

Course: Software Configuration Management

Week 8: Software Configuration Status Accounting

Lecturer: Yimer Amedie (MSc.)

Addis Ababa Science and Technology University, Ethiopia

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Contents



SOFTWARE CONFIGURATION MANAGEMENT

- Introduction to Configuration Status Accounting (CSA)
- Status Accounting Process
- Status Information and Status Accounting DB
- Reporting in CSA
- Baselines and CSA Integration
- Summary

Figure 1: Concepts of SCM
(Source: OpenAI, 2025)

Learning Outcomes

After completing this lesson, you will be able to:

- Define CSA and its importance
- Identify sources of status information
- Explain CSA reporting and metrics
- Describe the role of baselines
- Evaluate CSA's impact on project success

What is CSA?

**Configuration
Status
Accounting –
CSA**

- Component of Software Configuration Management
- Records and reports the status of configuration items
- Tracks changes, versions, and approvals
- Provides visibility of project progress
- Supports decision-making with accurate data

Objectives of CSA in Software Engineering

- Ensure transparency of project artifacts
- Support monitoring of changes and versions
- Provide accurate reports to stakeholders
- Enable traceability of software evolution
- Improve decision-making in project management

Importance of CSA in SCM Process

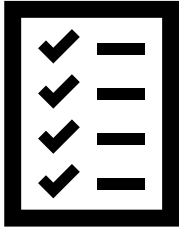
- ❑ SCA plays a central role in the successful implementation of SCM
 - ❖ Ensures reliable project documentation
 - ❖ Reduces risks of miscommunication
 - ❖ Facilitates audits and quality checks
 - ❖ Enhances control over software evolution
 - ❖ Strengthens accountability in project teams

Definition of “Status” in SCM

- Represents **current condition** of configuration items
- Includes version, approval, and change details
- Describes progress of artifacts in development
- Provides historical and current project view
- Basis for reporting and decision-making



Key CSA Activities



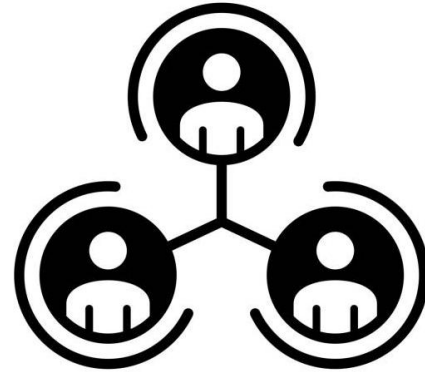
- Collecting data about configuration items
- Recording version histories and changes
- Maintaining approval and authorization records
- Reporting current and past status of items
- Supporting reviews and audits

Role of CSA in Change Management

- Tracks status of change requests
- Records implementation progress
- Ensures changes align with baselines
- Provides visibility of approved and pending changes
- Prevents unauthorized modifications

Stakeholders of CSA

- ❑ Project managers and team leads
- ❑ Developers and testers
- ❑ Configuration managers
- ❑ Quality assurance and auditors
- ❑ Customers and end-users



Benefits of CSA in Large Projects

CSA

- Increases project transparency and control
- Reduces confusion in large teams
- Supports risk management and decision-making
- Improves traceability of changes
- Enhances quality assurance and compliance

Challenges in CSA



- ≠ Managing large volumes of data
- ≠ Ensuring accuracy and timeliness
- ≠ Integrating with diverse tools and systems
- ≠ Overcoming resistance to documentation
- ≠ Balancing detail with usability

Sources of Status Information



Version control systems (e.g., Git, SVN)



Change request and issue trackers

Project management tools



Test management systems (TestRail)



Manual records and documentation

Where does the status information come?

Collecting Configuration Data

□ Tasks

- Identify key configuration items (CIs)
- Establish data collection procedures
- Use automated tools for efficiency
- Verify accuracy of captured information
- Update records regularly

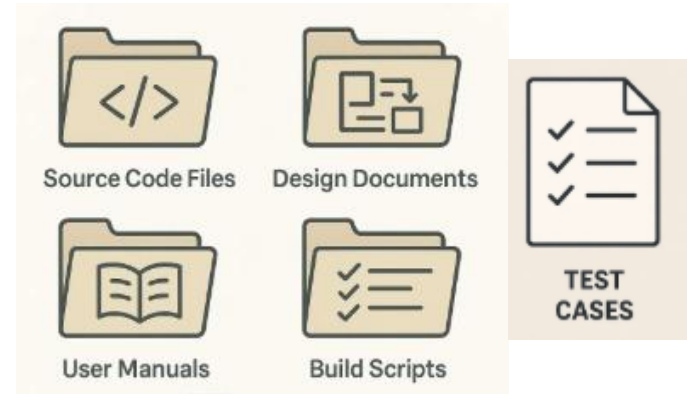


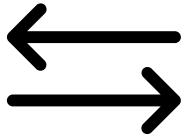
Figure 2: Configuration Items
(Source: OpenAI, 2025)

Status Accounting Database

- Central repository for all CI evolution data during the SDLC
 - Stores key details:
 - CI IDs, dates (design, coding, testing, builds), CRs
 - Supports real-time status tracking of changes and incorporations
 - Provides traceability
 - **Upward** (requirements → unit)
 - **Downward** (unit → requirements)
 - Must be secure, integrated, and automated to reduce manual workload



Recording Changes & Updates

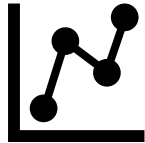
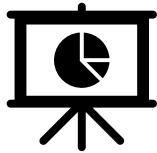


- Document every approved change request
- Capture implementation details
- Maintain version history of configuration items
- Link changes to requirements and issues
- Provide traceability for audits

Information Flow in CSA

- ❑ Status information moves from collection → reporting
 - Status information is collected from various sources
 - Data is aggregated from multiple sources
 - Reviewed for accuracy and completeness
 - Shared with project stakeholders
 - Supports ongoing decision-making

Tools for Status Information



- Version control systems (Git, Mercurial, SVN)
- Issue and change management systems (Jira)
- Continuous integration tools (Jenkins, GitLab CI)
- Reporting and dashboard platforms
- Integrated SCM suites

Status Accounting Reports (Overview)

- ❑ CSA reports provide visibility and traceability
 - **Change Log**
 - Records approved, pending, and rejected changes
 - **Progress Report**
 - Shows project advancement and milestones
 - **CI Status Report**
 - Indicates the lifecycle state of items
 - **Transaction Log**
 - Tracks operations and activities on items

Purpose of CSA Reports



Communicate Status

Communicate the current project status effectively.

Provide evidence of compliance with regulations

Evidence of Compliance



Support Decisions

Support managerial decision-making processes.

Identify potential risks and bottlenecks early.

Identify Risks



Track Progress

Track progress toward project milestones.

Examples of Report Contents

Change Log

Pending CRs, assigned CRs,
sorted by severity/priority

Progress Report

% milestones completed,
schedule variances

CI Status Report

Items in draft, approved,
baselined, or retired states

Transaction Log

Details of who made the change,
when, and what changed

Reports tailored for managers, developers, and auditors

Periodic vs. On-Demand Reporting



Which reporting approach should be used for CSA?

- Periodic reports
 - Issued at regular intervals (weekly/monthly)
 - Progress Reports often periodic, showing milestones and schedule health
- On-demand reports
 - Provides flexibility and responsiveness to immediate inquiries or concerns.
 - Transaction Logs usually generated on-demand for detailed analysis
- Change Logs & CI Status Reports may be considered as both
- Balance ensures routine visibility and flexibility for urgent needs

CSA Metrics in Reporting

- ❑ Metrics are used to transform raw data into actionable insights.
 - Change Log metrics: number of open, approved, or rejected changes
 - Progress metrics: % of milestones achieved, schedule variance
 - CI Status metrics: items in draft, approved, baselined, or retired states
 - Transaction Log metrics: frequency and volume of updates/activities
 - Metrics turn raw data into actionable project insights

Dashboards & Visualization

- **Change Log**
 - bar/line charts of open vs. closed changes
- **Progress Reports**
 - milestone completion and Gantt charts
- **CI Status Reports**
 - pie charts of item states (draft, approved, baselined)
- **Transaction Logs**
 - activity heatmaps or trend graphs



Dashboards provide real-time, visual project insights

Benefits of CSA Reporting

- **Change Logs**
 - improve traceability of modifications
- **Progress Reports**
 - enhance visibility of schedules & milestones
- **CI Status Reports**
 - ensure control over configuration items
- **Transaction Logs**
 - provide accountability for all activities



Status Accounting and Automation

- Automation streamlines CSA and reduces manual effort (Leon, 2015)
 - **Change & Problem Tracking Reports**
 - track changes, CR history, status, assignment, and priorities
 - **Difference Reporting**
 - highlights changes between versions and releases
 - **Ad Hoc Queries**
 - flexible, user-driven reporting with drill-down capabilities
 - **Journals**
 - Comprehensive chronological records providing audit trails and event reconstruction

Why Metrics in CSA?

- Provide quantitative assessment of project progress
- Help monitor effectiveness of configuration management
- Identify trends and patterns in changes
- Support objective decision-making
- Enable continuous improvement

Key CSA Metrics



- Number of change requests submitted and approved
- Average time to process change requests
- Number of active vs. closed defects
- Status of baselines and versions
- Rework rate due to errors or miscommunication

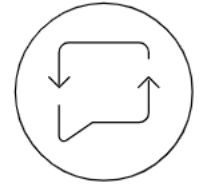
Quantitative vs Qualitative Metrics

- **Quantitative**
 - Measurable, numerical values
 - Number of defects, approval times
- **Qualitative**
 - Descriptive, non-numerical insights
 - Stakeholder satisfaction, process compliance



Quantitative Metrics

Provide objective, measurable data



Qualitative Metrics

Offer subjective insights and feedback

Both needed for balanced assessment

Tracking Progress through Metrics

- Metrics allow project teams to track progress in a systematic and reliable way
 - ✓ Measure progress against baselines
 - ✓ Track resolution of change requests and defects
 - ✓ Monitor adherence to schedules
 - ✓ Compare actual vs. planned effort
 - ✓ Identify early warning signs of issues

Using Metrics for Continuous Improvement

- Identify inefficiencies in processes
- Provide feedback loops for teams
- Support lessons learned sessions
- Benchmark against past projects
- Drive process maturity in organizations



Pitfalls in Metrics Collection

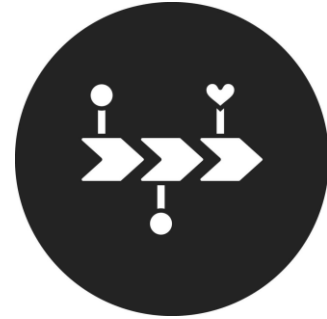


- ≠ Collecting too many irrelevant metrics
- ≠ Misinterpreting data without context
- ≠ Focusing on numbers over insights
- ≠ Poor data quality or inconsistency
- ≠ Using metrics punitively against teams

Baselines & CSA

➤ **Baseline:**

- ❖ Fixed reference points in development
- ❖ Approved set of configuration items
- ❖ Serve as starting point for further changes
- ❖ Provide stability and control
- ❖ Used to measure progress



Baselines & CSA ... (2)

- The relationship
 - CSA records baseline creation and approval
 - Tracks changes against baseline versions
 - Provides reports on baseline status
 - Ensures traceability of modifications
 - Supports audits and compliance reviews

Managing Baselines with CSA

- ❑ The steps:
 - Document baseline contents and identifiers
 - Record approvals by control boards
 - Monitor deviations from baseline
 - Report on baseline status and changes
 - Ensure consistency across project artifacts

Case Example: Baseline in a Software Project

- **Initial baseline:** approved requirements document
- **Allocated baseline:** approved design specifications
- **Developmental baseline:** iterative code versions
- **Product baseline:** final release package

CSA tracks and reports each stage

Knowledge Check – CSA

1. Which metric is NOT typically part of CSA reporting?

- A. Number of open change requests
- B. Status of baselines
- C. Developer's personal productivity score
- D. Configuration item history

2. Which of the following is a primary source of status information in CSA?

- A. Social media updates
- B. Version control systems
- C. End-user manuals
- D. Marketing reports

Knowledge Check – CSA ... (2)

1. Define Configuration Status Accounting in one sentence.

CSA is the process of recording, tracking, and reporting the status of configuration items and changes throughout the software lifecycle.

2. List two benefits of CSA for project management.

Provides transparency and accountability
Supports better decision-making with accurate project data.

3. Why is traceability important in CSA?

It ensures that every change can be linked back to its source (requirement, issue, or request), supporting audits, compliance, and accountability.

4. Give one example of a CSA metric.

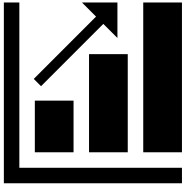
Number of open vs. closed change requests.

Summary

- CSA ensures transparency in SCM
- Status accounting records and tracks changes
- Status information comes from multiple tools
- Reporting provides visibility to stakeholders
- Baselines anchor progress and control

References

1. Leon, A. (2015). Software Configuration Management Handbook (3rd ed.). Norwood: Artechhouse. Retrieved September 4, 2025.
2. OpenAI. (2025, September 4). SCM history and concepts [AI-generated image]. ChatGPT (Sora). <https://chat.openai.com/>
3. OpenAI. (2025, October 13). List of Configuration Items [AI-generated image]. ChatGPT (Sora). <https://chat.openai.com/>

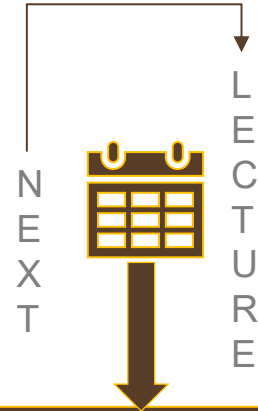


Thank You!

SOFTWARE CONFIGURATION MANAGEMENT



Figure 3: Concepts of SCM (Source: OpenAI, 2025)



Software Configuration Control