

# *IEEE 12207 Software Life Cycle*



*Architecture, Phases, Products, Evaluations,  
Records, Audits, Reviews, and Baselines*

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# Overview



- Architecture
- Phases (12)
- Products (35)
- Evaluations (62)
- Records (17)
- Audits (4)
- Reviews (9)
- Baselines (9)

# *IEEE 12207 Software Life Cycle*



*Architecture*

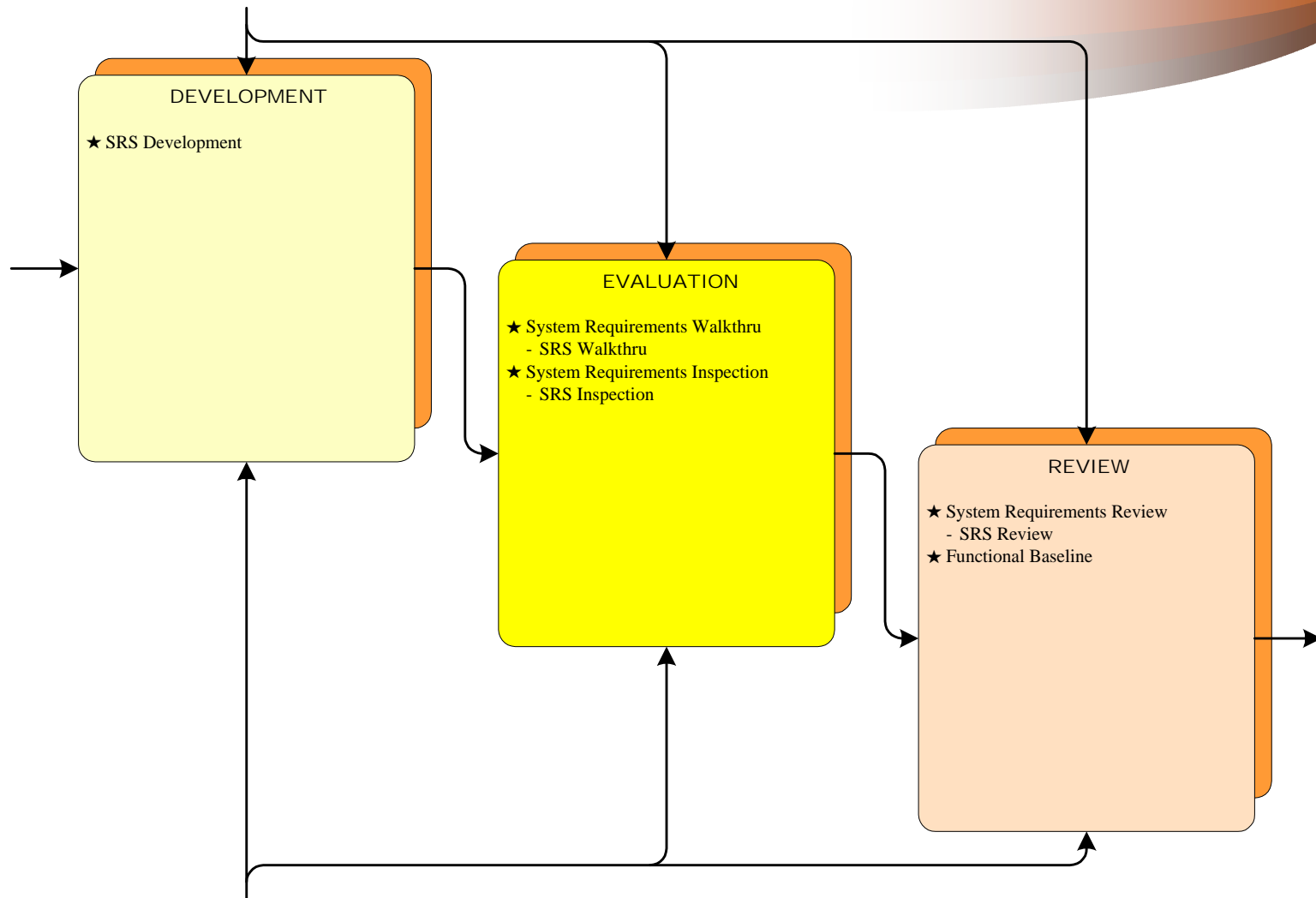
# IEEE 12207—Architecture

Phase	System Requirements Analysis	System Architectural Design	Software Requirements Analysis	Software Architectural Design	Software Detailed Design	Software Coding and Testing	Software Integration	Software Qualification Testing	System Integration	System Qualification Testing	Software Installation	Software Acceptance Support
Product	• SRS	• SARAD	• SRD	• SAD • SIDD (t) • DDD (t) • UDD (p) • TVPL (si)	• SDD • SIDD (d) • DDD (d) • UDD (u) • TVPL (su) • TVPL (siu)	• Software • TVPR (su) • TVRR (su) • UDD (u) • TVPL (siu)	• SOIP • TVRR (si) • UDD (u) • TVPR (sq)	• TVRR (sq) • UDD (u) • SIAR (sfc) • SIAR (spc)	• TVRR (yi) • TVPR (yq)	• TVRR (yq) • SIAR (yfc) • SIAR (ypc)	• SIP	• TVRR (sa) • Training
Evaluation	• Walkthru • Inspection	• Walkthru • Inspection	• Walkthru • Inspection	• Walkthru • Inspection	• Walkthru • Inspection	• Walkthru • Inspection	• Walkthru • Inspection	• Walkthru • Inspection	• Walkthru • Inspection	• Walkthru • Inspection	• Walkthru • Inspection	• Walkthru • Inspection
Record	• SYRER	• SYAER	• SORER	• SOAER	• DDER	• EOCR • SCTRER • SCR	• SIER	• DER • SCR	• SQTER	• SCR • SER • SQTARR	• SIRR	• SCR
Audit								• PCA • FCA		• PCA • FCA		
Review	System Requirements Review	System Design Review	Software Specification Review	Preliminary Design Review	Critical Design Review		Software Test Readiness Review	Software Formal Qualification Review	System Test Readiness Review	System Formal Qualification Review		
Baseline	Functional Baseline		Allocated Baseline	Developmental Configuration			Software Test Baseline	Software Product Baseline	System Test Baseline	System Product Baseline		

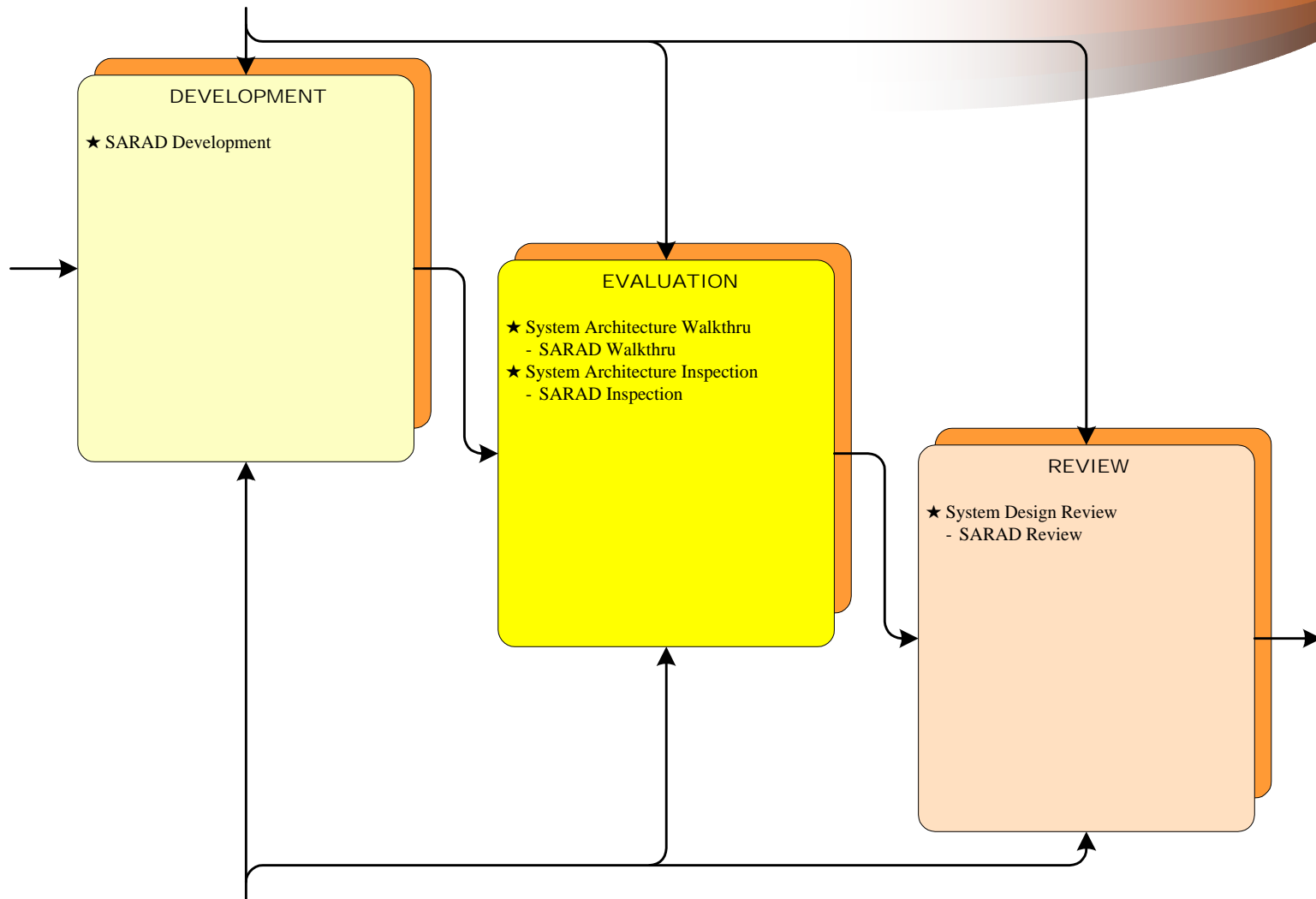
# IEEE 12207—Acronyms

PLAN (3)		SYMBOLS (15)	
SIP	Software Installation Plan	(t)	Top-Level
SOIP	Software Integration Plan	(p)	Preliminary
TVPL	Test or Validation Plan	(si)	Software Integration
SPECIFICATION (1)		(d)	Detailed
SRS	System Requirements Specification	(u)	Update
DESCRIPTION (7)		(su)	Software Unit
DDD	Database Design Description	(siu)	Software Integration Update
SAD	Software Architecture Description	(sq)	Software Qualification
SARAD	System Architecture and Requirements Allocation Description	(sfc)	Software Functional Configuration Audit
SDD	Software Design Description	(spc)	Software Physical Configuration Audit
SIDD	Software Interface Design Description	(yl)	System Integration
SRD	Software Requirements Description	(yq)	System Qualification
UDD	User Documentation Description	(yfc)	System Functional Configuration Audit
PROCEDURE (1)		(ypc)	System Physical Configuration Audit
TVPR	Test or Validation Procedures	(sa)	Software Acceptance
REPORT (2)		RECORD (14)	
SIAR	Software Integration Audit Report	DDER	Detailed Design Evaluation Record
TVRR	Test or Validation Results Report	DER	Documentation Evaluation Record
AUDITS (2)		EOCR	Executable Object Code Record
FCA	Functional Configuration Audit	SCR	Source Code Record
PCA	Physical Configuration Audit	SCTRER	Software Code and Test Results Evaluation Record
		SER	System Evaluation Record
		SIER	Software Integration Evaluation Record
		SIRR	Software Installation Results Record
		SOAER	Software Architecture Evaluation Record
		SORER	Software Requirements Evaluation Record
		SQTARR	System Qualification Test Audit Results Record
		SQTER	System Qualification Test Evaluation Record
		SYAER	System Architecture Evaluation Record
		SYRER	System Requirements Evaluation Record

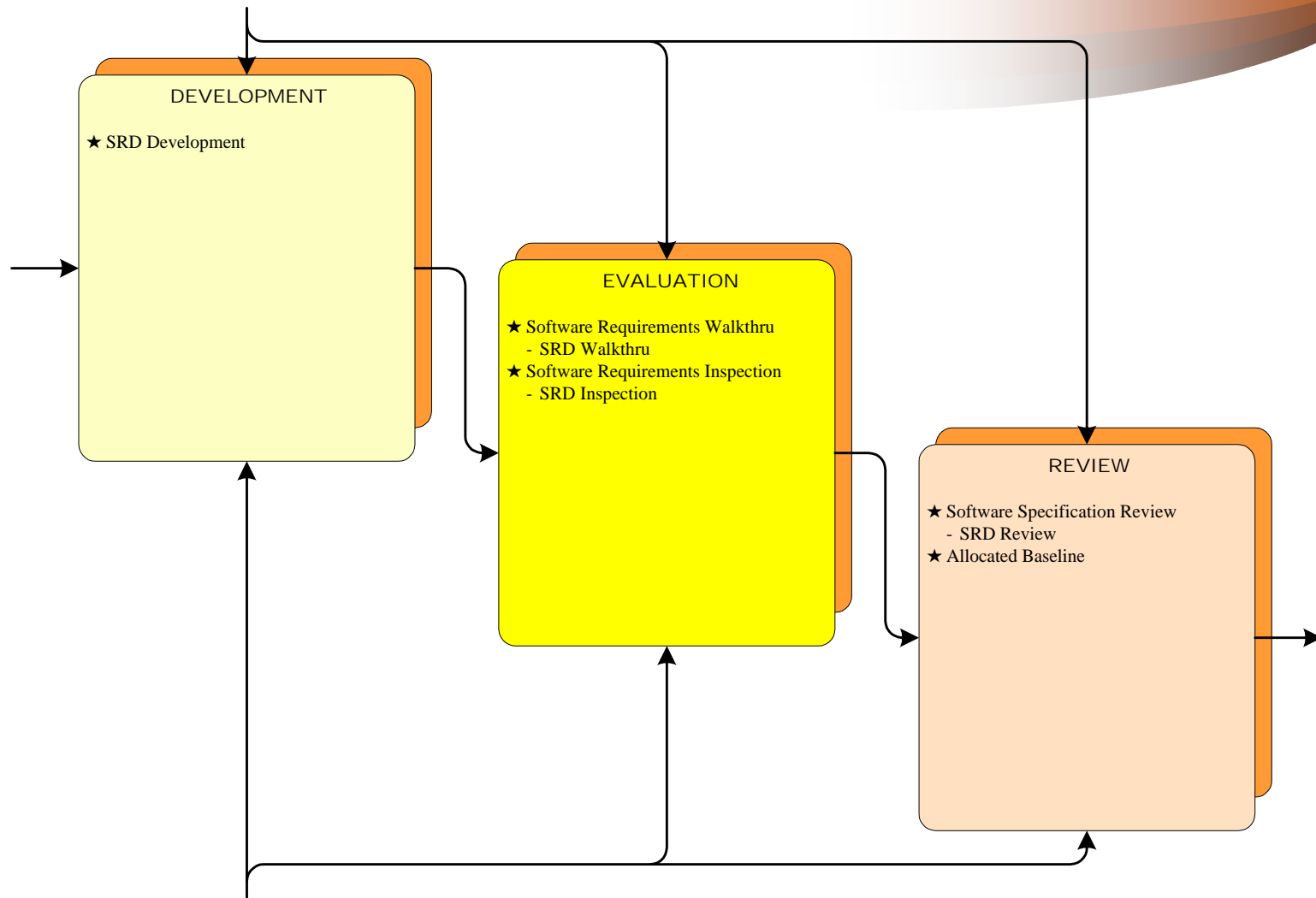
# System Requirements Analysis



# System Architectural Design

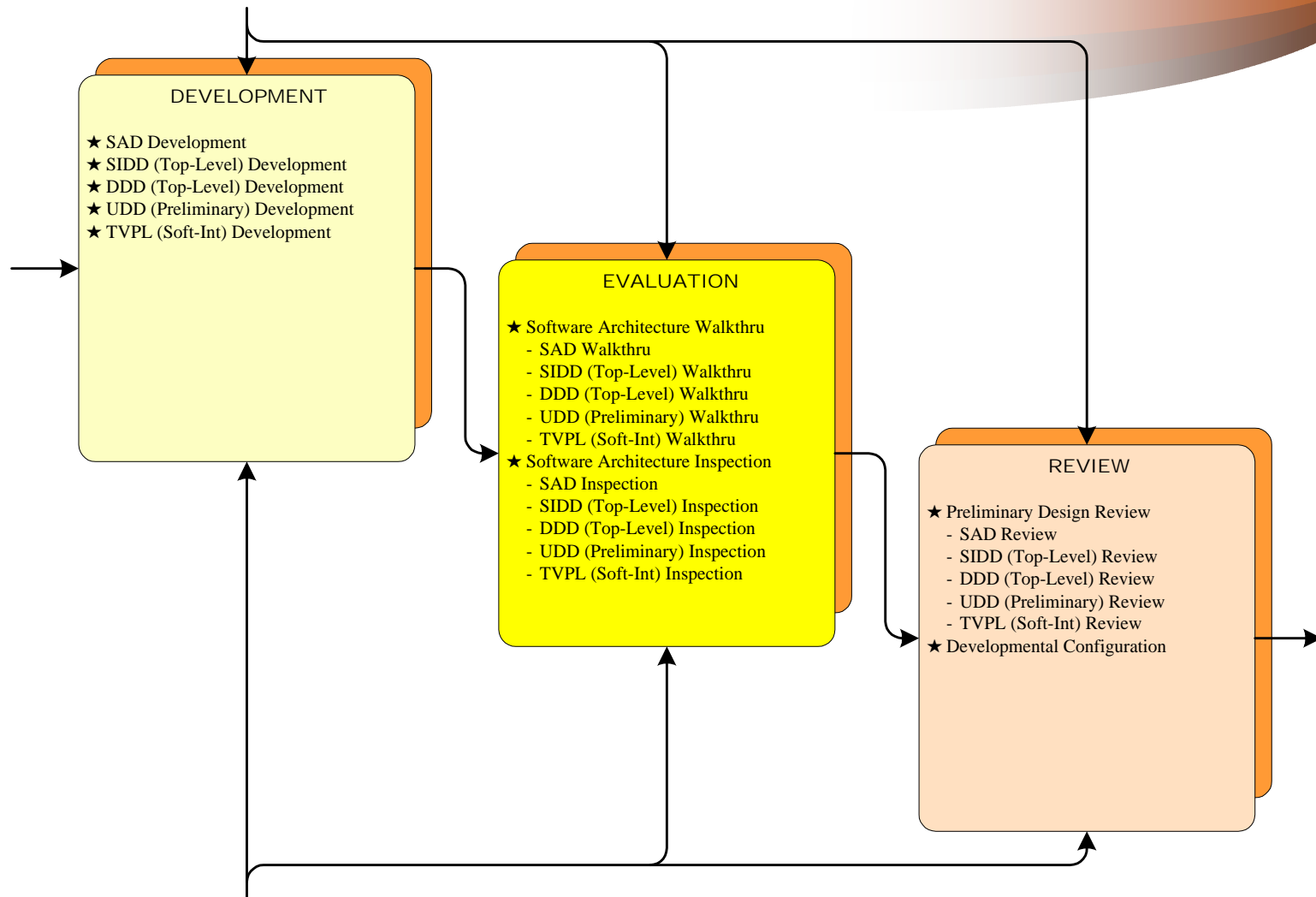


# Software Requirements Analysis

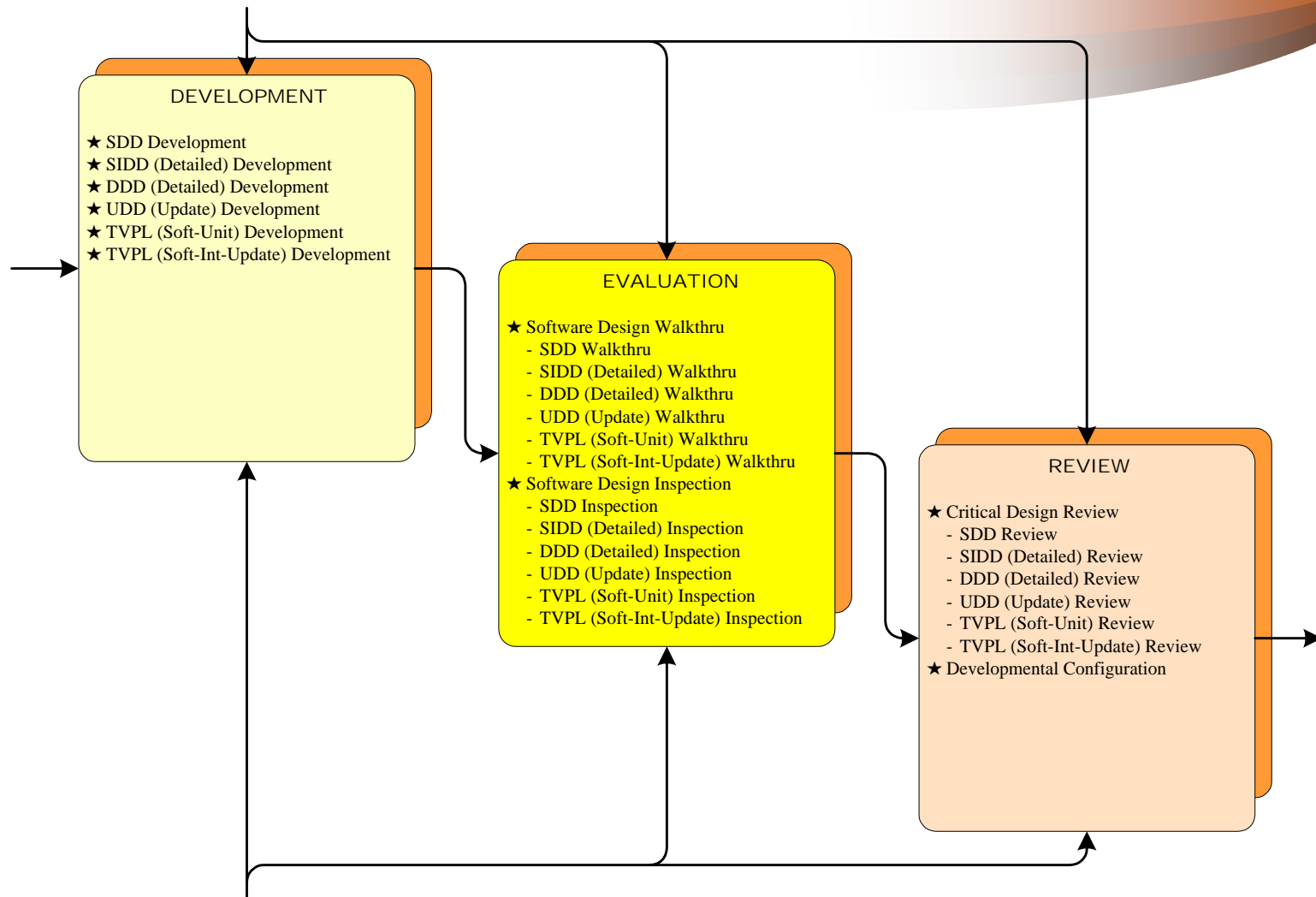




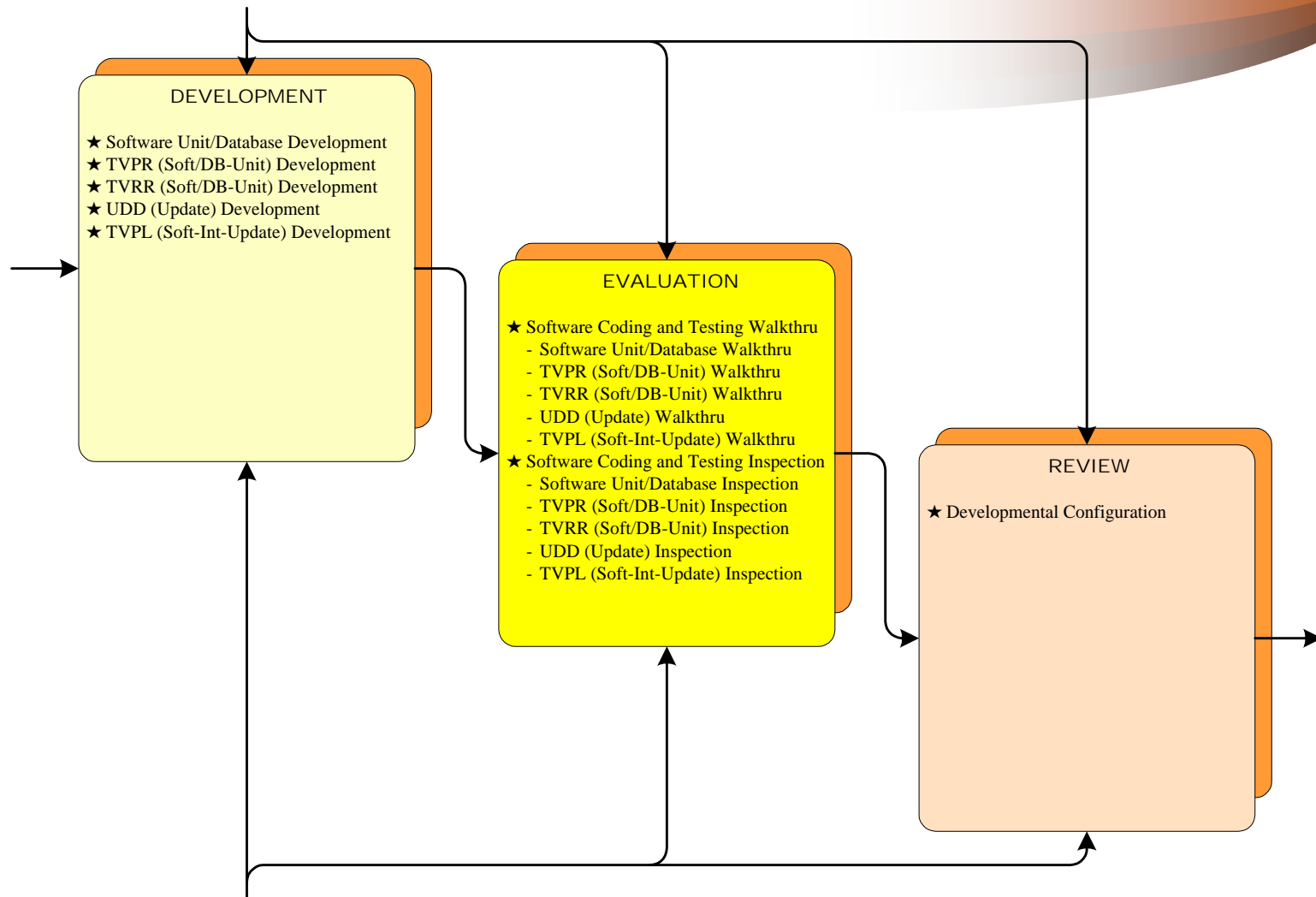
# Software Architectural Design



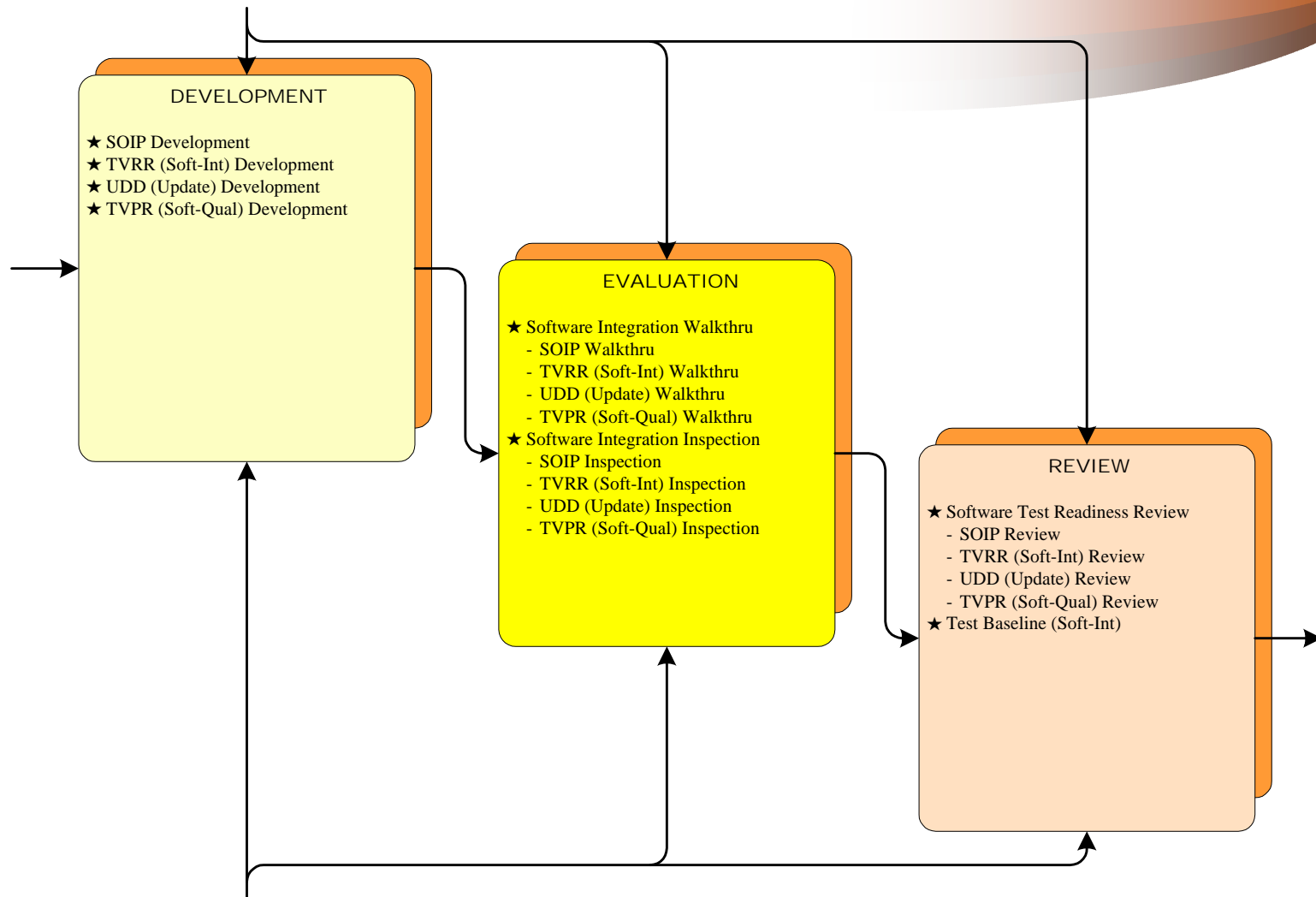
# Software Detailed Design



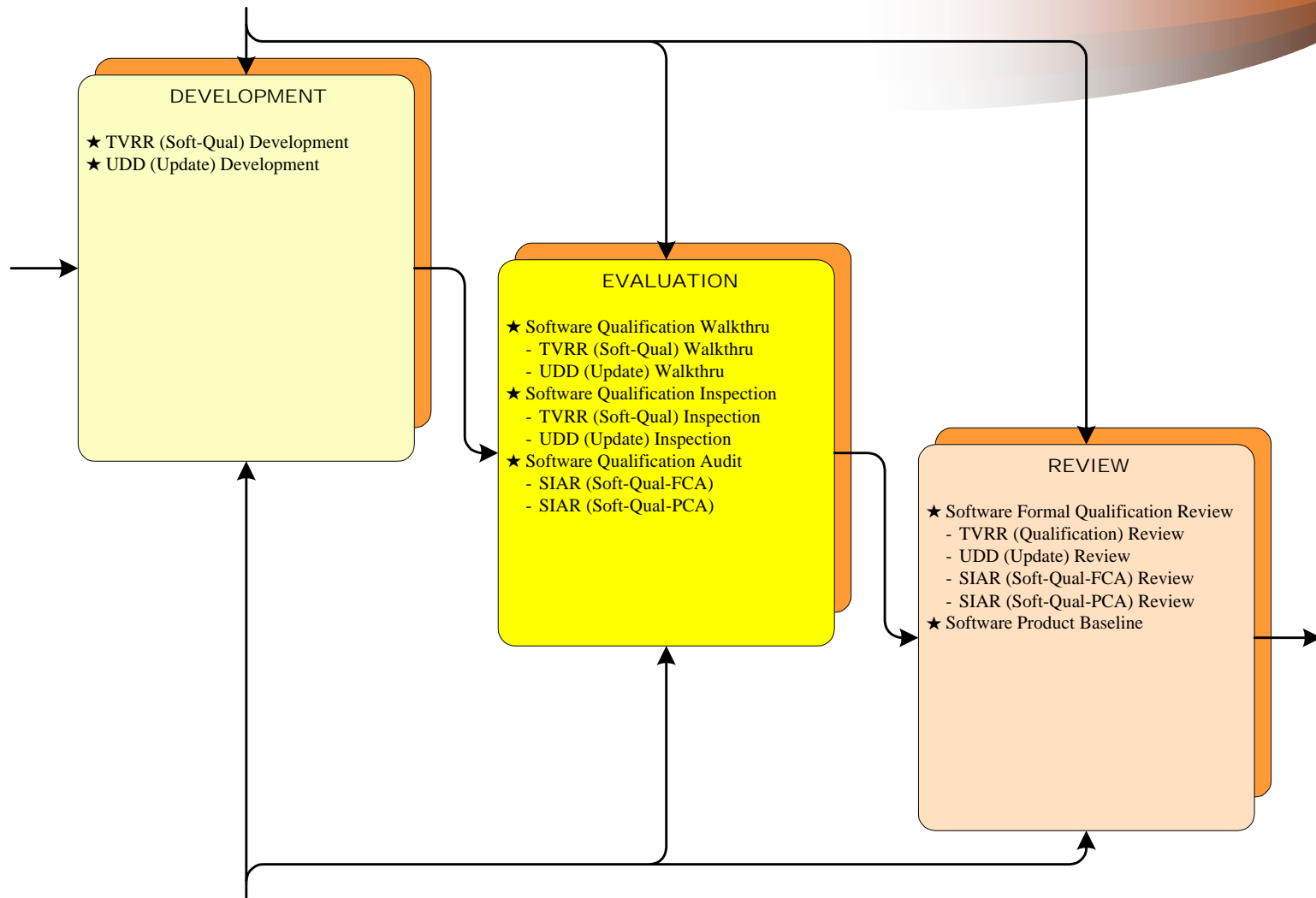
# Software Coding and Testing



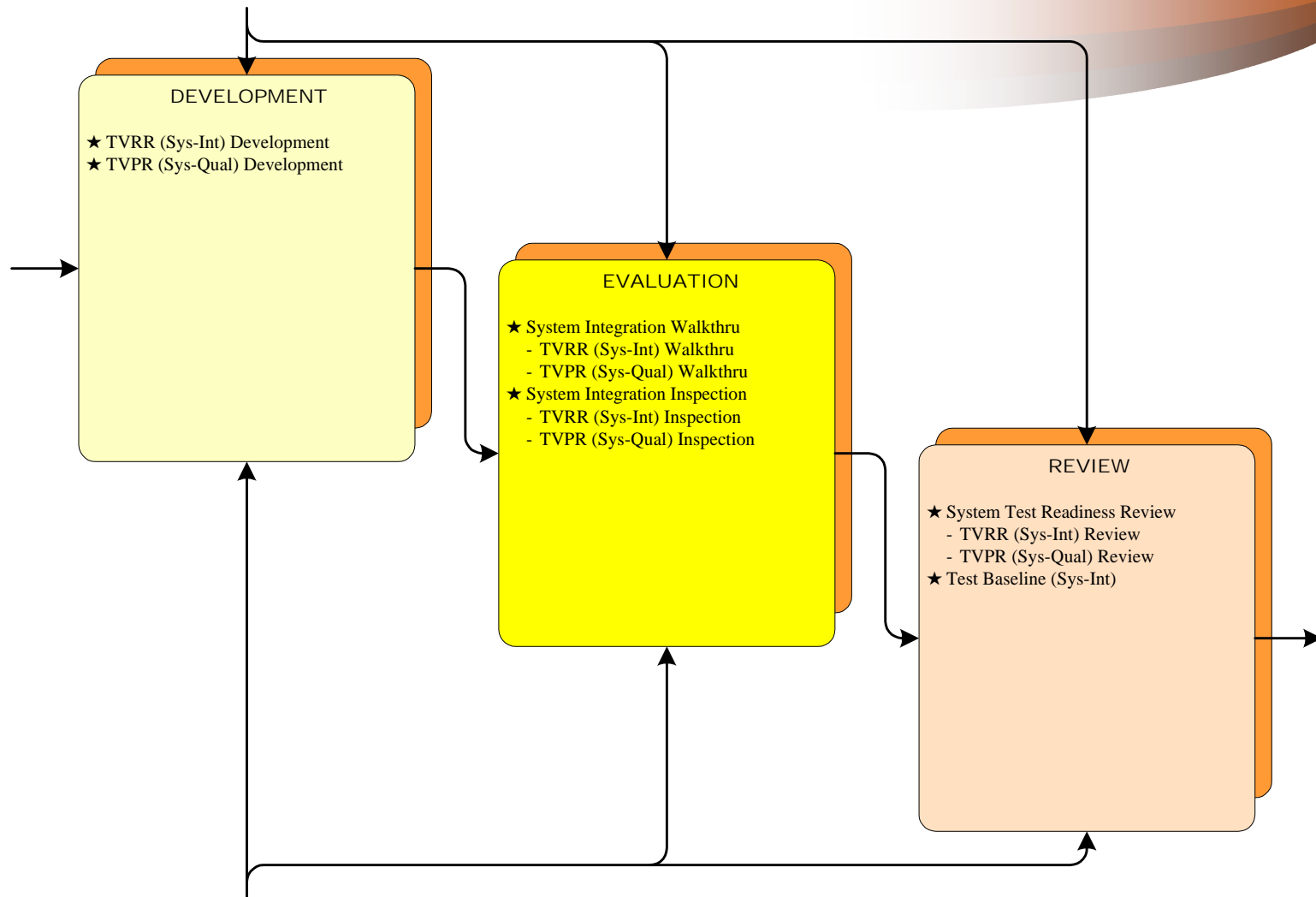
# Software Integration



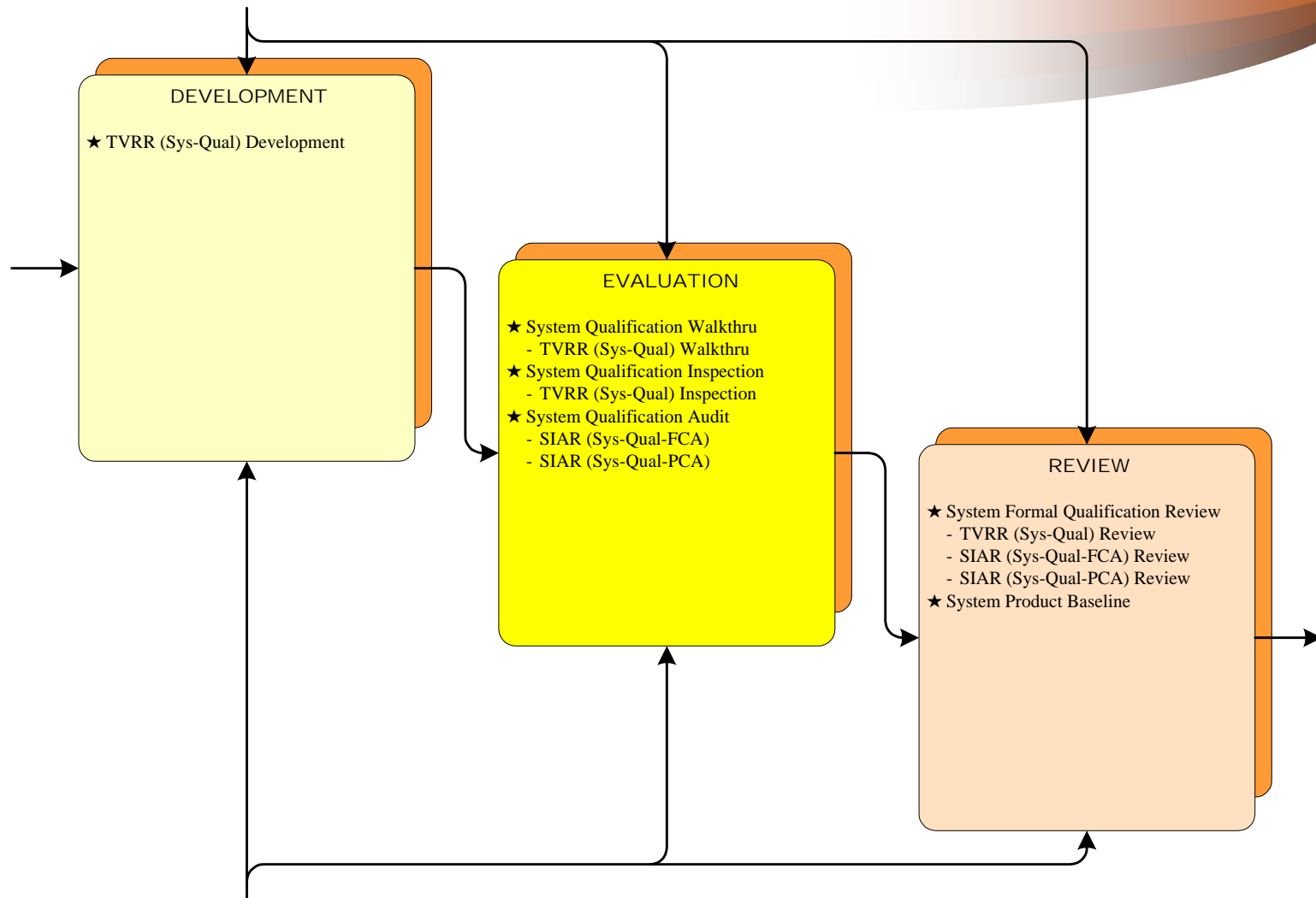
# Software Qualification Testing



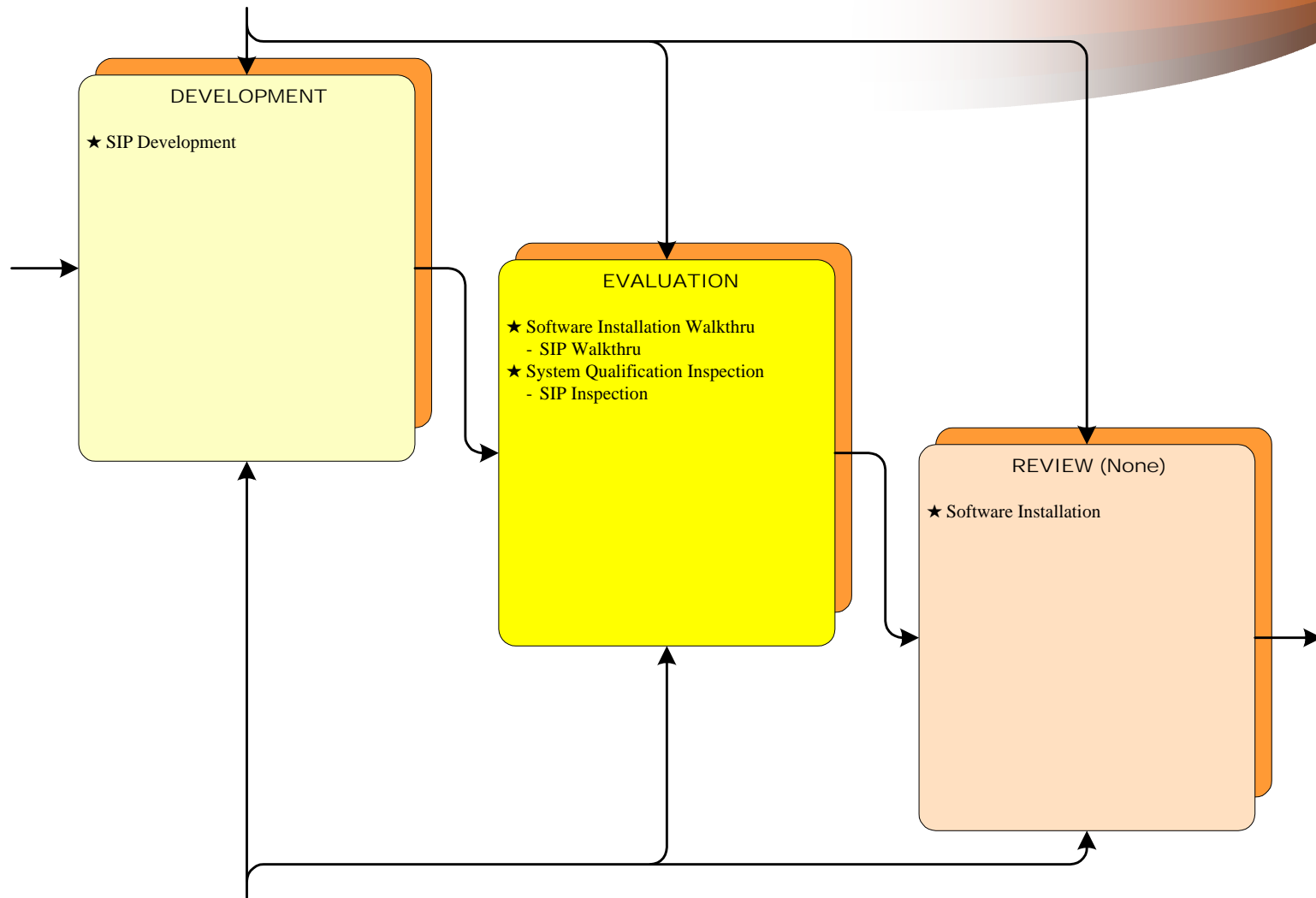
# System Integration



# System Qualification Testing

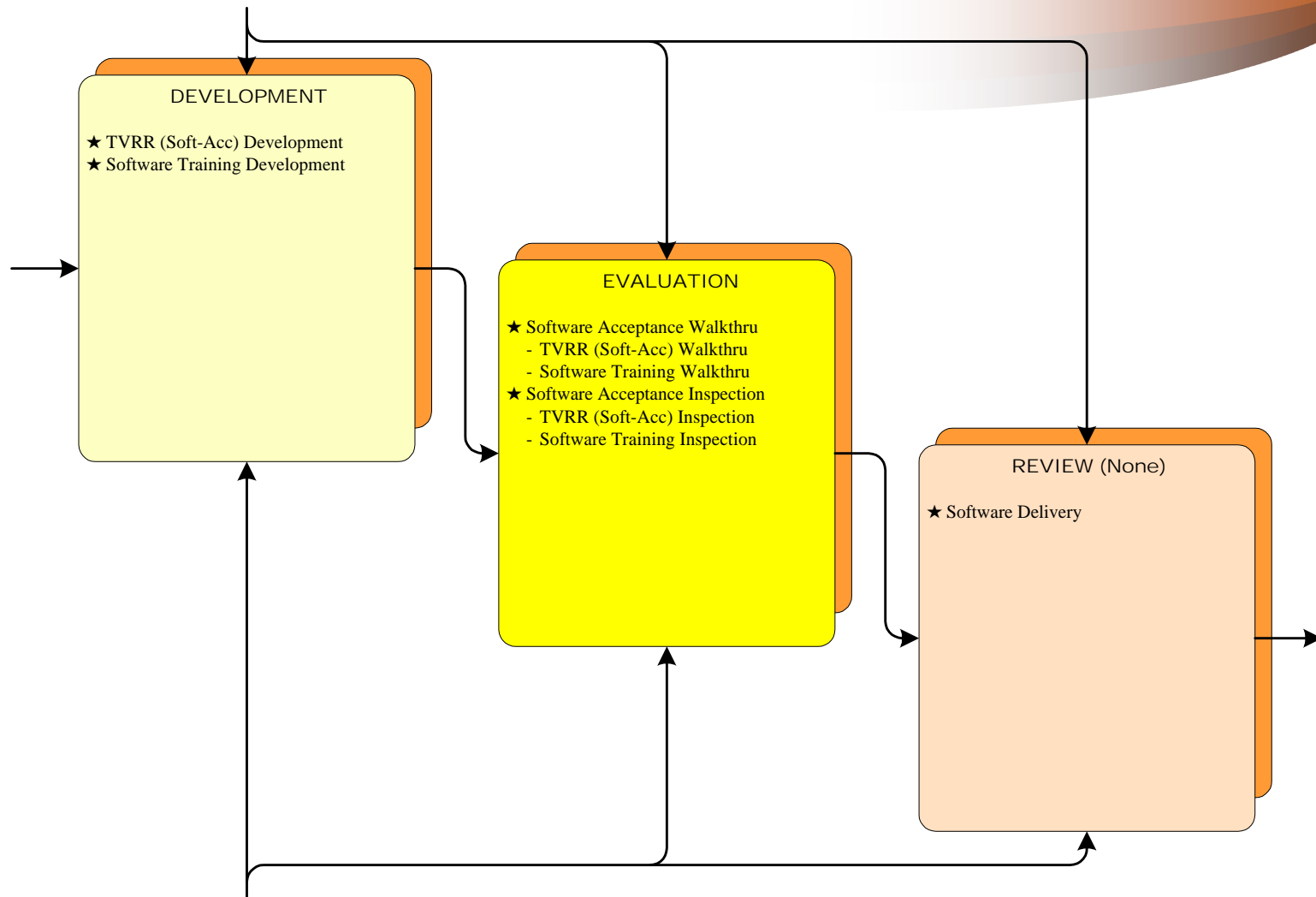


# Software Installation





# Software Acceptance Support




# *IEEE 12207 Software Life Cycle*



*Phases (12)*

# *IEEE 12207—Phases (12)*



- System Requirements Analysis
- System Architectural Design
- Software Requirements Analysis
- Software Architectural Design
- Software Detailed Design
- Software Coding and Testing
- Software Integration
- Software Qualification Testing
- System Integration
- System Qualification Testing
- Software Installation
- Software Acceptance Support

# *System Requirements Analysis*

System Requirements Analysis is the process of developing system-level requirements, for a CSCI of a system or segment of a system, for use in System Architectural Design

# *System Architectural Design*

System Architectural Design is the process of transforming the system requirements into an architectural design, for a system or segment of a system, including its operational and support environments, for use by Software Requirements Analysis

# *Software Requirements Analysis*



Software Requirements Analysis is the process of developing software requirements, for a CSCI of a system or segment of a system, for use by Software Architectural Design

# *Software Architectural Design*

Software Architectural Design is the process of transforming software requirements into a top-level software design consisting of CSCs, for a CSCI of a system or segment of a system, for use by Software Detailed Design

# *Software Detailed Design*

Software Detailed Design is the process of decomposing the preliminary software design into an increasingly detailed hierarchy of CSUs, for a CSCI of a system or segment of a system, for use by Software Coding and Testing



# *Software Coding and Testing*

Software Coding and Testing is the process of transforming the detailed software design-CSUs-into computer software, for a CSCI of a system or segment of a system, for use by Software Integration

# *Software Integration*

Software Integration is the process of combining and evaluating the CSUs that have been implemented and unit tested, for a CSCI of a system or segment of a system, for use by Software Qualification Testing

# *Software Qualification Testing*

Software Qualification Testing is the process of dynamically evaluating computer software using test cases and procedures based on CSCI-level software requirements, for a CSCI of a system or segment of a system, for use by System Integration

# *System Integration*

System Integration is the process of combining and evaluating CSCIs and HWCIIs of a system or segment of a system, that have undergone individual CSCI and HWCI qualification testing, for use by System Qualification Testing

# *System Qualification Testing*

System Qualification Testing is the process of dynamically evaluating integrated CSCIs and HWCIs of a system or segment of a system, using test cases and procedures based on system-level requirements, for Software Installation

# *Software Installation*

Software Installation is the process of creating necessary aids-user manuals, online help, operator manuals, and technical specifications-for operating and using CSCIs of a system or segment of a system, prior to Software Acceptance Support

# *Software Acceptance Support*

Software Acceptance Support is the process of supporting the customer's acceptance review and testing, completion and delivery, and provision of initial and continuing training and support for a CSCI of a system or segment of a system

# *IEEE 12207 Software Life Cycle*



*Products (35)*



# *IEEE 12207—Products (35)*

- System Requirements Analysis (1)
  - SRS
- System Architectural Design (1)
  - SARAD
- Software Requirements Analysis (1)
  - SRD
- Software Architectural Design (5)
  - SAD
  - SIDD (Top-Level)
  - DDD (Top-Level)
  - UDD (Preliminary)
  - TVPL (Soft-Int)
- Software Detailed Design (6)
  - SDD
  - SIDD (Detailed)
  - DDD (Detailed)
  - UDD (Update)
  - TVPL (Soft-Unit)
  - TVPL (Soft-Int-Update)
- Software Coding and Testing (5)
  - Software Unit/Database
  - TVPR (Soft/DB-Unit)
  - TVRR (Soft/DB-Unit)
  - UDD (Update)
  - TVPL (Soft-Int-Update)
- Software Integration (4)
  - SOIP
  - TVRR (Soft-Int)
  - UDD (Update)
  - TVPR (Soft-Qual)
- Software Qualification Testing (4)
  - TVRR (Soft-Qual)
  - UDD (Update)
  - SIAR (Soft-Qual-FCA)
  - SIAR (Soft-Qual-PCA)
- System Integration (2)
  - TVRR (Sys-Int)
  - TVPR (Sys-Qual)
- System Qualification Testing (3)
  - TVRR (Sys-Qual)
  - SIAR (Sys-Qual-FCA)
  - SIAR (Sys-Qual-PCA)
- Software Installation (1)
  - SIP
- Software Acceptance Support (2)
  - TVRR (Soft-Acc)
  - Software Training

# *SRS (1)*

The purpose of the system requirements specification is to specify the requirements for a system or subsystem and the methods to be used to ensure that each requirement has been met

# *SARAD (1)*

The purpose of the system architecture and requirements allocation description is to describe the architectural design of a system or subsystem, including the hardware, software, manual operations, and concept of execution

# *SRD (1)*

The purpose of the software requirements description is to specify the requirements for a software item and the methods to be used to ensure that each requirement has been met

# *SAD (1)*

The purpose of the software architecture description is to describe the software item-wide design decisions and the software item architectural design, including concept of execution and resource limitations

## *SIDD (2)*

The purpose of the software interface design description is to describe the interface characteristics of one or more systems, subsystems, hardware items, software items, manual operations, or other system components

## *DDD (2)*

The purpose of the database design description is to describe the design of a database, that is, a collection of related data stored in one or more computerized files in a manner that can be accessed by users or computer programs

## *UDD (5)*

The purpose of the user documentation description is to record the planning and engineering information created during the development process that is of use to the users of the software product or service



## *TVPL (4)*

The purpose of the test or validation plan is to describe plans for testing of software items and software systems, describe the software test environment, identify the tests to be performed, and provide schedules for test activities

# *SDD (1)*

The purpose of the software design description is to describe the design of a software item and provide the detailed design needed to implement the software

## *TVPR (3)*

The purpose of the test or validation procedures is to describe the test preparations, test cases, and test procedures to be used to perform qualification testing of a software item or a software system or subsystem

## *TVRR (6)*

The purpose of the test or validation results report is to provide a record of the qualification testing performed on a software item, a software system or subsystem, or other software-related item

# *SOIP (1)*

The purpose of the software integration plan is to define the test activities, requirements, procedures, responsibilities, data, and schedule necessary to integrate the software units and software components into the software item

## *SIAR (4)*

The purpose of the software integration audit report is to describe the results of an independent audit of qualification testing activities and work products, also known as functional and physical configuration audits

# *SIP (1)*

The purpose of the software installation plan is to describe the information necessary to install a system or component, set initial parameters, and prepare the system or component for operational use

# *IEEE 12207 Software Life Cycle*



*Evaluations (62)*



# *IEEE 12207—Evaluations (62)*

- System Requirements Analysis (2)
  - SRS Walkthrough/Inspection
- System Architectural Design (2)
  - SARAD Walkthrough/Inspection
- Software Requirements Analysis (2)
  - SRD Walkthrough/Inspection
- Software Architectural Design (10)
  - SAD Walkthrough/Inspection
  - SIDD (Top-Level) Walkthrough/Inspection
  - DDD (Top-Level) Walkthrough/Inspection
  - UDD (Preliminary) Walkthrough/Inspection
  - TVPL (Soft-Int) Walkthrough/Inspection
- Software Detailed Design (12)
  - SDD Walkthrough/Inspection
  - SIDD (Detailed) Walkthrough/Inspection
  - DDD (Detailed) Walkthrough/Inspection
  - UDD (Update) Walkthrough/Inspection
  - TVPL (Soft-Unit) Walkthrough/Inspection
  - TVPL (Soft-Int-Update) Walkthrough/Inspection
- Software Coding and Testing/Inspection (10)
  - Software Unit/Database Walkthrough/Inspection
  - TVPR (Soft/DB-Unit) Walkthrough/Inspection
- Software Coding and Testing /Inspection (cont'd)
  - TVRR (Soft/DB-Unit) Walkthrough/Inspection
  - UDD (Update) Walkthrough/Inspection
  - TVPL (Soft-Int-Update) Walkthrough/Inspection
- Software Integration (8)
  - SOIP Walkthrough/Inspection
  - TVRR (Soft-Int) Walkthrough/Inspection
  - UDD (Update) Walkthrough/Inspection
  - TVPR (Soft-Qual) Walkthrough/Inspection
- Software Qualification Testing (4)
  - TVRR (Soft-Qual) Walkthrough/Inspection
  - UDD (Update) Walkthrough/Inspection
- System Integration (4)
  - TVRR (Sys-Int) Walkthrough/Inspection
  - TVPR (Sys-Qual) Walkthrough/Inspection
- System Qualification Testing (2)
  - TVRR (Sys-Qual) Walkthrough/Inspection
- Software Installation (2)
  - SIP Walkthrough/Inspection
- Software Acceptance Support (4)
  - TVRR (Soft-Acc) Walkthrough/Inspection
  - Software Training Walkthrough/Inspection

# *Walkthrough (31)*

Walkthroughs are unstructured meetings held by software managers to publicize design and implementation concepts, without obligation to use any feedback, alternative ideas, or suggested changes resulting from the meeting

# *Inspection (31)*

Inspections are structured and neutrally facilitated meetings for technical peers to identify defects in software work products which must be corrected, without suggesting solutions or interference from the originator of the work product

# *IEEE 12207 Software Life Cycle*



*Records (17)*

# *IEEE 12207—Records (17)*



- System Requirements Analysis (1)
  - SYRER
- System Architectural Design (1)
  - SYAER
- Software Requirements Analysis (1)
  - SORER
- Software Architectural Design (1)
  - SOAER
- Software Detailed Design (1)
  - DDER
- Software Coding and Testing/Inspection (3)
  - EOCR
  - SCTRER
  - SCR
- Software Integration (1)
  - SIER
- Software Qualification Testing (2)
  - DER
  - SCR
- System Integration (1)
  - SQTER
- System Qualification Testing (3)
  - SCR
  - SER
  - SQTARR
- Software Installation (1)
  - SIRR
- Software Acceptance Support (1)
  - SCR

# *SYRER*

The purpose of the system requirements evaluation record is to provide a record of the evaluation performed on the results of the system requirements analysis activities, namely, the system requirements specification

# *SYAER*

The purpose of the system architecture evaluation record is to provide a record of the evaluation performed on the system architectural design activity results and the system architecture and requirements allocation description

# *SORER*

The purpose of the software requirements evaluation record is to provide a record of the evaluation performed on the results of the software requirements analysis activities, namely, the software requirements description



# *SOAER*

The purpose of the software architecture evaluation record is to document evaluations of software architectural design activities, and database design, software architecture, and software interface design descriptions

# *DDER*

The purpose of the detailed design evaluation record is to document evaluations of software detailed design activities, and database design, software design, and software interface design descriptions

# *EOCR*

The purpose of the executable object code record is to document the results of compiling the software source code into a form that is directly usable by the central processing unit of the target computer

# *SCTREER*

The purpose of the software code and test results evaluation record is to provide a record of the evaluation performed on the results of the software coding and testing activities, namely the software source code and the test or validation results report

The purpose of the source code record is to provide all software instructions developed in order to implement the design of a software item, and provide any instructions for generating the object code from the source code and for linking and loading data

The purpose of the software integration evaluation record is to provide a record of the evaluation performed on the results of the software integration activities, software integration plan, and the test or validation results report

The purpose of the documentation evaluation record is to document the evaluation performed on the results of the software qualification testing activities, software integration audit report, and test or validation results report

# *SQTER*

The purpose of the system qualification test evaluation record is to provide a record of the evaluation performed on the results of the system integration activities



The purpose of the system evaluation record is to provide a record of the evaluation performed on the results of the system qualification testing activities

# *SQTARR*

The purpose of the system qualification test audit results record is to provide a record of the audits performed on the results of the system qualification testing activities


The purpose of the software installation results record is to provide a record of the evaluation performed on the results of the software installation activities

# *IEEE 12207 Software Life Cycle*



*Audits (4)*

# *IEEE 12207—Audits (4)*



- Software Functional Configuration Audit
- Software Physical Configuration Audit
- System Functional Configuration Audit
- Software Physical Configuration Audit

## *FCA (2)*

An audit conducted to verify that the development of a HWCI or CSCI has been completed satisfactorily, the HWCI or CSCI has achieved its performance and functional characteristics, and that the operational and support documents are complete

## *PCA (2)*

An audit conducted to verify that a hardware or computer software configuration item, as built, conforms to the technical documentation that defines it


# *IEEE 12207 Software Life Cycle*



*Reviews*



# *IEEE 12207—Reviews (9)*



- System Requirements Review
- System Design Review
- Software Specification Review
- Preliminary Design Review
- Critical Design Review
- Software Test Readiness Review
- Software Formal Qualification Review
- System Test Readiness Review
- System Formal Qualification Review

The objective of the system requirements review is to ascertain the adequacy of the contractor's efforts in defining system requirements

The system design review shall be conducted to evaluate the optimization, correlation, completeness, and risks associated with the allocated technical requirements

The software specification review is an analysis of the finalized CSCI requirements and operational concept, conducted when CSCI requirements have been sufficiently defined to evaluate the contractor's responsiveness

The preliminary design review shall be conducted for each HWCI or CSCI or aggregate of CIs to evaluate the progress, technical adequacy, and risk resolution (on a technical, cost, and schedule basis) of the selected design approach

The critical design review shall be conducted for each HWCI or CSCI when the detailed design is complete, for the purpose of determining that the detailed design satisfies its performance and engineering specialty requirements

The test readiness review shall be conducted for each HWCI and CSCI to determine whether the test procedures are complete and to assure that the contractor is prepared for formal qualification testing

The formal qualification review is the test, inspection, or analytical process by which a group of HWCIs and CSCIs comprising the system are verified to have met specific contracting agency contractual performance requirements (not an FCA or PCA)



# *IEEE 12207 Software Life Cycle*



*Baselines (9)*

# *IEEE 12207—Baselines (9)*



- Functional Baseline
- Allocated Baseline
- Developmental Configuration
  - Software Architectural Design
  - Software Detailed Design
  - Software Coding and Testing
- Test Baseline (Software Integration)
- Software Product Baseline
- Test Baseline (System Integration)
- System Product Baseline

# *Functional Baseline*

The functional baseline is the approved configuration documentation describing a system's or top level configuration item's performance and the verification required to demonstrate the achievement of those specified characteristics

# *Allocated Baseline*

The allocated baseline is the current approved performance oriented documentation, for a configuration item to be developed, which describes the functional and interface characteristics that are allocated to individual HWCI and CSCIs

# *Developmental Configuration (3)*

The developmental configuration is the software and associated technical documentation that define the evolving configuration of a computer software configuration item during development (between the allocated and product baselines)

## *Test Baseline (2)*

The test baseline is comprised of the HWCIs, CSCIs, and their technical documentation which have been formally prepared, reviewed, and approved for software or system qualification testing, after successful integration testing

## *Product Baseline (2)*

The product baseline is the approved technical documentation, which describes the configuration of a group of HWICs and CSCIs, during the production, fielding/deployment and operational support phases of their life cycle