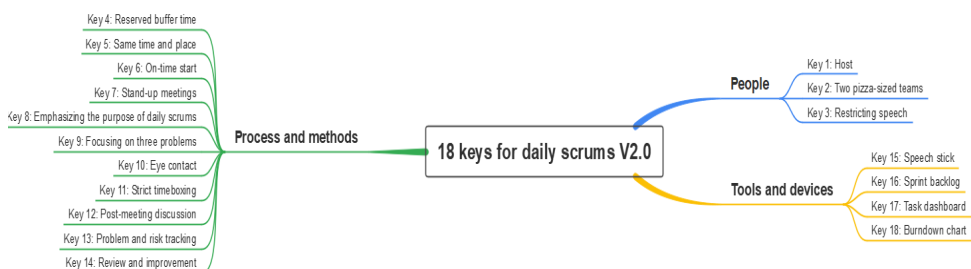
Problems can be raised at any time in Agile, but daily scrum is a golden time for team members to reflect on "what hinders me or slows down my work".

3. **Learning best practices and key points**

Summarize some key points for successful daily scrums through a large number of practices. Maybe these key points are not fully applicable. Therefore, it is essential to customize these points to suit the specific circumstances. These key points are called "18 keys for daily scrums".

The "18 keys for daily scrums" are divided into people, procedures and methods, and tools and equipment to help you learn and memorize.

Figure 2-31 18 keys for daily scrums



- **Key 1: Host**

The host (such as the Scrum master) holds a meeting on time and manages the meeting duration. Team members can talk to each other concisely. They can take turns hosting the meeting to feel the pace of the meeting.

- **Key 2: Two pizza-sized teams**

In *Succeeding with Agile: Software Development Using Scrum* by Mike Cohn, a good way to determine the team size is to see if two pizzas can feed everyone on the team.

Because two pizza-sized teams are similar to the size of the family, the goal of the daily scrum can be easily achieved. When the team is a family size, it is easy to track what happens in the team. People can easily remember everyone's daily commitment and their responsibility for the team. It is also recommended to keep the team size small in Scrum, usually 7 to 9 people.

Finally, the team does not have to do daily scrums based on the above 18 keys. These keys are simply a collection of experiences and solutions to various problems. Each team may need to choose 18 keys according to their own needs.

- **Key 3: Restricting speech**

Non-team members are welcome to join, but they are not allowed to speak. During the daily scrum, only team members who are fully committed to reaching the sprint goal should talk.

- **Key 4: Reserved buffer time**

The development team should consider having a daily scrum either 30 minutes or 1 hour after their work hours start. This leaves some buffer time for regular tasks, such as checking emails. It can also give the development team extra time to review the work from the day before, such as defect reports generated by automated testing tools that were initiated overnight.

- **Key 5: Same time and place**

Daily scrums ideally take place at the same time and place, with a visualized task board in front of team members. By meeting regularly at a fixed time and place, team members can develop the habit, saving time and efforts to find a meeting spot or confirm schedules.

- **Key 6: On-time start**

All team members should arrive on time. The host should start the meeting on time, even if someone has not arrived yet. Latecomers should be punished, such as paying fines or doing push-ups. Team members decide on the penalties beforehand. If the penalty is a fine, the team also decides on how to use it. What if team members keep being late? For more solutions, see [Learn More: Solutions for Members Being Late](#).

- **Key 7: Stand-up meetings**

Team members must stand for a meeting, which is why the meeting is called a daily scrum. Standing at a meeting is more efficient than sitting, encouraging people to wrap up the meeting sooner and get started on their work for the day. Sitting down is easy to relax, but difficult to stay focused and manage time effectively.

- **Key 8: Emphasizing the purpose of daily scrums**

The purpose of the daily scrum is often emphasized, especially for teams new to daily scrums. The Scrum master or other leaders (or meeting hosts) can emphasize the purpose of daily scrums. They gather feedback from team members about the daily scrum and the progress they have made. Over time, team members might decide to use the goal statement as their daily benchmark. Following each daily scrum, team members assess their own performance. It is an effective self-management tool.
- **Key 9: Focusing on three problems**

During the daily scrum, team members only focus on three topics (yesterday... today... the problems are ...) and do not talk about other things. Only discuss work that has been finished and is about to start, and any problems and challenges faced during that work. The purpose is not to report work to leaders, but to communicate with each other to understand the project progress and solve problems together.
- **Key 10: Eye contact**

It is a fun game in which someone is asked to speak in front of the group, and other members are asked to maintain eye contact with the speaker. The speaker will see who is looking away as they speak. This game keeps speeches concise and improves members' understanding of what speakers say, thereby accelerating the improvement of the daily schedule.
- **Key 11: Strict timeboxing**

The daily scrum is a 15-minute timebox for the development team. It is recommended that the meeting not be too long. For a team of 5 to 9 members, a meeting of 15 minutes is enough.
- **Key 12: Post-meeting discussion**

When someone is speaking, other members should listen carefully. They can ask concise questions for clarification, but they should not have lengthy discussions. To learn more about a member's report or seek assistance from other members, they are free to gather interested individuals for a discussion right after the daily scrum.
- **Key 13: Problem and risk tracking**

A brief record of the problems and risks encountered by the meeting members shall be made (avoid too many details), and saved to the knowledge base or somewhere appropriate. The purpose is to ensure that these problems and risks are closed (For example, problems and risks can be discussed and tracked after the meeting until they are closed).
- **Key 14: Review and improvement**

The daily scrum is a basic Plan-Do-Check-Act (PDCA). Also, the team can get feedback of the daily scrum during the retrospective meeting, including its pros and cons for the next sprint. (The daily scrum serves as a review point during the review meeting. If everything is going smoothly, no additional review is necessary.)
- **Key 15: Speech stick**

Some small props can be used to ensure that the meeting does not time out. I will find either a pen or a small item as a speech stick, ask a member to answer the three questions, and then pass it on to the next member. Only members with the speech stick can talk. If someone takes

too long, interrupt in time and ask for the speech stick to be passed on to the next person.

– **Key 16: Sprint backlog**

In a daily scrum, team members can refer to the sprint backlog to check the task progress. The sprint backlog records the progress of team members' work and needs to be updated and tracked daily. The electronic sprint backlog can keep local and remote teams on the same page during daily scrums. When the speaker answers the three questions, the sprint backlog can be displayed to the team.

The CodeArts sprint backlog is as follows.

Figure 2-32 CodeArts sprint backlog

<input type="checkbox"/>	ID	<input type="checkbox"/> Title	Priority	Status
<input type="checkbox"/>	66595...	Story Admin manages accessories	🚩 Middle	New
<input type="checkbox"/>	66595...	Story Admin collects accessory data	🚩 Middle	New
<input type="checkbox"/>	66595...	Story User searches for products	🚩 Middle	New
<input type="checkbox"/>	66593...	Story User views products	🚩 Middle	New

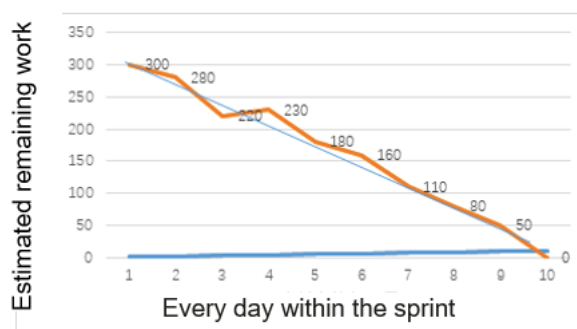
– **Key17: Task dashboard**

In the daily scrum, the task board helps the team members to stay updated on the ongoing and completed work. The team prioritizes finishing tasks that are ongoing. By highlighting these tasks, the team can resolve them promptly.

– **Key 18: Burndown chart**

The burndown chart is a powerful tool for visualizing progress and remaining work. Generally, the vertical axis indicates the remaining workload (hours, story points, or number of work items), and the horizontal axis indicates the sprint duration (usually in days).

Figure 2-33 Burndown chart



Speakers can use a burndown chart to explain the progress during the daily scrum. The burndown chart enables all team members to see the sprint progress at a glance, including whether the work is on track and in good condition. The progress assists the team in figuring out if they can

finish a set number of tasks and decide early in the sprint. The following effects can be achieved by using the burndown chart:

- i. High visibility, displaying progress and remaining work intuitively
- ii. Rapid risk identification
- iii. Helping the team develop knowledge and understand their strengths
- iv. Knowing the work pace of team members
- v. Understanding the team sprint plan
- vi. Using together with task walls for better efficiency

You do not have to use all **18 keys** in a daily scrum. These keys are just suggestions based on successful practices. If you face problems during the daily scrum, consider the **18 keys** and choose keys that fit your team. For example, there are four keys about tools. Do we need to use all these tools? No. As mentioned in the Agile Manifesto, individuals and interactions are higher than processes and tools. Tools serve the team, instead of weighing them down or even holding them back. Therefore, it is important for the team to choose the right keys.

Learn More: Solutions for Members Being Late

Team members can discuss reasons for lateness at the retrospective meeting, gather opinions, or change the start time of the daily scrum. For example, why does the meeting need to start at 9:00 a.m? Can we do another time? What are the difficulties? They can work together to find a solution.

Emphasize the significance of team members arriving on time. The host should start the meeting at the scheduled time and place, even if some attendees are missing. Do not convey the meeting content again to latecomers. Otherwise, someone would think it acceptable to be late.

There should be some punishments for those who are late. The team members decide on the punishments beforehand. Compared with the rules given by others, you are more willing to follow your own rules and keep your commitments.

If the punishment is not enforceable, visualize the punishment. For example, make a specific spot on the whiteboard and pin a photo each time you are late. This particular spot attracts people to see.

Talk to those who are often late, try to understand what problems and difficulties they have, care about them, and help them solve the problems together.

If tardiness is prevalent, the team may not be able to solve the problem. You can attempt to enforce the company's policies and strictly follow the attendance system. However, this goes against the concept of agile self-management and cannot really solve the problem.

To sum up, consider the following factors when addressing the problem of tardiness:

- Analyze the cause, care about the members, and decide together.
- Do the daily scrum at a fixed time and place, and on time.
- If someone is late, do not convey meeting content again.
- Establish a mechanism for light punishment.

- Understand the reason for being late and whether there are difficulties.

2.6 Member Management

2.6.1 How Do I Cultivate and Manage New Members of My Project Team When the Team Members Change Frequently?

Background

As the business grows, an enterprise often has many new employees joined. The development team leader needs to explain knowledge, working modes, and team information to each new employee. The workload increases sharply in a short period of time. The core members of a project, such as the project manager and development team leader, often face the following challenges:

- New employees need many trainings to get started with their work.
- The resignation of senior employees leads to the lack of personnel who understand key technologies and services.
- After working for a period of time, employees have new plans for their career and want to change their work.

So, how should the project owner address these challenges?

Problem Analysis

As a project develops, the project team continuously expands with new employees. Since new employees are unfamiliar with the project to which they have been just assigned, trainings are necessary for new employees.

When the project becomes stable, some senior employees resign due to various reasons such as the business structure, salary, and physical and mental fatigue. Some senior employees gradually become tired of their work, or they want to seek opportunities for transformation. This results in the lack of personnel who knows certain services and key technologies. If these problems are not solved, the project progress will be affected and unnecessary costs will be incurred. It will also be unfavorable to the internal growth and self-organization of the team.

The key to these problems is still the cultivation of new employees.

Solution

Generally, the joining of new employees, key employee resignation, and personal development can be addressed by establishing an information library for managing **team information**, **working modes**, and **knowledge**.

CodeArts is an R&D cloud platform built with Huawei's development practices, cutting-edge R&D concepts, and advanced R&D tools (see [Reference Documents](#)).

2.6.2 How Do I Manage the Permissions of Project Members?

Background

This section describes how to add customer service members and grant them permissions.

Problem Analysis

- How do I use IAM to control permissions?

An account can create multiple software development projects. By default, only accounts can view all projects and members, and determine whether their Identity and Access Management (IAM) users can create projects. In some enterprise scenarios, an account can authorize an IAM user through fine-grained permissions management so that the user can configure settings on behalf of the account.

- What roles can project members have?

All projects created on the project management page support independent permission settings. This means you can configure different permissions in each project.

Project management involves the following default roles:

- Project administrator: the creator of a project
 - Project manager: project development administrator
 - Test manager: project test administrator
 - Product manager: requirement analysis manager of a project
 - System engineer: architecture analysis manager of a project
 - Committer: participant in project development
 - Developer: participant in project development
 - Tester: participant in project testing
 - Participant: participates in specified tasks of a project
 - Viewer: a member who follows or browses a project
 - O&M manager: a member responsible for O&M of a project
- How do I add members to a project and assign them roles?

Solution

CodeArts Req uses IAM to manage permissions for multiple projects of a tenant. Each project can have different permissions. There are two types of permissions managed in CodeArts Req: cloud service and project permissions.

- Cloud service permissions are configured using IAM. IAM is a basic service for permissions management in Huawei Cloud. It can be used free of charge. You pay only for the resources in your account.
 - For details about IAM, see [What Is IAM?](#)
 - For details about cloud service permissions, see [Cloud-Service-Level Permissions](#).
- Project permissions are configured in CodeArts Req. For details about project permissions, see [Project-Level Permissions](#).

For details about members, see [Managing CodeArts Project-Level Permissions](#).

2.7 Appendix

2.7.1 Reference Documents

- *Essential Scrum* by Kenneth S. Rubin
- *User Stories for Agile Approach* (A translation of *User Stories Applied: For Agile Software Development*) by Mike Cohn
- *2019 State of DevOps Report of China* by China Academy of Information and Communications Technology (CAICT), Huawei Cloud CodeArts (formerly "DevCloud"), and Nanjing University
- *User Stories Applied: For Agile Software Development* by Mike Cohn
- *Becoming a Technical Leader* by Gerald M. Weinberg
- *Turn Your Experience into Capabilities* by Qiu Zhaoliang
- *The Scrum Guide*. November 2017
- *Essential Scrum* by Kenneth S. Rubin. [M]. Beijing: Tsinghua University Press
- *Scrum Guide*. 2007
- *Agile Project Management For Dummies* by Mark C. Layton. [M]. Beijing: Posts & Telecom Press
- [Should Team Member Sign Up for Tasks During Sprint Planning?](#)
- *Coaching Agile Teams* by Lyssa Adkins. [M]. Beijing: Publishing House of Electronics Industry

3 Using IPD-System Device Projects to Manage RRs of a Smart Watch R&D Project

Overview

A successful product must meet customer needs, which are the driving force of enterprise development. Unlike traditional requirement management tools that only play a role in the R&D phase, CodeArts Req covers both customer and market requirements by providing a complete process from customer requirement collection, high-value requirement decision-making, to delivery and acceptance. It makes real-time requirement progress transparent and improves market requirement flow by 70%.

In CodeArts Req's raw requirement (RR) management, you can submit customer requirements to the target organization. This organization can then make decisions, conduct analysis, and manage delivery and acceptance of these requirements in real time. This process accelerates the delivery of customer requirements and enhances the market competitiveness of your products. This sector describes how to use an IPD-system device project to simulate the smart watch R&D project for RR management.

Procedure

The basic operation process of the simulation case is as follows.

Figure 3-1 Basic operation process

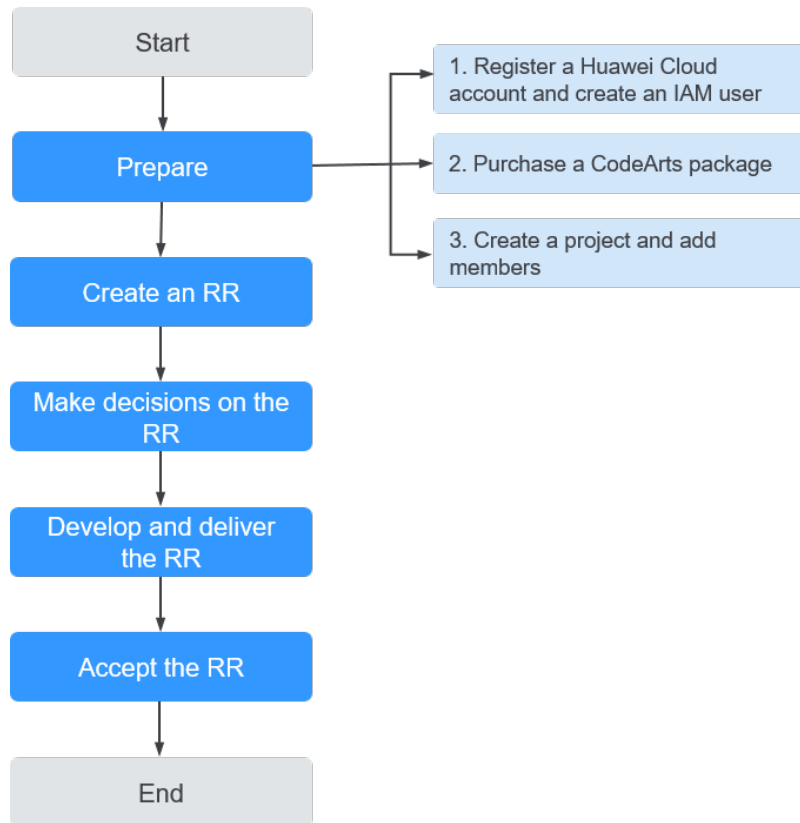


Table 3-1 CodeArts Req RR management process

Process	Description
Step 1: Create an RR	Convert customer requirements into an RR to be traced in the project.
Step 2: Make Decisions on the RR	The analysis owner of the RR analyzes and makes decisions on the requirement.
Step 3: Develop and Deliver the RR	The development and delivery of child requirements equals to that of the RR.
Step 4: Accept the RR	After the RR is delivered, the requirement proposer accepts the requirement.

Preparations

Before performing a specific task, you need to complete the following preparations:

- The project owner has registered a HUAWEI ID and enabled Huawei Cloud services. For details, see [My Account - Signing up for a HUAWEI ID and Enabling Huawei Cloud Services](#).
- The project owner has created IAM users for project members. For details, see [Creating an IAM User](#).
- You can purchase either CodeArts or CodeArts Req.
 - Purchasing CodeArts
To complete all operations in this practice, you need to purchase CodeArts Pro Edition.
 - i. Go to the [Buy CodeArts](#) page.
 - ii. Select **CodeArts Pro**, retain the default value for **Users**, set **Required Duration** to 1 month, agree to the statement, and click **Next**.
 - iii. Confirm the order and click **Pay**.
 - iv. Follow the prompts to complete the payment.
 - v. Check the subscription record on the **CodeArts** page.
- Creating an IPD-System Device Project
Before starting the baseline review (BR), the product owner Sarah creates a project.
 - a. Click **Access Service** on the CodeArts console.
 - b. Click **Create Project** and select **IPD-System Device**.
 - c. Enter the project name **Smart Watch** and click **OK**. The project is created.
- Adding Project Members
Sarah creates accounts for team members and adds them to the project. This practice involves the following project roles, as shown in [Table 3-2](#).

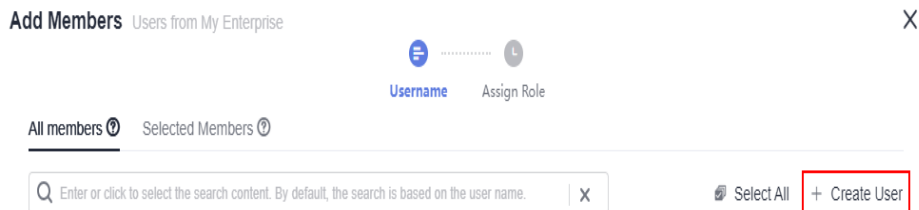
Table 3-2 Project roles

Member	Role	Responsibility
Sarah	Project creator (product owner)	Creates a project and sets up a team.
Maggie	Product manager	Analyzes and makes decisions on RRs.
Chris	System engineer	Analyzes and breaks down R&D requirements.
Frank	Developer	Develops and releases the broken-down R&D requirements.
Lily	Product sales person	Submits and accepts RRs.

- a. Access the smart watch project. Choose **Settings > General > Service Permissions > Member**.

- b. Click **Add Members** above the project member list and choose **Users from My Enterprise** from the drop-down list.

Figure 3-2 Adding members



- c. In the displayed dialog box, click **Create User**. The **Users** page is displayed.
- d. Click **Create User**, and create users **Maggie**, **Chris**, **Frank**, and **Lily** in sequence.
- e. Return to the CodeArts page, refresh the browser, click **Add Members** above the member list, and choose **Users from My Enterprise**. Select members **Maggie**, **Chris**, **Frank**, and **Lily**, and click **Next**.
- f. Click the **Role** drop-down list in each row, select **Project manager** for Maggie, **Developer** for Chris, **Test manager** for Frank, and **Product sales personnel** for Lily, and then click **Save**.

Step 1: Create an RR

Lily (product salesperson) discovered the customer's new requirements for smart watches during a conversation. Lily recorded these requirements in the smart watch project.

Step 1 Go to the smart watch project and choose **Work > Req > Raw Requirements**.

Step 2 Click **Create RR**. On the **Create RR** page, set the following parameters.

Table 3-3 Creating an RR

Parameter	Description	Example Value
Title	RR title. <ul style="list-style-type: none"> The value can contain letters, digits, hyphens (-), underscores (_), commas (,), semicolons (;), colons (:), dots (.), slashes (/), parentheses (()), and spaces. The value can contain 1 to 256 characters. 	Using a Smart Watch to Control iPhones for Photo Shooting

Parameter	Description	Example Value
Description	RR description. <ul style="list-style-type: none">The value can contain images, links, letters, digits, hyphens (-), underscores (_), commas (,), semicolons (;), colons (:), dots (.), slashes (/), parentheses (()), and spaces.Enter a maximum of 500,000 characters.	Background: The customer hopes to use a smart watch to control iPhones for photo shooting. Value: Meet customer requirements and improve product competitiveness. Details: Currently, the smart watch supports only Android and HarmonyOS phones.
Expected Completion	Time when the RR is due to be completed and delivered.	2024/08/30
Recipient	Analyzer and decision maker of an RR. <ul style="list-style-type: none">Generally, this parameter is set to the product manager of the project.You can add project members by referring to Adding CodeArts Project Members.	Maggie
Priority	RR priority. The options are as follows: <ul style="list-style-type: none">HighMediumLow	High

Step 3 Click **Submit**.

----End

Step 2: Make Decisions on the RR

After receiving the notification of Lily's RR, Maggie (product manager) accessed the requirement details page through the notification card to view and analyze the requirement.

Step 1 Go to the service homepage, click **Messages** in the upper right corner, or go to the smart watch project and choose **Work > Req > Raw Requirements**. On the **Raw Requirements** page, select **Assigned to me** from the drop-down list to view the RRs that you need to make decisions on.

Step 2 Click an RR title. On the RR details page, view the RR information. Click **Accepted** in the upper right corner. In the displayed dialog box, set parameters by referring to the following table.

Figure 3-3 Accepted dialog box

Accepted [Close]

* Owner [Dropdown]

* Planned Com... [Calendar]

* Promised [Dropdown]

* Planned ... [Input: Required.] person-day

* Priority [Dropdown: Medium]

Conclusion [Rich Text Editor: Conclusion required.]

[OK] [Cancel]

Table 3-4 Parameters for accepting RRs

Parameter	Description	Example Value
Owner	Owner after RR acceptance. <ul style="list-style-type: none"> Generally, this parameter is set to the product manager of the project. You can add project members by referring to Adding CodeArts Project Members. 	Maggie
Planned Completion	Planned delivery time of the current RR.	2024/08/20
Promised	Whether the planned completion time is promised. This parameter is used together with Planned Completion .	Yes
Planned Workload	Estimated number of person-days required to complete the current RR.	20
Priority	RR priority. The options are as follows: <ul style="list-style-type: none"> High Medium Low 	Medium

Step 3 Click **OK**. Maggie has accepted the RR.


Step 4 Click  **Break Down** in the upper right corner of the accepted RR details page and set parameters as follows.

Table 3-5 Parameters for requirement breakdown

Parameter	Description	Example Value
Title	Title of a child requirement. <ul style="list-style-type: none"> The value can contain letters, digits, hyphens (-), underscores (_), commas (,), semicolons (;), colons (:), dots (.), slashes (/), parentheses (()), and spaces. The value can contain 1 to 256 characters. 	Using a Smart Watch to Control iPhones for Photo Shooting
Raised By	Person who raises a child requirement. The default value is the requirement creator and can be changed.	Maggie

Parameter	Description	Example Value
Responsible Project	Project to which the child requirement belongs.	Smart Watch
Owner	Owner of a child requirement. <ul style="list-style-type: none"> Generally, this parameter is set to a system engineer of a project. You can add project members by referring to Adding CodeArts Project Members. 	Chris

Step 5 Click **OK**. Maggie has broken down the RR.

----End

Step 3: Develop and Deliver the RR

After receiving the notification of the initial requirement (IR) created by Maggie, Chris (system engineer) accessed the requirement details page through the notification card to develop and deliver the requirement.

Step 1 Go to the service homepage, click **Messages** in the upper right corner, or go to the smart watch project and choose **Work > Req > R&D Requirements**. On the **R&D Requirements** page, select **Assigned to me** from the drop-down list to view the R&D requirements that you need to make decisions on.

Step 2 Click the title of an R&D requirement. On the R&D requirement details page, set parameters based on the current delivery pace. For details, see the following table.

Table 3-6 Description of R&D IR parameters

Parameter	Description	Example Value
Status	Status of an IR, indicating the current phase of the requirement. The options are as follows: <ul style="list-style-type: none"> Initial Analyzing Testing Developing Completed 	Analyzing
Planned Completion	Planned completion time of the IR, indicating the time when the IR is expected to be completed.	2024/08/20


Step 3 On the **Related Items** tab page of the IR details page, click  **Break Down** next to **Subrequirement** and configure parameters by referring to the following table.

Table 3-7 Parameters for child requirement breakdown

Parameter	Description	Example Value
Title	Title of a child requirement. <ul style="list-style-type: none">The value can contain letters, digits, hyphens (-), underscores (_), commas (,), semicolons (;), colons (:), dots (.), slashes (/), parentheses (()), and spaces.The value can contain 1 to 256 characters.	Using a Smart Watch to Control iPhones for Photo Shooting
Owner	Owner of a child requirement. <ul style="list-style-type: none">Generally, this parameter is set to a developer of the project.You can add project members by referring to Adding CodeArts Project Members.	Frank
Priority	Priority of a child requirement. The options are as follows: <ul style="list-style-type: none">HighMediumLow	Medium

Step 4 Click **OK**. Chris has updated the IR progress and broken down the child requirement.

Step 5 After receiving the notification of the system requirement created by Chris, Frank (developer) accessed the requirement details page through the notification card.

Step 6 After Frank analyzed the system requirement and completed the R&D and delivery of the requirement, the system requirement status was changed to **Completed**. At the same time, the IR status was updated to **Completed** and the RR status automatically transited to **Delivering**.

Step 7 Maggie (also RR owner) accessed the details page of the delivered RR and evaluated the delivery quality in each dimension. After the evaluation was complete, click **Submit** in the upper right corner and set parameters by referring to the following table.

Table 3-8 Parameters for submitting acceptance applications

Parameter	Description	Example Value
Owner	RR acceptance owner, also the RR proposer.	Lily
Remarks	Remarks.	Accepted

Step 8 Click **OK** to submit the delivered RR to the applicant for acceptance.

----End

Step 4: Accept the RR

After receiving the notification of RR acceptance submitted by Maggie, Lily (requirement proposer) accessed the requirement details page through the notification card to view and accept the requirement.

Step 1 Go to the service homepage, click **Messages** in the upper right corner, or go to the smart watch project and choose **Work > Req > Raw Requirements**. On the **Raw Requirements** page, select **Assigned to me** from the drop-down list to view the RRs that you need to accept.

Step 2 Click the RR title to go to the RR details page. View the comments, attachments, and associated items of the RR, and go to the product test environment to experience product functions. After confirming that the functions meet your expectations, click **Accepted** in the upper right corner. In the **Accepted** dialog box, set parameters by referring to the following table.

Table 3-9 Parameters for passing the acceptance

Parameter	Description	Example Value
Acceptance Conclusion	Information entered when the requirement is accepted.	The function has been accepted.

Step 3 Click **OK**. Lily has accepted the RR, and the RR status has transited to **Closed**.

----End

4 Using IPD-System Device Projects to Manage Defects of a Smart Watch R&D Project

Overview

Defect management is a critical part in product lifecycle management. Both hardware and software development will encounter countless defects. Poor defect management will affect the product quality. Based on years of experience in quality and operation management, Huawei has developed a set of effective defect best practices. It provides a unified, efficient, and visualized defect tracking platform to ensure that each defect can be closed with high quality and efficiency.

A company plans to launch a smart watch. However, the R&D will take a long period, and requires collaboration of multiple departments and teams. How can the company transfer defects among organizations and ensure that the defects can be finally closed? This sector describes how to use an IPD-system device project to simulate the smart watch R&D project for defect management.

Procedure

The basic operation process of the simulation case is as follows.

Figure 4-1 Basic operation process

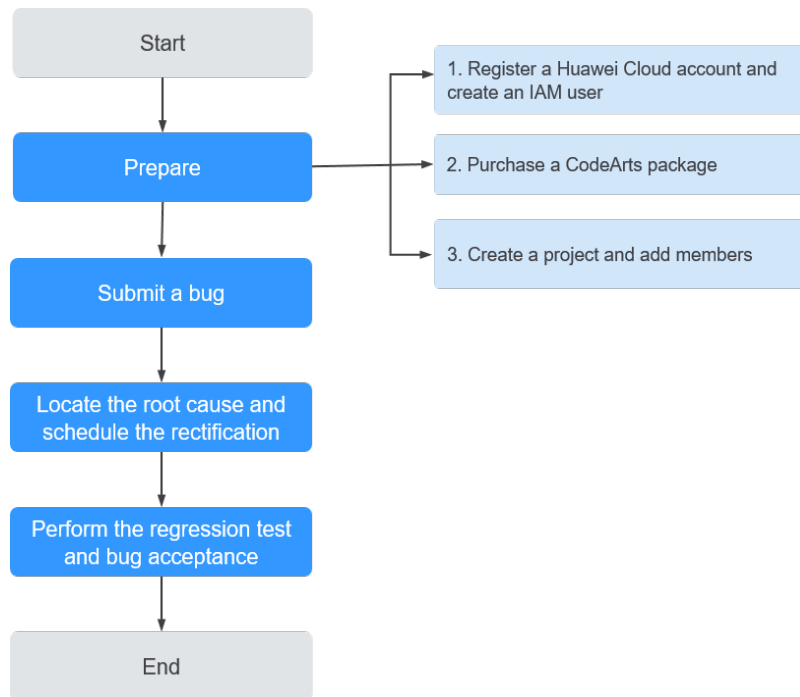


Table 4-1 CodeArts Req defect management process

Process	Description
Step 1: Submit a Bug	After detecting a bug in the environment, the tester needs to create and submit a bug in the project.
Step 2: Locate the Root Cause and Schedule the Rectification	After receiving a bug, the developer needs to locate the root cause and schedule the rectification.
Step 3: Perform the Regression Test and Bug Acceptance	After the developer fixes the bug, the tester needs to perform a regression test and the bug creator needs to perform acceptance.

Preparations

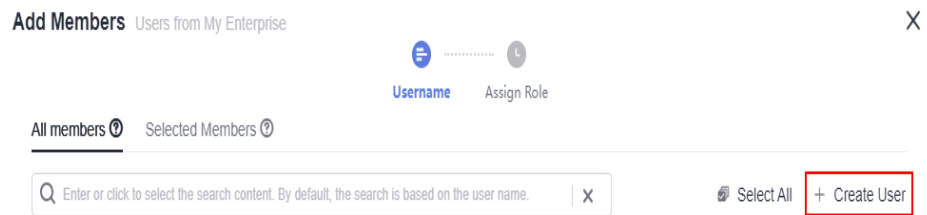
Before performing a specific task, you need to complete the following preparations:

- The project owner has registered a HUAWEI ID and enabled Huawei Cloud services. For details, see [My Account - Signing up for a HUAWEI ID and Enabling Huawei Cloud Services](#).
- The project owner has created IAM users for project members. For details, see [Creating an IAM User](#).
- You can purchase either CodeArts or CodeArts Req.
 - Purchasing CodeArts
To complete all operations in this practice, you need to purchase CodeArts Pro Edition.
 - i. Go to the [Buy CodeArts](#) page.
 - ii. Select **CodeArts Pro**, retain the default value for **Users**, set **Required Duration** to 1 month, agree to the statement, and click **Next**.
 - iii. Confirm the order and click **Pay**.
 - iv. Follow the prompts to complete the payment.
 - v. Check the subscription record on the **CodeArts** page.
- Creating an IPD-System Device Project
Before starting the BR, the product owner Sarah creates a project.
 - a. Click **Access Service** on the CodeArts console.
 - b. Click **Create Project** and select **IPD-System Device**.
 - c. Enter the project name **Smart Watch** and click **OK**. The project is created.
- Adding Project Members
Sarah creates accounts for team members and adds them to the project. This practice involves the following project roles, as shown in [Table 4-2](#).

Table 4-2 Project roles

Member	Role	Responsibility
Sarah	Project creator (product owner)	Creates a project and sets up a team.
Frank	Developer	Analyzes the root cause of a bug and rectifies the bug.
Lily	Tester	Identifies and submits bugs, and check whether the bugs are rectified.

- a. Access the smart watch project. Choose **Settings > General > Service Permissions > Member**.
- b. Click **Add Members** above the project member list and choose **Users from My Enterprise** from the drop-down list.

Figure 4-2 Adding members

- c. In the displayed dialog box, click **Create User**. The **Users** page is displayed.
- d. Click **Create User** and create users **Frank** and **Lily** in sequence.
- e. Return to the CodeArts page, refresh the browser, click **Add Members** above the member list, and choose **Users from My Enterprise**. Select members **Frank** and **Lily**, and click **Next**.
- f. Click the **Role** drop-down list in each row, select **Test manager** for Frank and **Product sales personnel** for Lily, and then click **Save**.

Step 1: Submit a Bug

Lily (project tester), found a function bug during a product function test. Therefore, Lily recorded the bug in the smart watch project.

Step 1 Go to the smart watch project and choose **Work > Req > Defects**.

Step 2 Click **Bug**. On the **Bug** page, set the following parameters.

Table 4-3 Creating a bug

Parameter	Description	Example Value
Title	Bug title. <ul style="list-style-type: none"> • The value can contain letters, digits, hyphens (-), underscores (_), commas (,), semicolons (;), colons (:), dots (.), slashes (/), parentheses (()), and spaces. • The value can contain 1 to 256 characters. 	Smart Watch - Incomplete Information Display in Settings

Parameter	Description	Example Value
Description	Bug description. <ul style="list-style-type: none">The value can contain images, links, letters, digits, hyphens (-), underscores (_), commas (,), semicolons (;), colons (:), dots (.), slashes (/), parentheses (()), and spaces.Enter a maximum of 500,000 characters.	Test environment: large beta; Problem description: There are 10 functions in the setting center, but only 8 are displayed; Suggestion: Supplement the functions.
Expected Rectification	Time when the bug is expected to be rectified.	2024/08/30
Owner	Bug analyzer. <ul style="list-style-type: none">The parameter refers to the person who is responsible for bug analysis and locating. Generally, it is set to a project developer.You can add project members by referring to Adding CodeArts Project Members.	Frank
Severity	Bug severity, which is set based on the impact scope. The options are as follows: <ul style="list-style-type: none">CriticalMajorMinorInfo	Minor

Step 3 Click **Submit**.

----End

Step 2: Locate the Root Cause and Schedule the Rectification

After receiving the notification of the bug submitted by Lily, Frank (developer) accessed the defect details page through the notification card, located the root cause, and scheduled the rectification.

- Step 1** Go to the service homepage, click **Messages** in the upper right corner, or go to the smart watch project and choose **Work > Req > Defects**. On the **Defects** page, select **Assigned to me** from the drop-down list to view the bugs that you need to handle.
- Step 2** Click a bug title. On the bug details page, view the bug information. After the confirmation, click **Submit to Fix** in the upper right corner. In the displayed dialog box, set parameters by referring to the following table.

Figure 4-3 Submit to Fix dialog box

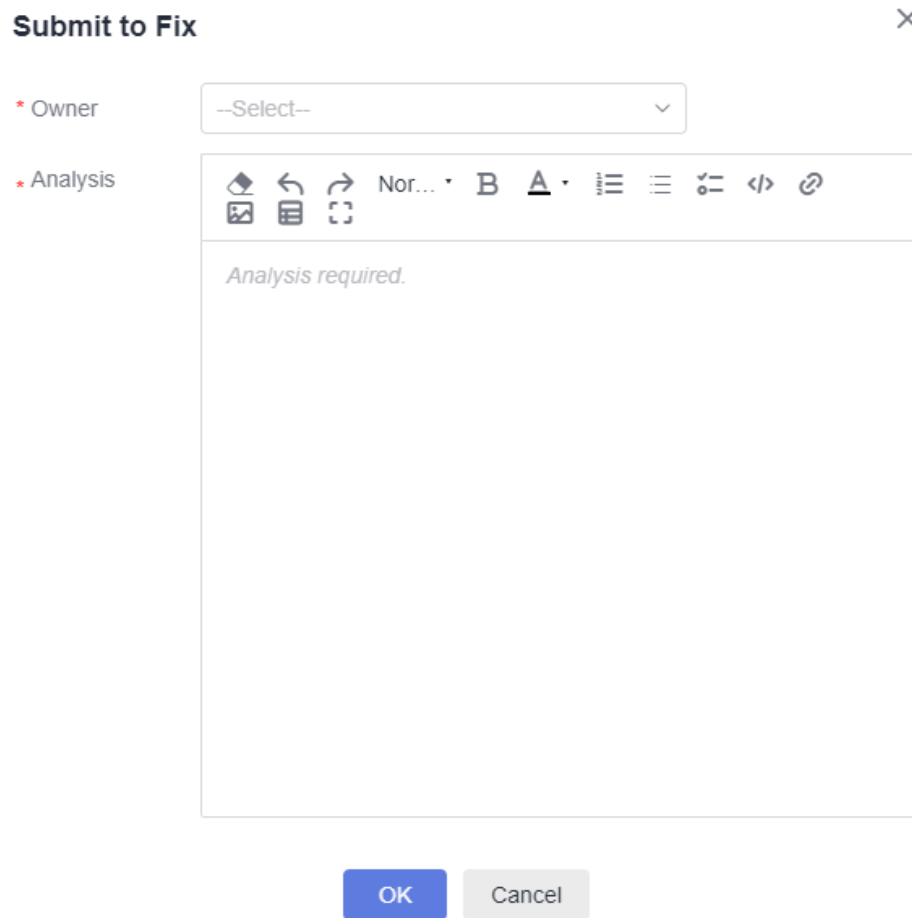


Table 4-4 Parameters for submitting bugs for rectification

Parameter	Description	Example Value
Owner	Owner of the bug rectification node. <ul style="list-style-type: none"> • The parameter refers to the person who is responsible for bug rectification. Generally, it is set to a project developer. • You can add project members by referring to Adding CodeArts Project Members. 	Frank

Parameter	Description	Example Value
Analysis	Root cause analysis made by the bug analyzer. You can enter the analysis conclusion here.	It is preliminarily estimated that a bug occurs in the background database and needs to be resolved.

Step 3 Click **OK**. Frank has analyzed the bug. Then, developers write code in the development environment for bug rectification.

Step 4 After the fault was rectified, Frank opened the bug and goes to the details page. Click **Submit to Test** in the upper right corner. In the **Submit to test** dialog box, configure parameters by referring to the following table.

Table 4-5 Parameters for submitting bugs for testing

Parameter	Description	Example Value
Owner	Owner of the bug test node. <ul style="list-style-type: none">The parameter refers to the person who is responsible for the bug regression test. Generally, it is set to a project tester.You can add project members by referring to Adding CodeArts Project Members.	Lily
Solution	Bug rectification solution in the form of texts or pictures.	The database bug has been rectified, as shown in the following screenshot.

Step 5 Click **OK**. Frank has rectified the defect.

----End

Step 3: Perform the Regression Test and Bug Acceptance

After receiving the bug rectification notification from Frank, Lily accesses the bug details page through the notification card and performs the regression test and acceptance.

Step 1 Go to the service homepage, click **Messages** in the upper right corner, or go to the smart watch project and choose **Work > Req > Defects**. On the **Defects** page, select **Assigned to me** from the drop-down list to view the bugs that you need to handle.

Step 2 Click the bug title. On the bug details page, view the cause and solution, and perform verification in the beta environment to check whether the bug has been

rectified. Click **Passed** in the upper right corner of the details page. The **Passed** dialog box is displayed. Configure parameters by referring to the following table.

Table 4-6 Parameters for passing the test

Parameter	Description	Example Value
Owner	Owner of the bug acceptance node. <ul style="list-style-type: none">The parameter refers to the person who is responsible for bug acceptance. Generally, it is set to the bug creator.You can add project members by referring to Adding CodeArts Project Members.	Lily
Test Report	Bug rectification description in the form of texts or pictures.	The bug has been rectified.

Step 3 Click **OK**. Lily has completed the bug regression test.

Step 4 The bug is in the **Accepting** state and needs to be accepted by the creator. In this example, the bug creator is the bug tester. Therefore, this process can be simplified. Lily clicked **Accepted** in the upper right corner of the details page. In the displayed dialog box, click **OK**. The **Accepted** dialog box is displayed. Configure parameters by referring to the following table.

Table 4-7 Parameters for passing the acceptance

Parameter	Description	Example Value
Closure Type	Bug closure type. You can choose Resolved or Non-bug .	Resolved

Step 5 Click **OK**. The bug creator Lily has accepted the bug. The bug is in the **Closed** state.

----End

5 Using IPD-System Device Projects to Perform a Baseline Review (BR) on a Smart Watch R&D Project

Overview

A product goes through a complex R&D process from planning to release. CodeArts Req helps to manage these processes by requirement baselines, change requests of controlled fields, change reviews, and change management. Baseline changes must reach specified gate thresholds before going to the next stage to keep teams on the right track.

A company plans to launch a smart watch, which requires collaboration across departments and teams. R&D requirements have been assigned to each production and research team after rounds of communication and clarification on requirements. To ensure that products are delivered on time and with high quality, all R&D and production teams need to devotedly carry out tasks based on specified requirements. Therefore, baseline control for requirements is necessary and baselined requirements cannot be modified randomly. This sector describes how to use an IPD-system device project to simulate the smart watch R&D project to perform a BR.

Procedure

The basic operation process of the simulation case is as follows.

Figure 5-1 Basic operation process

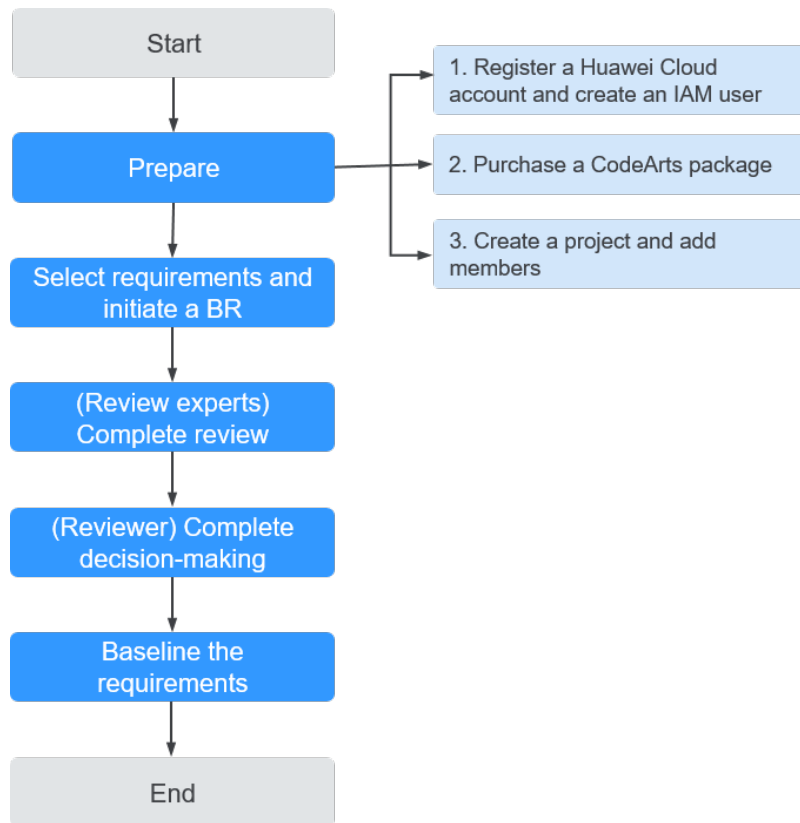


Table 5-1 CodeArts Req baseline control process description

Process	Description
Step 1: Select Requirements and Initiate a BR	Select R&D requirements and initiate a BR.
Step 2: (Review Experts) Complete Review	Review experts complete review of the BR.
Step 3: (Reviewer) Complete Decision- making	Organize approver decision-making on the BR.
Step 4: Baseline the Requirements	After the BR, the R&D requirements become baselined.

Preparations

Before performing a specific task, you need to complete the following preparations:

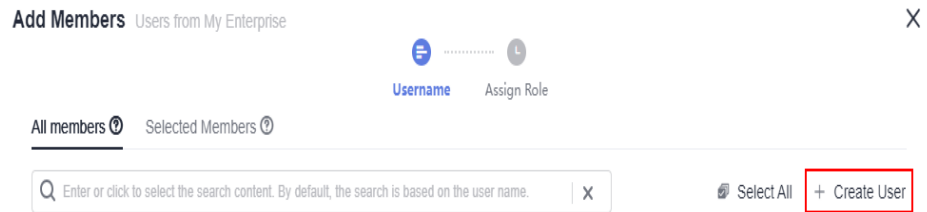
- The project owner has registered a HUAWEI ID and enabled Huawei Cloud services. For details, see [My Account - Signing up for a HUAWEI ID and Enabling Huawei Cloud Services](#).
- The project owner has created IAM users for project members. For details, see [Creating an IAM User](#).
- You can purchase either CodeArts or CodeArts Req.
 - Purchasing CodeArts
To complete all operations in this practice, you need to purchase CodeArts Pro Edition.
 - i. Go to the [Buy CodeArts](#) page.
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- Creating an IPD-System Device Project
Before starting the BR, the product owner Sarah creates a project.
 - a. Click **Access Service** on the CodeArts console.
 - b. Click **Create Project** and select **IPD-System Device**.
 - c. Enter the project name **Smart Watch** and click **OK**. The project is created.
- Adding Project Members
Sarah creates accounts for team members and adds them to the project. This practice involves the following project roles, as shown in [Table 5-2](#).

Table 5-2 Project roles

Member	Role	Responsibility
Sarah	Project creator (product owner)	Creates a project and sets up a team.
Maggie	Project manager	Approves the BR.
Chris	Developer	Initiates the BR.
Frank	Test manager	Serves as the review expert of the BR.
Billy	Tester	Serves as the review expert of the BR.

- a. Access the smart watch project. Choose **Settings > General > Service Permissions > Member**.

- b. Click **Add Members** above the project member list and choose **Users from My Enterprise** from the drop-down list.

Figure 5-2 Adding members

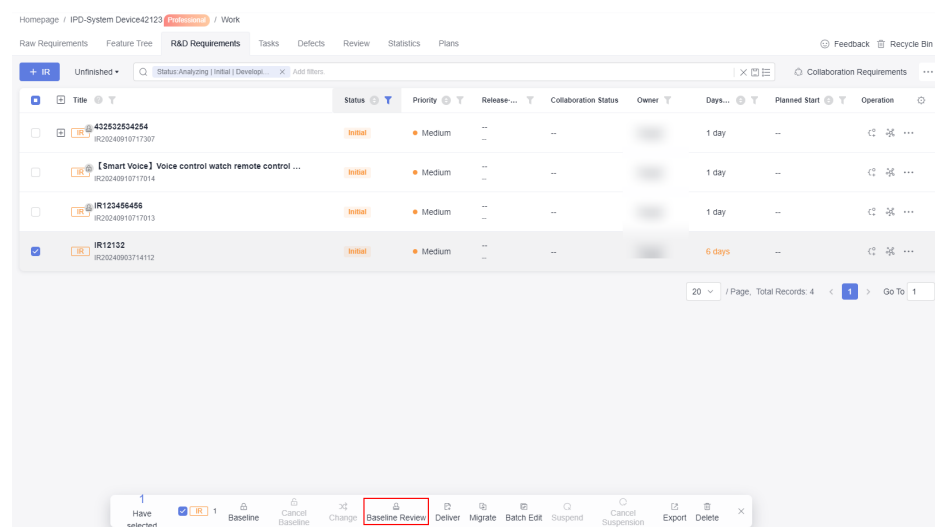
- c. In the displayed dialog box, click **Create User**. The **Users** page is displayed.
- d. Click **Create User**, and create users **Maggie, Chris, Frank, and Billy** in sequence.
- e. Return to the CodeArts page, refresh the browser, click **Add Members** above the member list, and choose **Users from My Enterprise**. Select members **Maggie, Chris, Frank, and Billy**, and click **Next**.
- f. Click the **Role** drop-down list in each row, select **Project manager** for Maggie, **Developer** for Chris, **Test manager** for Frank, and **Tester** for Billy, and then click **Save**.

Step 1: Select Requirements and Initiate a BR

Chris, a project member, hopes that the R&D requirements determined in rounds of clarification will not be easily changed. Therefore, Chris adds these R&D requirements to the BR so that they can be controlled by locking the baseline.

Step 1 Go to the smart watch project and choose **Work > Req > R&D Requirements**.

Step 2 View the R&D requirements of the current project. Select the R&D requirements to be baselined and click **Baseline Review** on the operation bar in the lower part of the page.

Figure 5-3 R&D requirement list

Step 3 Go to the page for creating a BR. The R&D requirements selected in the previous step are automatically added to the **Baseline Object** list.

Figure 5-4 Creating a BR

The screenshot shows a web interface for creating a Baseline Review (BR). At the top, there's a header with a 'BR' icon and a breadcrumb trail. Below that is a section titled 'Basic Information' containing a text field for the BR title, currently set to 'BR Initiated by Maggie - R&D Requirements'. A progress bar below the title shows four stages: 'Committed' (active), 'Under review', 'Decisioning', and 'End'. Underneath is a 'Description' section with a rich text editor containing fields for 'Background:', 'Value:', and 'Details:'. Below the editor are two date pickers for 'Start time' and 'Completes'. Further down are four form elements: a radio button group for 'Require Decision-Making' (with 'Yes' selected), a dropdown menu for 'Reviewer', a dropdown menu for 'Review Expert', and another dropdown menu for 'Copy To'. At the bottom of the form are three buttons: 'Submit', 'Save', and 'Cancel'.

Step 4 Enter the following information and click **Submit** to initiate a BR.

Table 5-3 BR description

Parameter	Description	Example Value
Title	<p>BR title.</p> <ul style="list-style-type: none"> The value can contain letters, hyphens (-), underscores (_), commas (,), semicolons (;), colons (:), dots (.), slashes (/), parentheses (()), and spaces. The value can contain 1 to 256 characters. 	<p>Retain the default value generated by the system in this document.</p>

Parameter	Description	Example Value
Description	<p>Description of a review.</p> <ul style="list-style-type: none">The value can contain images, links, letters, digits, hyphens (-), underscores (_), commas (,), semicolons (;), colons (:), dots (.), slashes (/), parentheses (()), and spaces.The value can contain 1 to 50,000 characters.	<p>BR background: The requirement has been clarified for multiple rounds and has entered the R&D phase.</p> <p>BR value: The following R&D requirements must be baselined and cannot be modified randomly.</p> <p>BR details: For details, see the associated files.</p>
Require Decision-Making	<p>Whether this field is displayed in the review depends on whether Require Decision-Making is enabled on the Work Configuration > Review page. If the switch is enabled, this field is displayed in the review form. If not, this field is not displayed.</p> <ul style="list-style-type: none">When this field is displayed in the review and the value is Yes, Reviewer is mandatory and Review Expert is optional.When this field is displayed in the review and the value is No, Reviewer does not exist and Review Expert is mandatory.When this field is not displayed in the review and the value is Yes, Reviewer is mandatory and Review Expert is optional.	Yes
Reviewer	<p>Approver of a review.</p> <ul style="list-style-type: none">The approver makes decisions on the review.This field is associated with the Require Decision-Making field. You can select only one value. Set the value range in the Reviewer Roles area on the Work > Review page.	Maggie

Parameter	Description	Example Value
Review Expert	Review expert of the review. <ul style="list-style-type: none"> The review expert reviews the requirements. Select one or more project members. 	Billy, Frank
Baseline Object	You can add more R&D requirements and system features (SFs) as baseline objects as required.	Requirements selected in the R&D requirement list

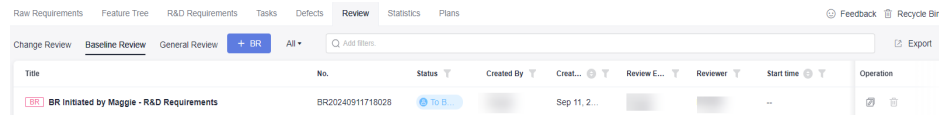
----End

Step 2: (Review Experts) Complete Review

After the BR is submitted successfully, the review experts Billy and Frank will receive a notification, access the review details page through the notification card, and review the requirements.

- Step 1** Access the service homepage and click **To-do Center** in the upper right corner, or go to the smart watch project and choose **Review > Baseline Review**. On the **Baseline Review** page, select **To be reviewed by me** to view the BRs that need to be reviewed.

Figure 5-5 List of BRs to be reviewed



- Step 2** Click the title of the BR. On the review details page, click **Expert Review** in the upper right corner. The **Expert Review** dialog box is displayed.

Figure 5-6 BR details

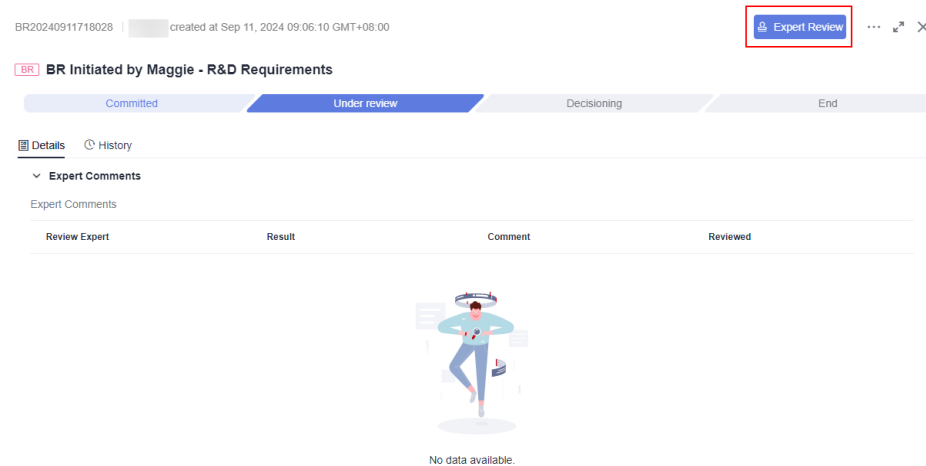


Figure 5-7 Expert review

Step 3 After setting the following parameters, click **OK** to complete the BR review.

Table 5-4 Expert review parameters

Parameter	Description	Example Value
Result	Select a value as required. When Transfer to others is selected, the Review Expert selection box is displayed and you must set this parameter.	Approve
Comments	This parameter is mandatory when Result is set to Approve or Reject .	OK
Expert Comments	If multiple review experts participate in the review, their review comments will be displayed here.	--

----End

Step 3: (Reviewer) Complete Decision-making

NOTE

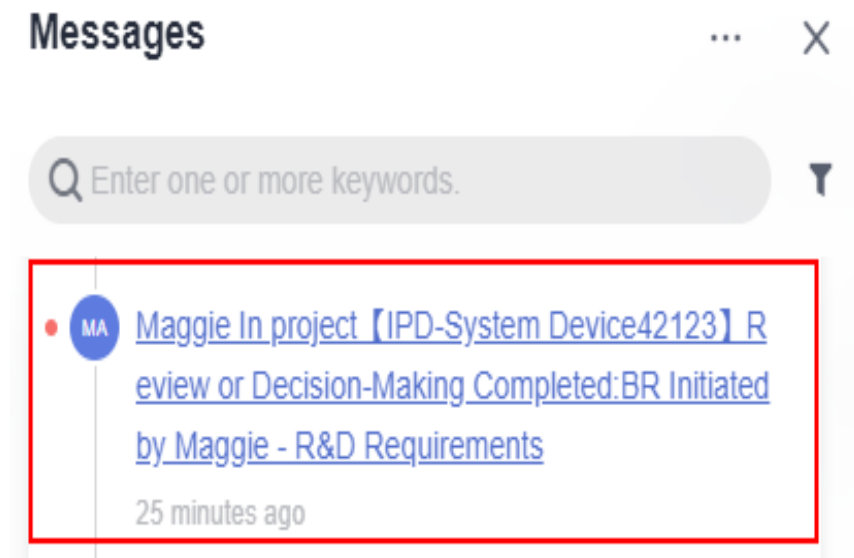
When the percentage of review experts selecting **Approve** or **Reject** reaches the threshold set in the **Review Methods** area on the **Work Configuration > Review** page, the BR automatically moves from the review phase to the decision-making phase.

If the review result of the BR is **Rejected**, the decision-making result will automatically be **Rejected** and the BR will be in the **End** state.

After the review expert completes the review, Maggie, the approver of the review, will be notified to handle the project.

Step 1 Access the service homepage and click **To-do Center** in the upper right corner, or go to the smart watch project and choose **Review > Baseline Review**. On the **Baseline Review** page, select **Pending decision-making** to view the BRs that need to be approved.

Figure 5-8 Notices



Step 2 Click the BR title to go to the review details page. Click **Decide by reviewer** in the upper right corner of the page. The **Decide by reviewer** dialog box is displayed.

Figure 5-9 BR details

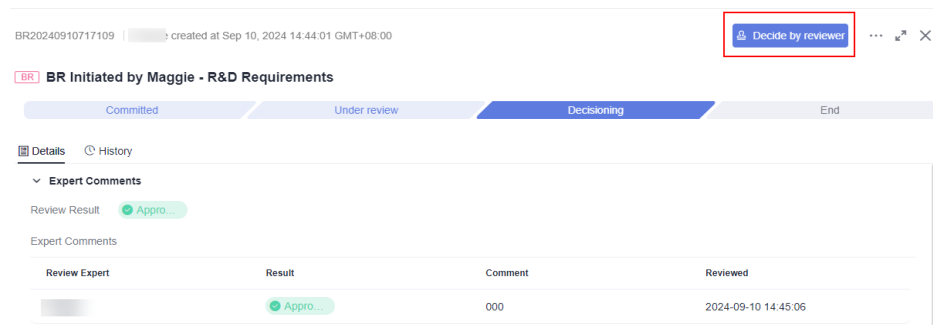
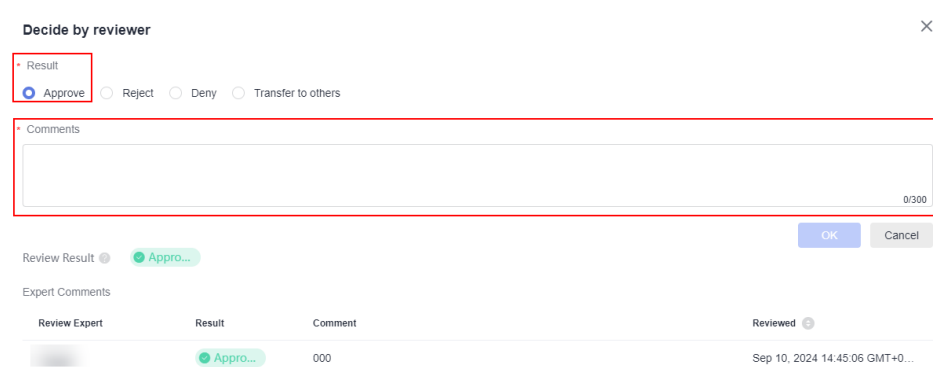


Figure 5-10 Decide by reviewer



Step 3 After setting the following parameters, click **OK** to complete decision-making on the BR.

Table 5-5 Approver decision-making parameters

Parameter	Description	Example Value
Result	Select a value as required. When Transfer to others is selected, the Reviewer selection box is displayed and you must set this parameter.	Approve
Comments	This parameter is mandatory when Result is set to Approve, Reject, or Deny .	OK
Review Result	This parameter indicates the final result of the review.	Passed
Expert Comments	The review results and comments of review experts are displayed here.	--

----End

Step 4: Baseline the Requirements

After the review is approved, the review transits to the **End** state, indicating that the review is completed. Chris, the creator of the review, will be notified to handle the project.

- Step 1** Access the service homepage and click **Messages** in the upper right corner, or go to the smart watch project and choose **Review > Baseline Review**. On the **Baseline Review** page, select **I created** to view the created BRs and their review result in the **Status** column.

Figure 5-11 Notices

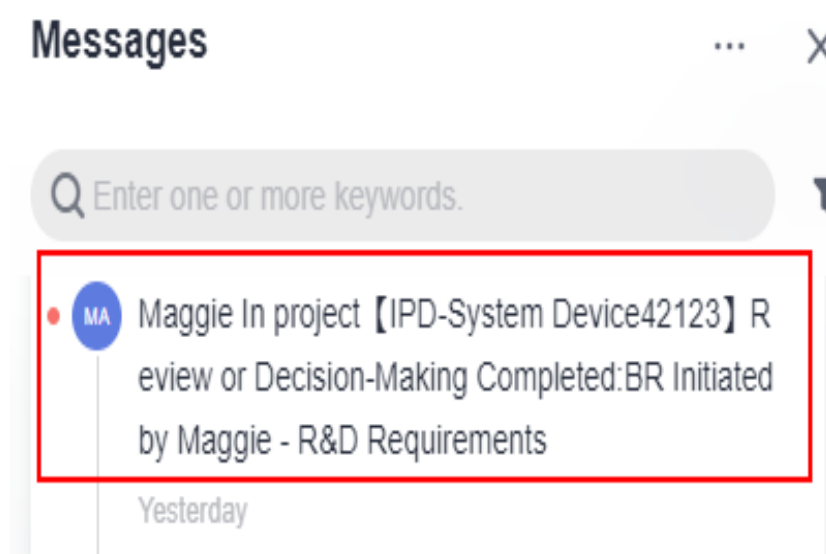
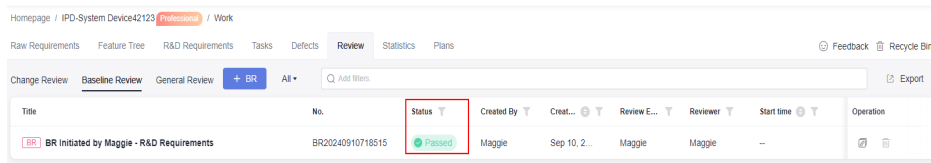
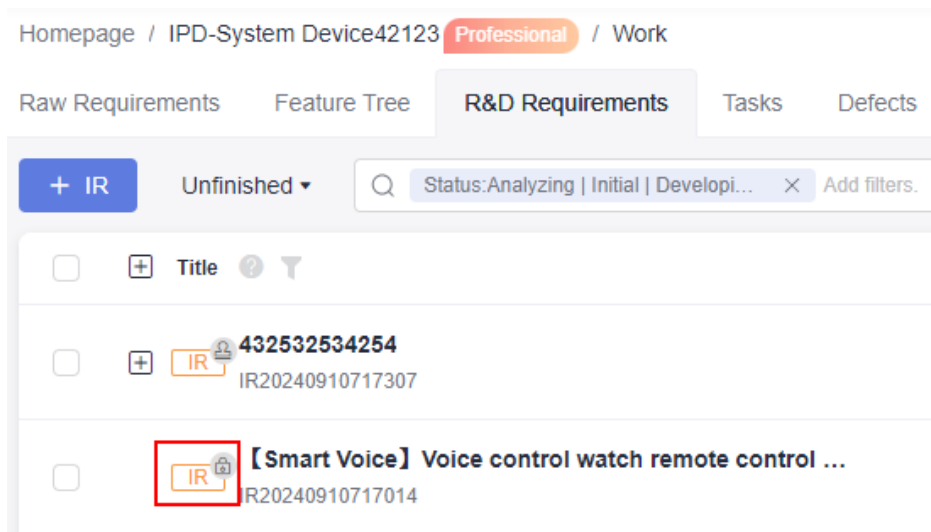


Figure 5-12 BR list page



Step 2 Click the **R&D Requirements** tab. On the displayed page, all R&D requirements added to the BR are in the **Baselined** state. The baseline locking of R&D requirements is implemented.

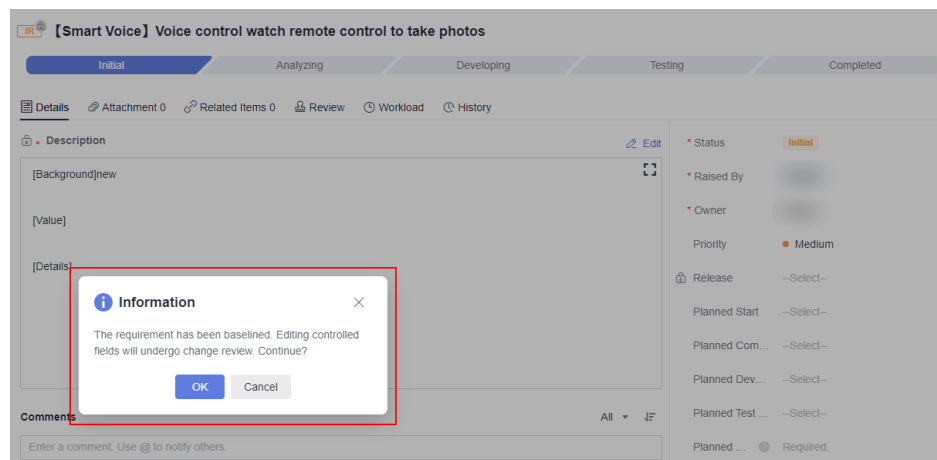
Figure 5-13 R&D requirement list



NOTE

The locked baseline fields of baselined R&D requirements cannot be changed randomly. Changes take effect only after review.

Figure 5-14 Change notification



----End

6 Using IPD-System Device Projects to Manage Feature Trees of a Smart Watch R&D Project

Overview

SFs are the core assets of a product and are always iterating. Full management provided by CodeArts Req includes a feature tree to better manage SFs, prevent asset loss, and enable fast cross-generation feature inheritance and development.

A company plans to launch a smart watch, which requires collaboration across departments and teams. Therefore, all the departments involved, such as marketing, product planning, and R&D, need to have a consistent understanding of the functions and features of the smart watch so that each R&D process aligns with the overall product strategy. This sector describes how to use an IPD-system device project to simulate the smart watch R&D project for feature tree management.

Procedure

The basic operation process of the simulation case is as follows.

Figure 6-1 Basic operation process

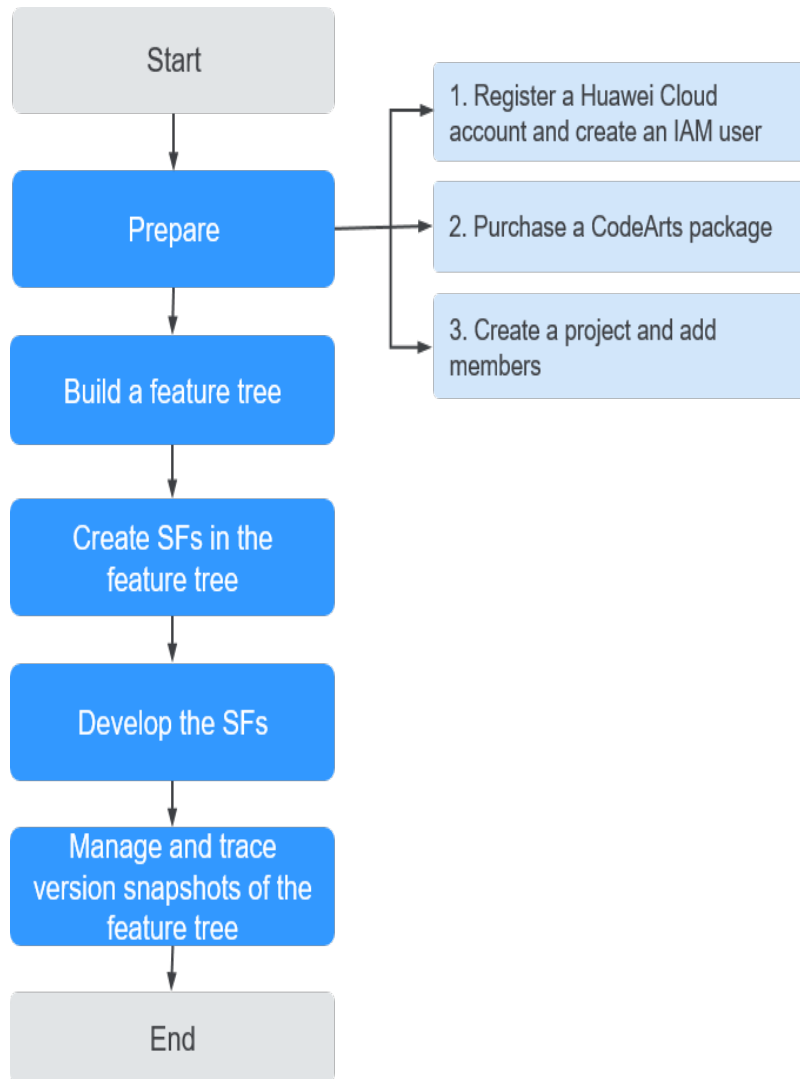


Table 6-1 CodeArts Req feature tree management process description

Process	Description
Step 1: Build a Feature Tree	Build a complete feature tree based on the product feature type.
Step 2: Create SFs in the Feature Tree	Create SFs in the feature set based on the feature type.
Step 3: Develop the SFs	Break down and baseline SFs for R&D.

Process	Description
Step 4: Manage and Trace Version Snapshots of the Feature Tree	Use version snapshots to manage feature tree versions, keeping them consistent in pre-sales and R&D teams.

Preparations

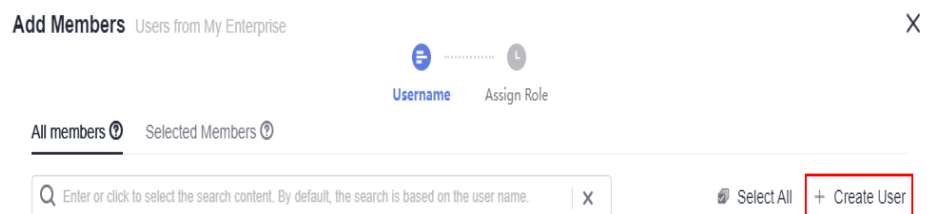
Before performing a specific task, you need to complete the following preparations:

- The project owner has registered a HUAWEI ID and enabled Huawei Cloud services. For details, see [My Account - Signing up for a HUAWEI ID and Enabling Huawei Cloud Services](#).
- The project owner has created IAM users for project members. For details, see [My Account - Signing up for a HUAWEI ID and Enabling Huawei Cloud Services](#).
- You can purchase either CodeArts or CodeArts Req.
 - Purchasing CodeArts
To complete all operations in this practice, you need to purchase CodeArts Pro Edition.
 - i. Go to the [Buy CodeArts](#) page.
 - ii. Select **CodeArts Pro**, retain the default value for **Users**, set **Required Duration** to 1 month, agree to the statement, and click **Next**.
 - iii. Confirm the order and click **Pay**.
 - iv. Follow the prompts to complete the payment.
 - v. Check the subscription record on the **CodeArts** page.
- Creating an IPD-System Device Project
Before starting the BR, the product owner Sarah creates a project.
 - a. Click **Access Service** on the CodeArts console.
 - b. Click **Create Project** and select **IPD-System Device**.
 - c. Enter the project name **Smart Watch** and click **OK**. The project is created.
- Adding Project Members
Sarah creates accounts for team members and adds them to the project. This practice involves the following project roles, as shown in [Table 6-2](#).

Table 6-2 Project roles

Member	Role	Responsibility
Sarah	Project creator (product owner)	Creates a project and sets up a team.
Frank	Product manager	Builds a product feature tree.
Billy	Developer	Develops requirements and views the differences between SFs of different versions.

- Access the smart watch project. Choose **Settings > General > Service Permissions > Member**.
- Click **Add Members** above the project member list and choose **Users from My Enterprise** from the drop-down list.

Figure 6-2 Adding members

- In the displayed dialog box, click **Create User**. The **Users** page is displayed.
- Click **Create User** and create users **Frank** and **Billy** in sequence.
- Return to the CodeArts page, refresh the browser, click **Add Members** above the member list, and choose **Users from My Enterprise**. Select members **Frank** and **Billy**, and click **Next**.
- Click the **Role** drop-down list in each row, select **Project manager** for Frank and **Developer** for Billy, and then click **Save**.

Step 1: Build a Feature Tree

At the beginning of the project, Frank (product manager) needs to create and maintain the product feature tree. Team members must be aware of the following aspects concerning the feature tree:

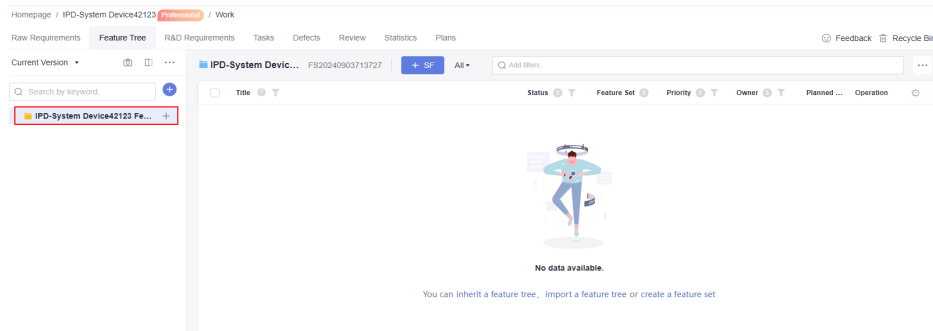
- Objectives: Position the product first, which is the basis for building the feature tree.
- Survey and analysis: Dive into customer requirements and market trends to ensure that the feature tree matches market requirements.
- Classification: Classify features based on their importance and association to form a clear tree structure.

- Optimization: Adjust the feature tree to meet evolving market and customer requirements.

After determining the product's core competitiveness, Frank starts to build the product feature tree.

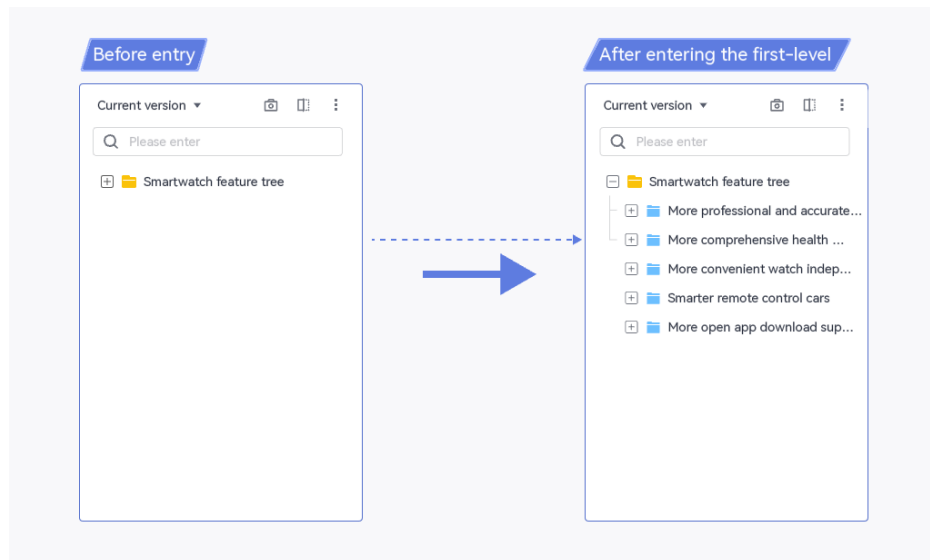
Step 1 Access the smart watch project and choose **Work > Req > Feature Tree** . After a project is created, a feature tree named after the project name is automatically generated.

Figure 6-3 Feature tree homepage



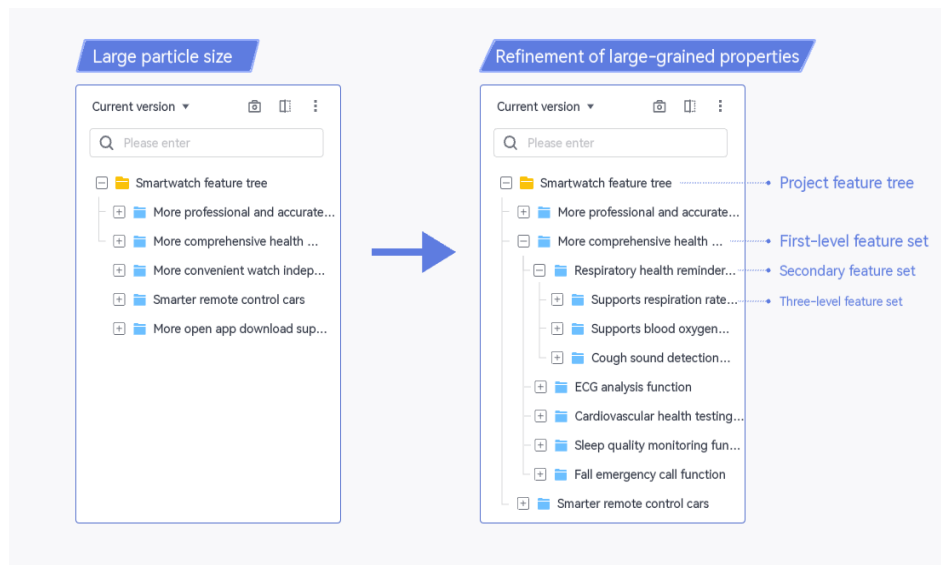
Step 2 Click **Create Feature Set** and enter the feature set name. Frank can use the large-granularity competitive features obtained from the preceding analysis as the level-1 feature set, that is, the trunk in the feature set catalog.

Figure 6-4 Feature tree building - 01



Step 3 Frank refines product features by adding subnodes at multiple levels under the level-1 feature set. A full feature tree is gradually built.

Figure 6-5 Feature tree building - 02



----End

Step 2: Create SFs in the Feature Tree

After building the product feature tree, Frank needs to enter the detailed work items that support the implementation of large-granularity features, that is, SFs, to enable the full lifecycle management of features.

Step 1 Select any feature set node in the menu on the left and click + SF on the right.

Step 2 On the SF page, enter the following information and click OK.

Table 6-3 Creating an SF

Parameter	Description	Example Value
Title	SF title. Set it as required.	Real-Time Cycling Path Update On Smart Watches
Description	SF description. Set it as required.	Background: The smart watch needs to support real-time path updates. Benefits: The product competitiveness is enhanced. Details: None
Responsible Project	Project to which the SF belongs. The default value is the current project.	Smart Watch
Owner	Current SF owner.	Frank
Feature Set	Feature set to which the SF belongs. The default value is the selected feature set and can be changed.	Smart watch feature tree

Parameter	Description	Example Value
Priority	SF R&D priority. Set it as required. Example: Medium .	Medium

Step 3 Repeat **1** and **2** to create SFs in the feature tree.

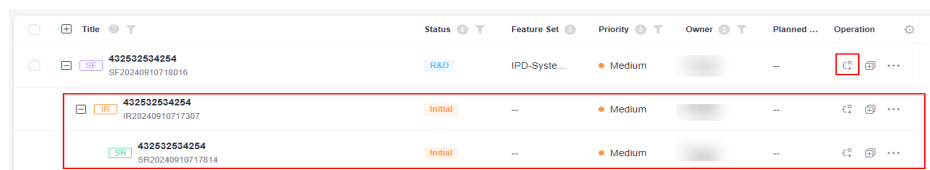
----End

Step 3: Develop the SFs

After setting all product features, start R&D of competitive features, including SF breakdown and contractual SF R&D.

Step 1 Access the smart watch project. Choose **Work > Req > Feature Tree**. On the **Feature Tree** tab page, Frank clicks the breakdown button in the **Operation** column of the SF list to break down a feature into multiple R&D items and assign them to the development team. Then the development team develops requirements based on the R&D items.

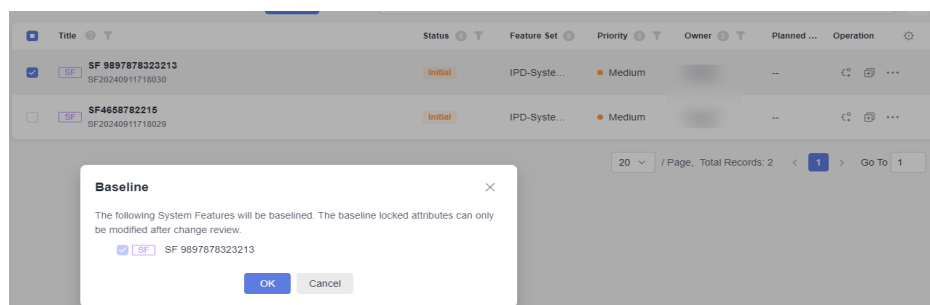
Figure 6-6 Breaking down an SF into R&D requirements



Step 2 During R&D, the smart watch team manages SF baselines by requirement baselines, change requests of controlled fields, change reviews, and change management, thereby staying on the right track.

Frank selects the target SF, clicks **Baseline**, and clicks **OK**. The baselined fields of the baselined SF can be modified only after the change review is passed.

Figure 6-7 Baselining an SF



----End

Step 4: Manage and Trace Version Snapshots of the Feature Tree

The product feature tree is mainly used to focus on product value and align product R&D with customer and market requirements. The full feature list can be

used as the pre-sales document of the product. Version snapshots can be used to keeping versions consistent in pre-sales and R&D teams.

In addition, the feature tree supports version snapshot comparison, helping the team better implement cross-generation development.


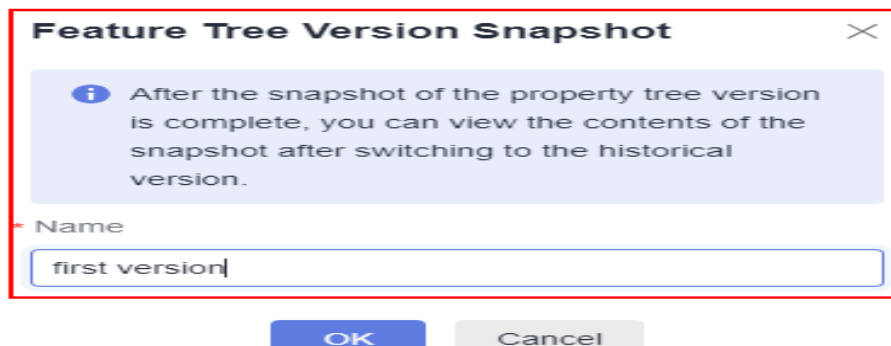
Step 1 Access the smart watch project. Choose **Work > Req > Feature Tree**. On the **Feature Tree** tab page, Frank clicks , and enter the snapshot version name. The feature tree is recorded as a version.

Figure 6-8 Feature tree version snapshot



Step 2 Click an SF title to go to the SF details page. Click **Version History** after clicking the **More** icon. You can select any two versions and view version differences on the version comparison page.

Figure 6-9 SF details page

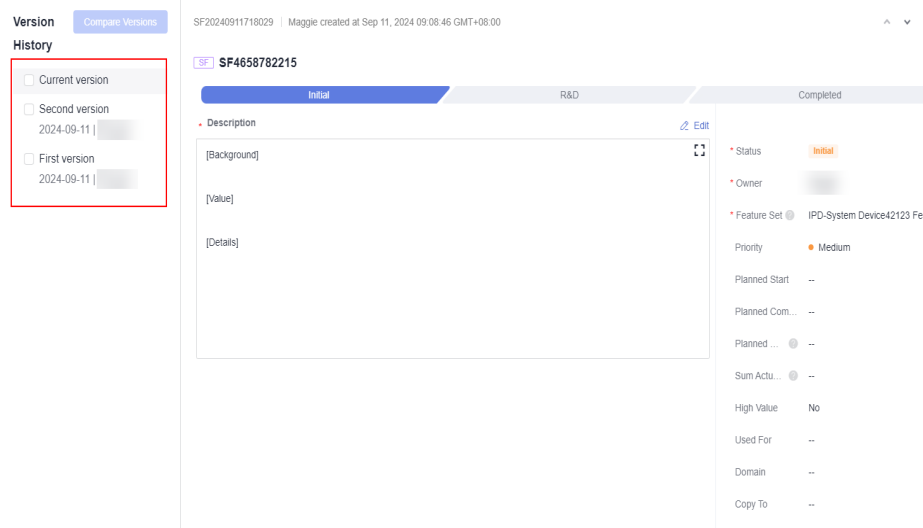
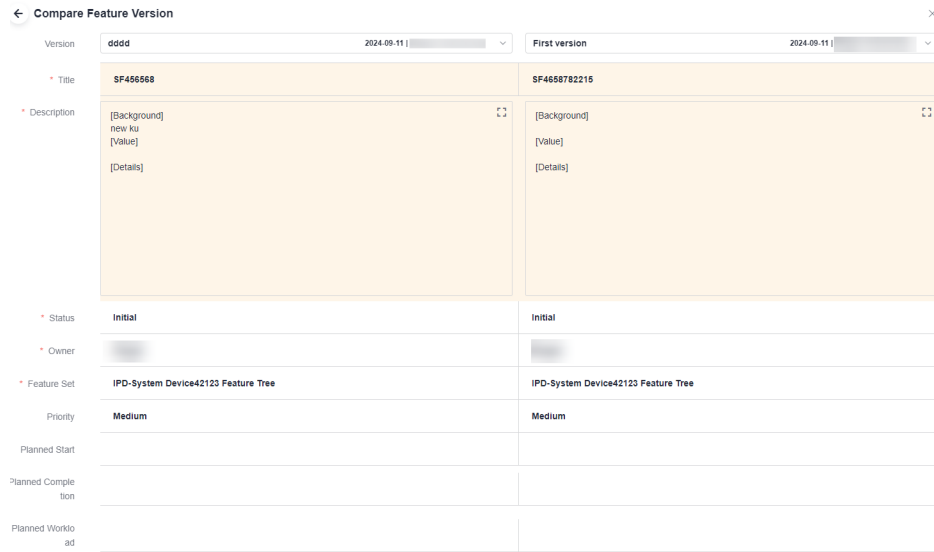


Figure 6-10 Comparison of historical feature tree versions



----End

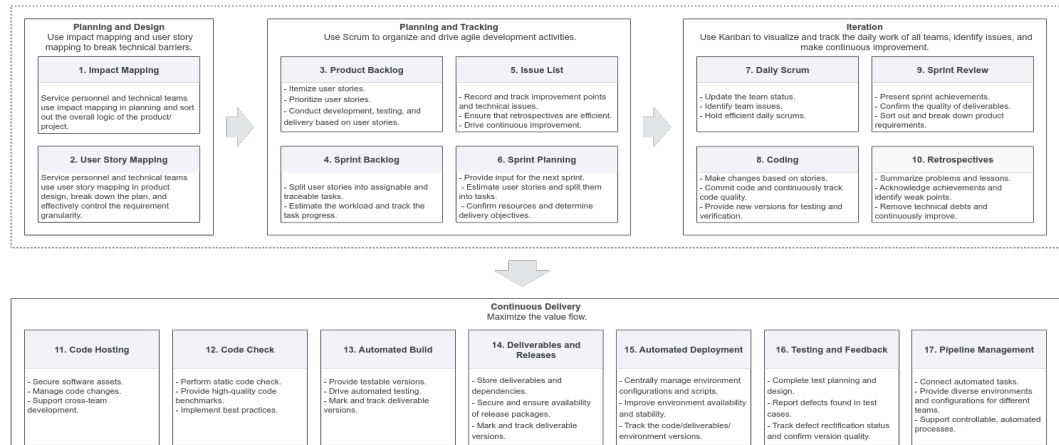
7 Huawei E2E DevOps Practice: Managing Requirements

7.1 Overview

Background

CodeArts proposes a feasible agile development methodology — HE2E DevOps implementation framework by using years of R&D experience and industry-leading practices.

Figure 7-1 HE2E DevOps implementation framework



- **Planning and Design**

The first two steps in the diagram depict the product planning process where service personnel (or customers) collaborate with technical personnel to establish the product's overall logic, plan and design the product, and break down requirements at a specific granularity.

- Software development solves issues and delivers value, not simply provides functions. Impact mapping identifies user requirements and root causes.

- User stories convey objectives and requirements in specific scenarios, facilitating communication between customers, service personnel, and developers. If you only view separate requirement items, you cannot consider them from the entire solution's perspective. User stories focus on scenarios, sort out and display stages and activities in a tree structure. In this way, you will view both requirement items and overall requirement scenarios.
- Planning, Tracking, and Iteration
Steps 3 to 10 are the main management practices in the Scrum framework.
 - Scrum defines a relatively complete framework for agile process management. CodeArts well integrates the Scrum framework with daily activities of development teams. Main process deliverables include the product backlog, sprint backlog, potential deliverable product increments, and issue list. Core team activities include sprint planning meetings, daily Scrums, sprint reviews, sprint retrospective meetings, and daily updates.
- Continuous Delivery
Starting from step 11 is the engineering practice, that is, the CI/CD process.
 - Continuous delivery is based on code configuration management. It not only covers traditional security control of code assets, concurrent development, and version and baseline management, but also reflects team collaboration and communication.
 - The pipeline connects code check (or static scanning), automated build, automated testing in all stages, and automated deployment.
 - Continuous delivery also covers continuous artifact management and environment management at different levels, including development, test, quasi-production, and production environments.
 - The continuous delivery pipeline manages stages, environments, activities, entry and pass quality gates, and input and output artifacts in each stage.

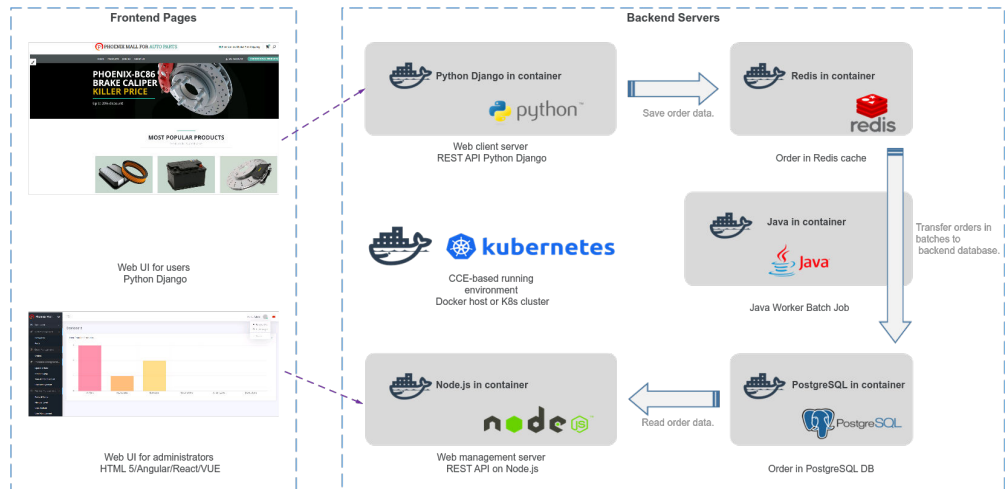
Application Scenarios

We will use the sample code for an auto part e-mall named "Phoenix Mall" and the "DevOps Full-Process" sample project to describe how to use CodeArts to implement the HE2E DevOps framework. This solution is applicable to Scrum R&D projects.

Solution Architecture

- Phoenix Mall Architecture
Figure 7-2 shows the architecture of the Phoenix Mall sample program.

Figure 7-2 Technical architecture of Phoenix Mall



The sample program consists of five microservice components that can be independently developed, tested, and deployed, as shown in [Table 7-1](#).

Table 7-1 Microservice components of Phoenix Mall

Microservice Component	Description
Web client server (corresponding to the Vote function in the sample code)	<ul style="list-style-type: none"> • Service logic: Users can use a browser to access the web UI of this service. When a user clicks Like on a specific offering, the service saves the record of the selected offering in the Redis cache. • Technology stack: Python and Flask frameworks • Application server: Gunicorn
Web management server (corresponding to the Result function in the sample code)	<ul style="list-style-type: none"> • Service logic: Users can use a browser to access the web UI of this service. The statistics about Like clicked by users on the UI are dynamically displayed. The data is obtained from the PostgreSQL database. • Technology stack: Node.js and Express frameworks • Application server: server.js

Microservice Component	Description
Background order batch processing program (corresponding to the Worker function in the sample code)	<ul style="list-style-type: none"> Service logic: This service is a background process. It monitors item records in the Redis cache, obtains new records, and saves them in the PostgreSQL database so that the management UI can extract data for statistics display. Technology stack: .NET Core or Java (This service provides two technology stacks to implement the same function. You can modify the configuration and select one of the technology stacks as the runtime process.)
Order cache	<ul style="list-style-type: none"> Service logic: Persists data for the client UI. Technology stack: Redis
Order database	<ul style="list-style-type: none"> Service logic: Serves as the data source of the management UI. Technology stack: PostgreSQL

- Composition of the DevOps Full-Process Sample Project
This project uses Scrum and presets some service templates. Products and services involved in this project.

Table 7-2 List of involved products/services

Service	Description	
CodeArts	Req	Presets three planned and completed Sprints, project module settings, and several statistical reports.
	Repo	Presets the code repository phoenix-sample to store project sample code.
	Check	Presets four tasks.
	Build	Presets five tasks.
	Artifact	Stores software packages generated by build tasks.
	Deploy	Presets three applications.
	TestPlan	Presets more than 10 test cases in a function test case library.
	Pipeline	Presets five pipelines.
Other components and services	Identity and Access Management (IAM)	Manages accounts.

Service		Description
	SoftWare Repository for Container (SWR)	Stores Docker images generated by build tasks.
	Cloud Container Engine (CCE)	Deploys software packages, which is different from ECS-based deployment.
	Elastic Cloud Server (ECS)	Deploys software packages, which is different from CCE-based deployment.

Advantages

- We provide a one-stop cloud platform to manage the entire software development process, to address R&D pain points such as frequent requirement changes, complex development and test environments, difficult multi-version maintenance, and failure to effectively monitor the progress and quality.
- This service provides visualized and customizable pipeline services for continuous delivery, doubling the software rollout speed.

7.2 Preparations

Background

This section uses the DevOps Full-Process Sample Project as an example to describe how to manage requirements in a project.

This sample project uses the Scrum mode for iterative development. Each sprint lasts for two weeks. The Phoenix Mall has been developed in the first three sprints, and sprint 4 is being planned.

According to the project plan, time-limited discount and group buying activity management functions need to be implemented in sprint 4.

Due to business and market changes, store network query is added as an urgent requirement. Therefore, this function will be developed in sprint 4.

The following four roles are involved in the project.

Table 7-3 Project role list

Project Member	Project Role	Responsibility
Sarah	Product owner (project creator)	Responsible for the overall product planning and product team setup.

Project Member	Project Role	Responsibility
Maggie	Project manager	Manages project delivery plans.
Chris	Developer	Develops, compiles, deploys, and verifies project code.
Billy	Tester	Writes and executes test cases.

Creating a Project

Before starting the practice, the product owner Sarah creates a project.

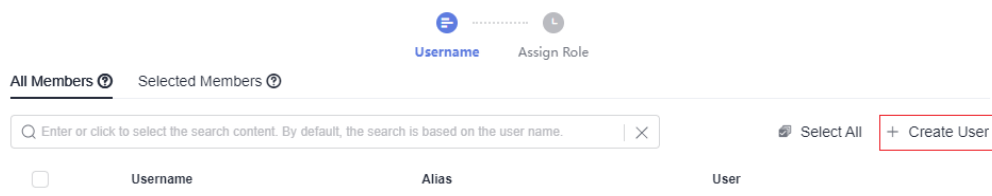
- Step 1** Click **Access Service** on the CodeArts console.
- Step 2** Click **Create Project**, and select **DevOps Full-Process**.
- Step 3** Enter the project name **Phoenix Mall** and click **OK**.

----End

Adding Project Members

- Step 1** Go to the **Phoenix Mall** project, and choose **Settings > Members**.
- Step 2** On the **Member View** tab, choose **Add Members > From My Account**.
- Step 3** In the dialog box that is displayed, click **Create User**. The **Users** page is displayed.

Figure 7-3 Adding members



- Step 4** Click **Create User**, and create three users named **Maggie**, **Chris**, and **Billy** in sequence.
- Step 5** Return to the CodeArts page, refresh the browser, click **Add Members** above the member list, and choose **Users from My Enterprises**. Select **Maggie**, **Chris**, and **Billy**, and click **Next**.
- Step 6** Click the **Role** drop-down list in each row, select **Project manager** for Maggie, **Developer** for Chris, and **Tester** for Billy, and then click **Save**.

----End

7.3 Managing Project Plans

Managing Requirements

Step 1 Create a work item for the new requirement.

The store network query function is a new requirement. Therefore, Sarah needs to add it to the requirement planning view.

1. Go to the **Phoenix Mall** project and choose **Work**.
2. Click the **Plans** tab and click **Phoenix-MindMap**.

NOTE

If the **Plans** tab page is empty, create a mind map.

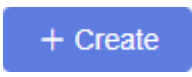

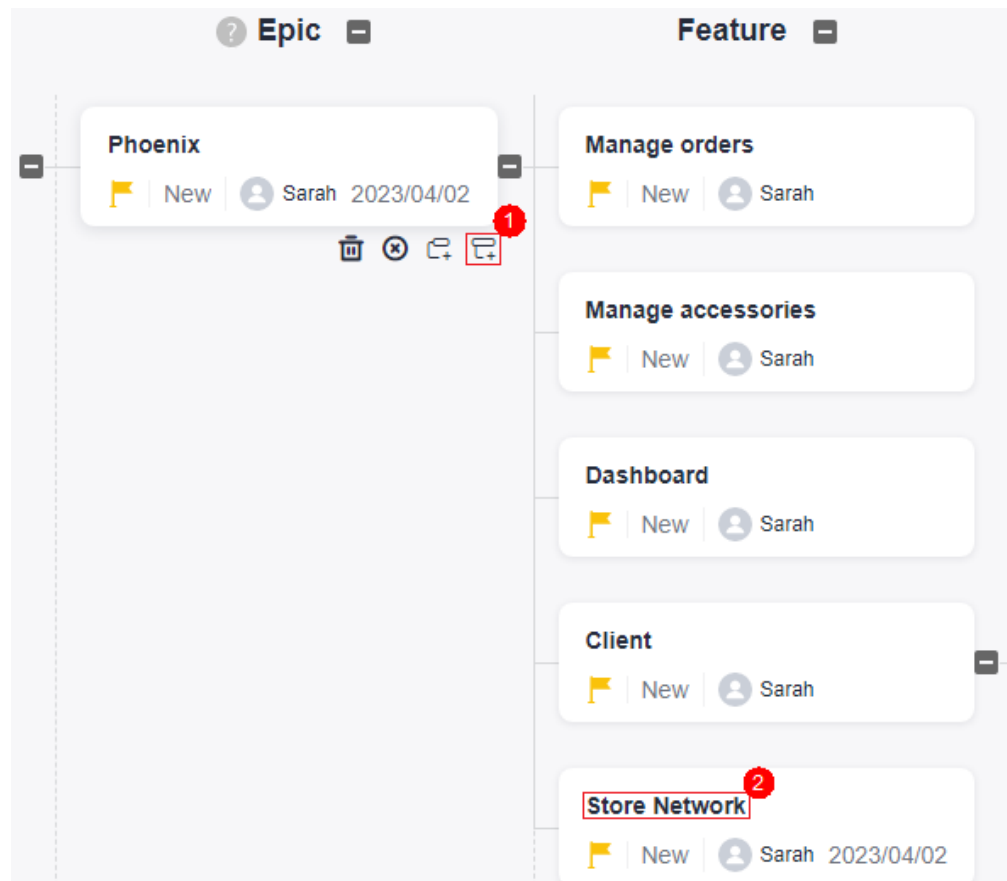
1. Click  and choose **Mind Maps** from the drop-down list.
In the dialog box that is displayed, enter the name **Requirement_Planning**, and click **OK**. The mind map details page is displayed.
2. Click **Add Epic**. In the displayed dialog box, select **Phoenix** and click **OK**.
3. Create a feature named **Store Network**.
 - a. Click  under Epic **Phoenix**.
 - b. Enter the name **Store Network** and press **Enter** to save the settings.

Figure 7-4 Creating a feature



4. Use the same method to add story **User can query network of all stores** to feature **Store Network**.

Step 2 Edit the story.

1. Click story **User can query network of all stores** and edit it by referring to the following table.

Table 7-4 Story configurations

Configuration Item	Suggestion
Description	Enter As a user, I want to query all stores so that I can select a proper store to obtain the service.
Priority	Select High .
Severity	Select Critical .

2. To facilitate understanding, prepare a local file named **Store List** that includes the following content.

Table 7-5 Store list

Branch Name	Branch Address
Branch A	123 meters to the departure floor, Terminal 1, Airport E
Branch B	No. 456, Street G, Area F
Branch C	No. 789, Street J, Area H
Branch D	West side of Building K, Avenue L, Area K

3. Return to the story editing page, find **Click to select a file, or drag and drop a file**, choose **Upload** from the drop-down list, and upload the list file to the work item as an attachment.
4. Click **Save**. The story details are edited.

----End

Managing Sprints

Step 1 Create a sprint.


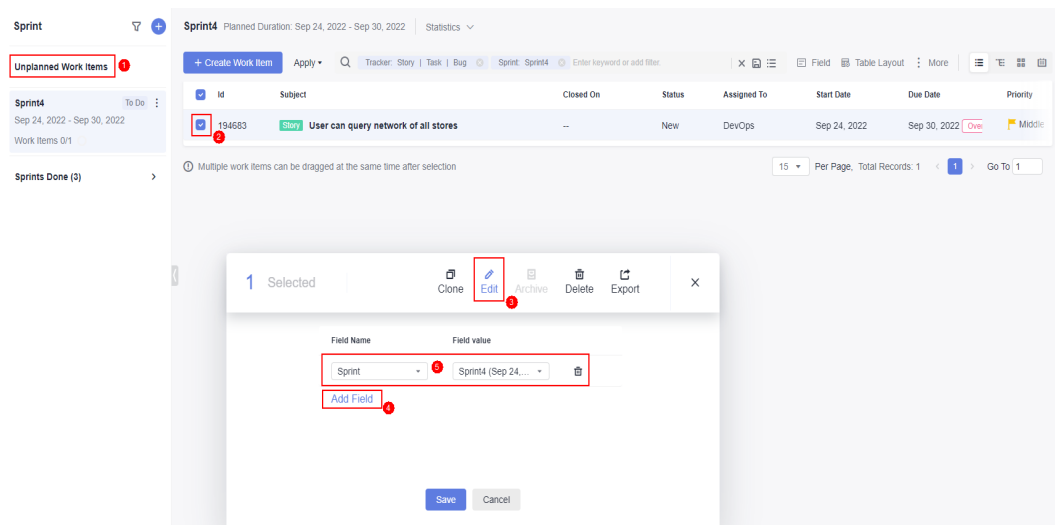
1. Go to the **Phoenix Mall** project, choose **Work** from the navigation pane, and click the **Sprints** tab.
2. Click  next to **Sprint** in the upper left corner of the page. In the dialog box that is displayed, configure the sprint by following [Table 7-6](#). Then click **OK**.

Table 7-6 Sprint information configurations

Configuration Item	Suggestion
Sprint Name	Enter Sprint4 .
Planned Duration	Set the duration to 2 weeks.

Step 2 Plan the sprint.

- From the left navigation pane, choose **Unplanned Work Items**.
- Select the following three stories in the list as planned:
 - User can query network of all stores
 - Admin adds group buying activities
 - Admin adds time-limited discounts
- Click **Edit** at the bottom of the page.
- Click **Add Field**.
- Choose **Sprint** from the **Field Name** drop-down list box, select **Sprint4** from the **Field Value** drop-down list box, and click **Save**.

Figure 7-5 Planning the sprint**Step 3** Assign the stories.

- Choose **Sprint4** from the left navigation pane.
- Select all stories and set the **Assign To** field to **Chris** by following the instructions in [Planning a Sprint](#).


Step 4 Break down the stories.

- Find the story **User can query network of all stores**. Click the story name.
- In the right pane of the page, click the **Child Work Items** tab.
- Click **Fast Create Child**. Enter the title **Frontend display-add store network menu**, assign it to **Chris**, and click **OK**.

4. Use the same method to add task **Background management-Add store network management and maintenance module**.

----End

Tracking Project Status

- **Tracking Task Progress via Daily Stand-ups**
After the sprint starts, the project team communicates the current progress of each work item through daily stand-up meetings and updates the status. You can view the status of work items in the sprint in the card mode.
Go to the **Sprints** tab page and click  to switch to the card mode. This page displays work item cards in each status. You can drag a work item card to update its status.
- **Accepting Iteration Results via Review Meeting**
Before the expected end time of the sprint, the project team holds a review meeting to present work achievements of the current sprint.
The **Sprints** tab page provides sprint statistics and charts. The team can easily collect statistics on the progress of the current sprint, including the requirement completion status, sprint burndown chart, and workload.
Go to the **Sprints** tab page and click **Statistics** to display the progress view.

7.4 Managing Project Configurations

Managing Project Notifications

The project manager Maggie wants team members to be notified of new tasks (work items) so that the members can handle the tasks (work items) in time.


Step 1 Go to the **Phoenix Mall** project, and choose **Settings > Work > Notifications** from the navigation pane.

Step 2 View default settings of the sample project displayed on the page.

We will keep default settings unchanged because they can meet requirements. If necessary, modify the settings. Then they will be automatically saved.

Step 3 Verify the configuration result.

When the project manager is done with breaking down the story, the developer Chris will receive the following two types of notifications.

- **Direct messages:** After Chris logs in to the homepage, they will see a number in the upper right corner. They can click  to view the notification.
- **Email:** The project member also receives an email if an email address has been configured for the corresponding user and the **Email Notifications** option has been enabled on the **This Account Settings** page.

 NOTE

All members can determine whether to receive email notifications. To enable email notification, perform the following steps:

1. Click the username in the upper right corner of the page and choose **This Account Settings** from the drop-down list.
2. Find **Email Notifications** on the **Notifications** page and click **Enable**. You can click **Edit Settings** to change the email address.

----End

Customizing a Project Workflow

In the sprint review meeting, the team demonstrates the product to the product owner and presents the test report. The product owner confirms whether the story is complete. However, the current story status does not show that the test is complete. Therefore, the tester suggests adding a status named **Accepting**.

The project manager Maggie performs the following operations to add a status to a story.

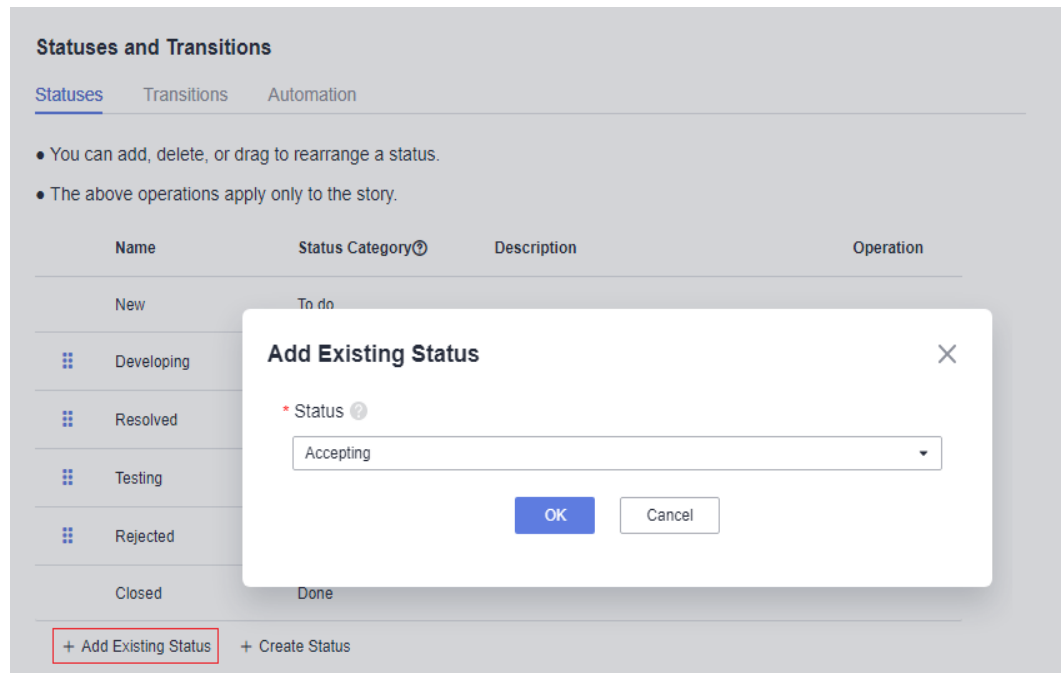
- Step 1** Go to the **Phoenix Mall** project, and choose **Settings > Work** from the navigation pane.
- Step 2** Choose **Common Statuses** from the middle navigation pane. View the default work item statuses of the sample project.
- Step 3** Click **Add Status**. In the dialog box that is displayed, edit the status information by referring to [Table 7-7](#), and click **Add**.

Table 7-7 Status configurations

Configuration Item	Suggestion
Status	Enter Accepting .
Status Category	Select Doing .

- Step 4** Choose **Stories > Statuses and Transitions** from the navigation pane. View the default story statuses of the sample project.
- Step 5** Click **Add Existing Status**. In the displayed dialog box, select **Accepting** and click **OK**.

Figure 7-6 Adding a story status



Step 6 Drag and place **Accepting** below **Testing**.

Step 7 Verify the configuration result.

1. Choose **Work** from the navigation pane, and click the **Work Items** tab.
2. Click any story name in the list to view story details.
3. Click the value in the **Status** column. In the drop-down list, you can see that the **Accepting** option is displayed.

----End