技术方案设计模板、指引和流程规范 / Technical Solution Design Template Guideline And Process Specification

前言 / Preface

技术方案设计可以用统一的语言减少研发过程中的沟通成本，通过记录推敲不同解决方案的优缺点可以帮助我们更全面的考虑问题，做到开发前胸有成竹，开发后可作为维护系统的参考材料。技术方案起到的作用除了信息对称、便于协作外，更重要的是要让大家知道为什么要如此设计。因此，一份好的技术方案不仅要有结论性的结果陈述，对方案选择的分析、对现有系统的影响、异常处理、稳定性分析等等都必不可少，甚至对方案本身的质量和最后能否成果落地起到决定性作用。

Technical solution can reduce communication costs in development process by a unified language. Trough recording the pros and cons of different solutions can help us to consider the problem more comprehensively, so that we can have a clear idea before development and use it as reference material for maintaining the system. In addition to information symmetry and collaboration, a technical solution is important to let everyone know why it was designed the way it was. Therefore, a good technical solution should not only have a conclusive statement of result, but also an analysis of the choice of solution, the impact on the existing system, exception handling, stability analysis and so on are essential, and even play a decisive role in the quality of the proposal itself and whether the final result can be implemented.

分析设计说明书和详细方案设计 / Analytical Design Specification And Detailed Technical Solution

在实现重要的需求时，往往不是只有一份技术方案，根据侧重点不同，分为分析设计说明书和详细方案设计。

When implementing important requirements, there is not just one technical solution, but depending on the focus, there is an analytical design specification and a detailed solution.

分析设计说明书由有经验的资深开发（项目PIC）负责完成，由名字可知该说明书重在分析，既要对需求进行分析、统一任务目标、从全局的角度对系统结构、功能模块、交互关系、部署架构进行分析说明，也要有对核心业务功能的实现方式的分析，做好稳定性分析、可靠性保障、容灾设计、监控、安全设计等等。通过用例分析，可以清晰出开发涉及的范围和合理预估出需要的人力。

Analysis and design specifications are completed by senior developers (project PIC). The name indicates that the manual is focus on analysis. It is necessary to analyze the requirements, unify the task objectives, analyze and explain the system structure, functional modules, interactions, and deployment architecture from a global perspective, as well as analyze the implementation of core business functions, and do a good job of stability analysis, reliability assurance, disaster recovery design, monitoring, security design, etc. Through use case analysis, the scope of development can be clearly identified and the manpower required can be reasonably estimated.

详细方案设计由直接负责实现需求的开发来完成，根据分析设计说明书细化出具体的接口设计、表结构设计和详细的功能流程图等。

The detailed technical solution is done by the developer who is directly responsible for realizing the requirements, refining the specific interface design, table structure design, and detailed functional flow chart, etc. according to the analysis and design specification.

两份技术文档的模板：分析设计说明书模板、详细方案设计模板

Template for two technical documents: Analyze And Design Specification Template, Detailed Technical Solution Template

分析设计说明书指引 / Guidelines Of Analysis And Design Specifications

目前，我们已有两份技术文档的模板，但大部分开发在做分析设计时更关注如何做（设计），而忽略了为什么要这么做（分析）。这里给出分析设计说明书写作指引，通过正反典型例子帮助大家理解技术分析设计方案撰写的要领，结合系统设计分析手册中记录的“坑点”，希望可以提升大家的技术方案设计能力。

Currently, we have two templates for technical documentation, but most developers are more concerned with how to do it (design) and ignore why to do it (analysis) when doing analysis and design. Here we give guidelines for writing analysis and design specifications, and help you understand the essentials of writing such a scheme through positive and negative typical examples, combined with the "pitfalls" recorded in the system design and analysis manual, in the hope of improving your technical solution design capabilities.

分析设计说明书写作指引 / Guidelines for writing analysis and design specifications：https://confluence.shopee.io/pages/viewpage.action?pageId=805486673

系统设计分析手册 / System Design Analysis Manual：https://confluence.shopee.io/pages/viewpage.action?pageId=805486832

除了上述的编写指引外，同学们对如何写好技术方案心中还有很多其他疑问，这里收集了大家最关注的4个问题进行了回答：

In addition to the above writing guidelines, you might have many other questions about how to write a good technical solution, here is a collection of the four top concerns：

什么样的需求需要技术方案 / What kind of requirements need technical solutions？

理论上任何涉及代码或配置变更的需求都需要相应的技术方案，结合实际主客观因素，原则上要求:

Theoretically, any requirement involving code or configuration changes requires a corresponding technical solution, combined with actual subjective and objective factors, which in principle requires:

1. 3天及以上工作量的开发任务 / 3 days or more development tasks
2. 涉及物流核心流程（履约前校验、下单、重量、运费）的需求改动 / Requirement changes involving core logistics processes (pre-fulfillment verification, order placement, weight, freight)
3. 评审的准入制度可以由各项目组结合自身特点制定，由相关PIC或Leader、Manager决定是否需要评审 / The access system of the review can be developed by each project team with its own characteristics, and the PIC or Leader or Manager will decide whether the review is needed.

技术方案一定要按照模板写两份文档或者包含模板中全部内容吗 / Does the technical solution have to follow the template and write two documents or include all the content in the template？

不一定，按需撰写即可，简单的需求可以把两份文档合并为一份。但一个完整的技术文档一定要有：

Not necessarily, just write as needed, simple requirements can be combined into one document. But a complete technical documentation must have:

1. 项目背景 / Project background
2. 任务概述 / Task overview
3. 核心业务规则 / Core business rules
4. 现有系统影响分析 / Existing external system impact analysis
5. 可靠性分析 / Reliability
6. 监控（核心指标）/ Monitoring(core metrics)
7. 上线方案 / Release plan

针对简单需求合并一份的技术方案可以在“核心业务规则”之后“非功能特性设计”之前增加“API设计”、“数据库设计”等内容，而对于像系统重构或架构升级等大型专项方案，技术方案一定要由《分析设计说明书》和《详细方案设计》两类构成。

For simple requirements combined with a technical program can add "API design", "database design" and other content after "core business rules" and before "non-functional features design", while for large programs such as system refactoring or architecture upgrade, the technical program must be composed of "analysis and design specification" and "detailed technical solution" two categories.

《分析设计说明书》中不仅对整体架构有深入的分析，还要对核心规则、依赖分析、非功能设计等都尽可能做到完善，要求由项目负责Leader、EE或SE完成。

The "Analysis and Design Specification" contains not only an in-depth analysis of the overall architecture, but also the core rules, dependency analysis, and non-functional design, which are required to be completed by the project leader, EE or SE.

《详细方案设计》则是对业务流程进行详细设计，主要包括表结构、API、核心业务规则的时序图和流程图，由实现需求的开发完成。

The "Detailed Technical Solution" is a detailed design of business processes, mainly including table structure, API, timing diagram and flow chart of core business rules, which is completed by the development who realizes the requirements.

技术方案review的要点有哪些 / What are the key points of technical solution review？

技术方案（这里主要指设计分析说明书）review要点也就是方案的编写要点，可以参考方案评级要素，从项目背景目标、系统分析设计、上线运维（非功能特性）三个角度出发。

Technical solutions (here mainly refers to the design and analysis specifications) review points is also the main points of the preparation of the program, you can refer to the program rating elements, from the project background objectives, system analysis and design, on-line operations and maintenance (non-functional features).

项目背景目标 / Project background objectives：

1. 标题规范、变更记录完整 / Title specification, change records complete
2. 目的和背景描述清晰 / Clear description of purpose and background
3. 任务概述从产品需求出发，明确要做成什么样子 / Task overview based on the product requirements, clear what to make it look like
4. 术语与缩略语解释清楚 / Terms and abbreviations are clearly explained

系统分析设计 / System analysis and design：

1. 系统设计目标从非功能特性需求和安全性角度出发，明确目标 / System design objectives from the perspective of non-functional feature requirements and security, clear objectives
2. 合理运用视觉元素表达架构设计（如C4模型）/ Rational use of visual elements to express architectural design (e.g. C4 model)
3. 可以清晰梳理出不同方案选择过程和决策的考量 / It is possible to clearly sort out the different solution selection processes and decision considerations
4. 可以从业务、系统等不同角度给出用例来描述交互 / Use cases can be given to describe interactions from different perspectives such as business and system
5. 如有新的系统或部署上的调整，一定要给出运维部署架构图，图中应准确阐述系统分布、交互关系、资源使用情况和容量规划，配合文字说明决策依据 / If there are new systems or deployment adjustments, be sure to give the operation and maintenance deployment architecture diagram, the diagram should accurately describe the system distribution, interaction, resource use and capacity planning, with text to explain the basis for decision-making
6. 核心功能可以通过领域模型的分析结合状态机清晰描述业务及运作的机制 / The core functions can be analyzed by the domain model combined with the state machine to clearly describe the business and the mechanism of operation
7. 通过时序图和流程图结合的方式对核心功能从设计细节上做进一步分析 / Further analysis of the core functions through timing and flow diagrams
8. 清晰列出受影响的系统，评估可能存在的兼容风险和发布依赖 / Clearly list affected systems and assess possible compatibility risks and release dependencies
9. 接口设计要求安全可靠、调用清晰，统一使用Yapi / The interface design requires safe and reliable, clear invocation, uniformly use yapi to record the protocol
10. 中间件设计阐述明确一目了然，按需包含数据库、缓存、消息队列、对象存储的设计分析，不能仅仅停留在表设计或结构变更上，要有对事务使用的分析、高可用设计、过载保护等 / The middleware design is clearly articulated at a glance and includes design analysis of database, cache, message queue, and object storage on demand. It can't just stop at table design or structure changes, but also analysis of transaction usage, high availability design, overload protection, etc.

上线运维（非功能特性）/ On-line operations and maintenance (non-functional features)：

1. 可靠性分析要遵循简单、冗余、标准、健壮的原则，消灭单点，做好数据一致性，注意对热点、极限值的分析处理；从依赖出发，做到控制依赖、弱化依赖，说清楚当外部故障发生时的应急预案，如何容错 / Reliability analysis should follow the principles of simplicity, redundancy, standard and robustness. Eliminate single point and do a good job of data consistency. Pay attention to the analysis and treatment of hot spots and limit values. Start from dependencies, do control dependencies, weaken dependencies, say clearly the contingency plan when external failures occur, how to tolerate faults.
2. 可扩展性包含编译和运行两个方面，编译期可以从设计模式出发，结合目录结构进行扩展性说明，这一部分可以和可维护性有重叠，不要简单理解为应用部署水平扩展能力 / Scalability contains two aspects of compilation and operation, the compilation period can start from the design pattern, combined with the directory structure for scalability description, this part can overlap with maintainability, do not simply understand the application deployment level scalability
3. 日志规范要提前确定 / Log specification to be determined in advance
4. 必须明确需求涉及的核心业务指标，围绕其制定监控和告警策略 / The core business metrics involved in the requirements must be clearly defined, and monitoring and alerting strategies must be developed around them
5. 设计过程中要考虑系统的向前和向后兼容性，列出可能存在的问题和解决方案 / The design process should consider the forward and backward compatibility of the system, listing possible problems and solutions
6. 上线计划要从发布依赖、灰度能力、配置变更、数据迁移等多角度结合实际进行分析 / The go-live plan should be analyzed from multiple perspectives such as release dependencies, grayscale capabilities, configuration changes, data migration, etc. in conjunction with the actual

技术方案的反馈机制是怎样的 / What is the feedback mechanism of the technical program？

技术方案的评审分成两步来做 / The review of technical solutions is done in two steps：

1. 项目组内的review：由项目PIC或Leader、Manager负责，修改意见当场给出。/ Review within the project team: the project PIC or Leader, Manager is responsible for the review, the revision is given on the spot.
2. 季度定期由技术方案评审委员会发起的review：收集当季重点项目的技术方案，评选优秀方案，统计不合格方案数。/ Regular quarterly reviews initiated by the Technical Program Review Committee: collect technical programs of key projects in the quarter, and select outstanding programs, count the number of unqualified programs.

方案评审 / Program Review

结果 / Result	要求 / Requirements
合格 Qualified	可以清晰描述设计思路，分析不同方案优劣点；核心规则要求可以具体到方案的实现细节，包括各种异常的考虑、索引的建立、各项约束、异常重试方案及结论依据等等；容量评估、兼容性论述合理；方案中在可维护性、可靠性、可运维、监控、上线方案等非功能特性上有充分思考 The design ideas can be clearly described and analyzed the advantages and disadvantages of different solutions; the core rules requirements can be specified to the implementation details of the solution, including the consideration of various exceptions, the establishment of the index, the constraints, the exception retry program and the basis for the conclusion, etc.; the capacity assessment and compatibility are reasonably discussed; the solution has sufficient consideration on non-functional features such as maintainability, reliability, operation and maintenance, monitoring, and online solutions.
不合格 Unqualified	方案无法满足需求，或不具备可实施性；只概括性的陈述了设计结果，缺少分析过程和可行性论述；缺乏可靠性、可运维、可监控等非功能特性的考虑 The solution does not meet the requirements or is not implementable; only general statements of design results, lack of analysis process and feasibility discussion; lack of the consideration of reliability, operation and maintenance, monitoring and other non-functional characteristics

技术方案评审时，有相应PIC或Leader、Manager给出评审结果，对于不合格方案限定修改完成时间并记录（可并行开发）。每个季度由技术委员会审核优质方案给与奖励并作为技术晋升的参考指标。

When the technical solutions are reviewed, the corresponding PIC or Leader or Manager will give the review results, and the modification completion time will be limited and recorded for unqualified solutions (parallel development is possible). Every quarter, the technical committee will review the high quality solutions and give rewards as a reference indicator for technical promotion.

备注：对实现细节描述的详细程度，可以结合文档受众来看，宗旨是做到阅读清晰、减少沟通成本。

Note: The level of detail of the description of the implementation can be seen in conjunction with the audience of the document, the purpose is to achieve clear reading and reduce communication costs.

技术方案Review执行流程规范 / Technical Solution Review Execution Specification

Review目标 / Review Target

- 统一语言，减少研发过程中的沟通成本，信息对称，便于团队协作
- Unified language to reduce communication costs in the R&D process, symmetrical information and easy to collaboration
- 通过推敲方案帮助我们思考周全，开发前胸有成竹，维护时有“档”可依
- It can help us to think through the solution, so that we can have a clear idea before development and a "file" to follow when maintaining it.
- 通过知识沉淀提升团队技术水平
- Improve the team's technical level through knowledge precipitation

执行团队 / Executive Team

技术方案Review执行组 / Technical Program Review Executive Team:

按照业务线，各组根据需要自行确定方案评审成员，一般至少包含项目PIC、Leader、负责AM中1人。

According to the business line, each group determines its own program review members according to the needs, generally including at least one of the project PIC, Leader and responsible AM

技术方案Review委员会 / Technical Program Review Committee:

组长：蔺绍枧、徐永轩

Team Leader: shaozhu.lin, yongxuan.xu

成员：吴龙辉、陈创柳、刘志求、梁志权、张龙、卢开瑞、李鹏、敖显奎

Member: longhui.wu, chuangliu.chen, zhiqiu.liu, zhiquan.liang, long.zhang, kairui.lu, peng.li, xiankui.ao

季度内负责重点（OKR）项目的技术分析设计初审，在季度末按季度收集重点项目技术方案，评选优秀方案，迭代分析设计说明书写作指引中的优秀案例和失败案例。

Responsible for the initial review of technical analysis design for key (OKR) projects during the quarter. Collect technical solutions for key projects at the end of the quarter, select outstanding solutions, and iterate the outstanding and failed cases in "analyze and design specification writing guidelines".

Review执行流程 / Review execution process

项目组review / Project team review

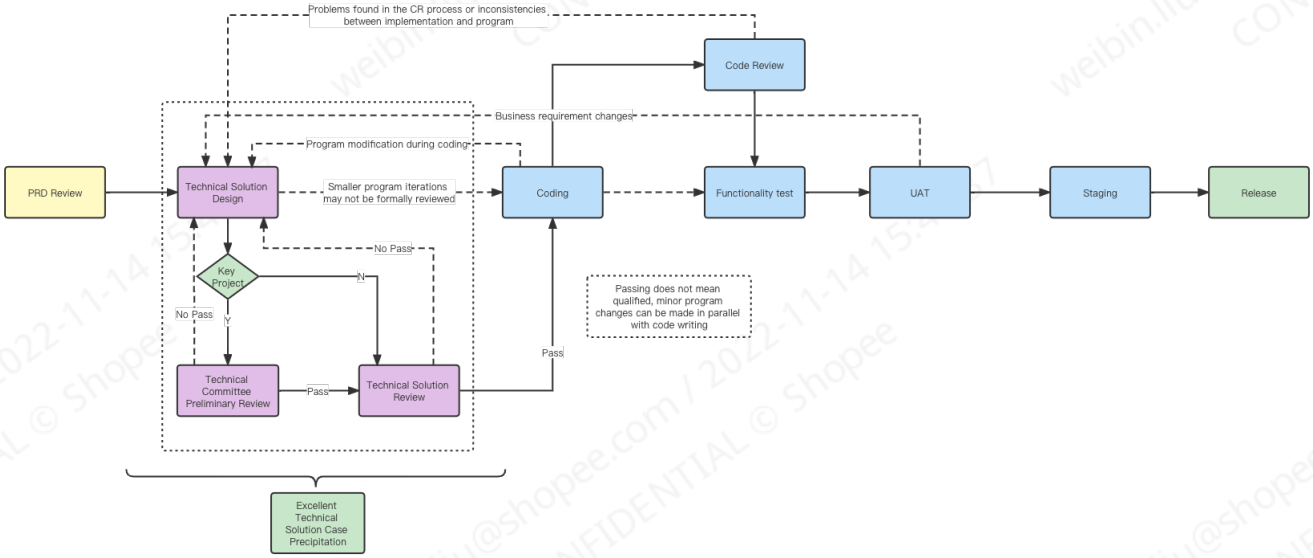
项目内review以保障项目研发质量为目的，重点专项由技术评审委员会成员参与review。

The intra-project review is aimed at guaranteeing the quality of project development, and the key projects are reviewed with the participation of the technical review committee members.

1. PRD评审完成后确定项目内技术方案评审时间 Determine the timing of the technical program review within the project after the PRD review is completed
1.1 如果是重点项目，由项目PIC提前一周预约下周技术委员会方案初审，初审通过后才可正式进入组内正式评审 If it is a key project, the project PIC will make an appointment one week in advance for the preliminary review of the technical committee program next week, and only after the preliminary review is passed can enter the formal review within the project
1.2 负责的项目PIC（Leader）根据技术委员会意见会后更新分析设计说明书写作指引中的正反案例 The responsible project PIC (Leader) updates the positive and negative cases in the analyze and design specification writing guidelines after the meeting based on the technical committee's comments
2. 组内正式评审日提前一天发出方案文档并开放评论权限，通过关键字“技术方案：链接”填入所属JIRA的Details字段中 Please send out the document one day before the official review date of the group and comment "Technical Solution: link" to Details field of JIRA
3. 评审结束后根据反馈意见修改方案，项目PIC或Leader、Manager当天确定评审结果，对不合格的方案要确定修改完成时间，并comment在JIRA中 After the review, according to the feedback to modify the program, the project PIC or Leader, Manager determine the results of the review on the same day, determine the completion of the revision time of the unqualified program, and comment in JIRA
4. 开发过程中如有设计变更必须同步修改技术文档 Technical documentation must be modified simultaneously if there are design changes in the development process

结合供应链研发流程，组内的技术方案review整体流程如下图所示：

Combined with the supply chain R&D process, the overall process of technical solution review within the group is shown in the following diagram:



技术方案评审委员会定期review

Regular reviews by the Technical Program Review Committee

技术方案评审委员会review以专业技能培养、总结归纳经验为目的，按季度由委员会组织评审和复盘。

The technical program review committee reviews for the purpose of professional skills development and summarizing experience, and is organized by the committee on a quarterly basis for review and reassessment.

1. 每个季度由技术委员会统一对当季度专项技术方案进行业务线内评审，可结合线上问题作为评审参考 Each quarter, the technical committee will conduct a unified business line review of the quarter's technical solutions, which can be combined with online issues as a reference for review
2. 评审选出的优秀方案在业务线内作为模范方案录入SLS Doc并作为优秀案例录入分析设计说明书写作指引 The best solutions selected by the review are recorded into the SLS Doc as exemplary solutions in the business line and the analyze and design specification writing guidelines as excellent cases
3. 评审选出不合格方案组织复盘，将存在代表性问题的方案作为失败案例录入分析设计说明书写作指引 Review and select the unqualified solutions, and record the solutions with representative problems as failure cases in the analyze and design specification writing guidelines
4. 每个季度，由技术委员讨论分析当季度技术方案设计情况，按需迭代系统分析设计指引的展现形式和涵盖内容 Each quarter, the technical committee will discuss and analyze the technical solution design for the quarter, and iterate on the presentation and content of the system analysis design guidelines as needed

备注 / Noted：

1. *每个季度结束前2周发起季度review。/ Quarterly review launched 2 weeks before the end of each quarter.*
2. *每个月收集当月重点项目的技术方案，组织评审委员月会讨论当前各项目组执行情况、存在的问题及需要重点跟进的内容，根据月会结论发出技术方案review月报；月会后委员会成员分工负责在各项目组周会上对会议内容（需要各项目组配合执行的内容）进行宣贯。/ Each month, we collect the technical solutions of the key projects of the month and organize the monthly meeting of the review committee to discuss the current implementation status of each project team, the problems and the contents that need to be followed up. Based on the conclusion of the monthly meeting, we will issue a monthly report on the technical solution review. After the monthly meeting, the committee members will be responsible for the weekly meeting of each project team to promote the content of the meeting (the content that needs to be implemented by each project team).*

结果产出 / Resulting Output

组内Review完成的技术方案统一收录在各小组的技术方案目录下并按规定填写到JIRA上，技术方案评审委员会在每个季度末汇总当季度重点项目的技术方案，筛选出优秀和失败方案案例。通过上述举措，实现以下产出：

After review within the group, the technical solutions are uniformly recorded in the technical solution catalog of each group and filled out on JIRA as required. The Technical Solution Review Committee summarizes the technical solutions of the current quarter's key projects at the end of each quarter and screens out the excellent and failed solution cases. Through the above initiatives, the following outputs are achieved:

- 统一收集重点项目技术方案，沉淀知识的同时为后续相关奖励机制做好数据支持
- Unify the collection of key project technical solutions, precipitate knowledge and provide data support for the subsequent related incentive mechanism
- 丰富分析设计说明书写作指引、系统设计分析手册等文档，持续促进方案设计能力，最终沉淀出完整的技术方案方法论（以课程形式）
- Enrich documentation such as analysis and design specification writing guidelines, system design and analysis manuals, etc. to continuously promote solution design capabilities and eventually precipitate a complete technical solution methodology (in the form of courses)
- 本文档及子目录中的相关内容变更由评审委员会统一评审，通过后周知给各业务线
- Changes to the content of this document and sub-categories are reviewed by the review committee and communicated to the business lines on a weekly basis after approval

激励机制 / Incentive Mechanism

经评审委员会评审出的优秀技术方案将存档作为职级晋升的参考指标

The excellent technical solutions evaluated by the review committee will be archived as the reference index for grade promotion

后续奖励机制不断丰富中

Subsequent reward mechanisms are constantly being enriched