Measurement Information Specification
Design Progress
Version 1.0

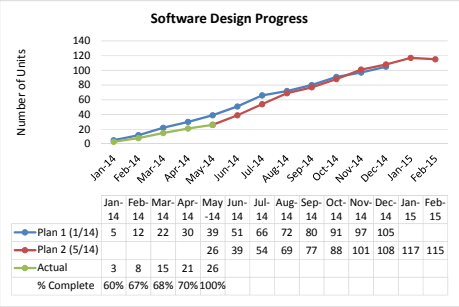
Information Need Description	
Information Need	Evaluate the status of the software design activity and see whether design activities are being completed as scheduled.
Information Category	Schedule and Progress

Measurable Concept	
Measurable Concept	Work Unit Progress

Entities and Attributes	
Relevant Entities	1. Design unit schedule 2. Configuration management records of completed and approved design units
Attributes	1. Planned design units 2. Status of design units

Base Measure Specification	
Base Measures	1. Design units planned for each period 2. Design units that have completed design
Measurement Methods	1. Count the cumulative number of design units planned to be completed to date. 2. Count the number of approved design units under configuration management.
Type of Method	1. Objective 2. Objective
Scale	1. Integers from zero to infinity 2. Integers from zero to infinity
Type of Scale	1. Ratio 2. Ratio
Unit of Measurement	1. Design unit 2. Design unit

Derived Measure Specification	
Derived Measure	Percent of design units completed
Measurement Function	Divide the design units that have completed design by the design units planned for each period and multiply by 100

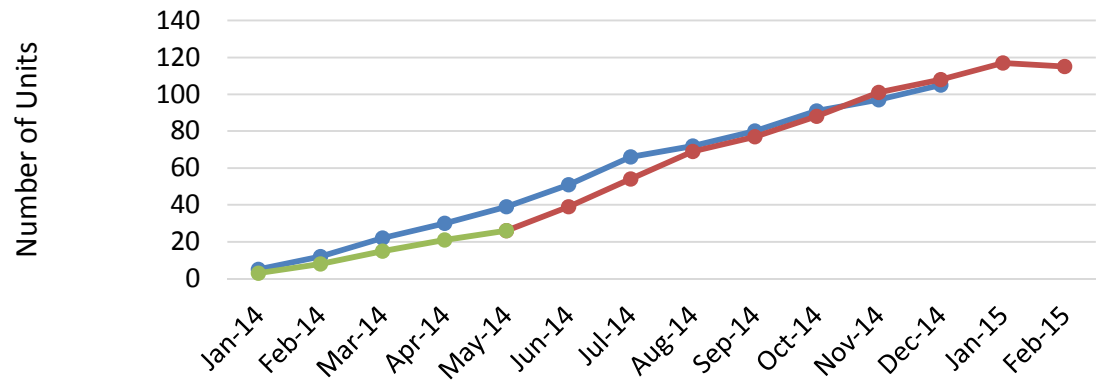
Indicator Specification	
Indicator Description and Sample	Design Completion - graph the two base measures (planned design units complete, actual units complete) over time, plus include a data table with the derived measure (percent complete).  Jan-14 Feb-14 Mar-14 Apr-14 May-14 Jun-14 Jul-14 Aug-14 Sep-14 Oct-14 Nov-14 Dec-14 Jan-15 Feb-15 Plan 1 (1/14) 5 12 22 30 39 51 66 72 80 91 97 105 Plan 2 (5/14) 26 39 54 69 77 88 101 108 117 115 Actual 3 8 15 21 26 % Complete 60% 67% 68% 70% 100%
Analysis Model	Plot plan and actual design completion over time. The two lines should be very close together, and the derived measure, percent complete, should stay close to 100%.
Decision Criteria	A design completion result of 90% or less, or a percentage complete that declines during three consecutive periods, should be further investigated and a replan may be required.
Indicator Interpretation (sample chart)	This indicator tells the project manager that design progress has been behind the original plan each of the last four months. While corrective actions were taken during each of the four prior months, based on the established decision criteria for the indicator, they did not solve the problem. So, in May, a replan of the overall design activity was conducted (Plan 2) and this information was added to the chart. The replan resulted in extending the schedule for design by two months.

Data Collection Procedure (For Each Base Measure)	
Frequency of Data Collection	1. Once from initial plan and updated whenever a revision to the design unit completion plan occurs. 2. Bi-weekly
Responsible Individual	1. Software Manager provides plans; measurement analyst validates data 2. Measurement analyst collects data from CM representative
Phase or Activity in which Collected	1. Design phase only 2. Design phase only
Tools Used in Data Collection	1. Excel (planning data) 2. CM system (actual data)
Verification and Validation	1. Total number of units compared to Software Development Folders (SDFs) to ensure total is correct. Slope of curve is reviewed to ensure it is achievable. Start and end dates are compared to Master Schedule to ensure compatibility. 2. Total number of units compared to SDFs to ensure total is correct. Actuals are compared to periodic QA spot-checks to ensure units are complete.
Repository for Collected Data	1. PSM Insight 2. PSM Insight

Data Analysis Procedure (For Each Indicator)	
Frequency of Data Reporting	Bi-weekly
Responsible Individual	Measurement analyst

Phase or Activity in which Analyzed	Design phase only
Source of Data for Analysis	PSM Insight
Tools Used in Analysis	Straight line trend lines may be used to estimate completion
Review, Report, or User	Bi-weekly software IPT meeting

Additional Information	
Additional Analysis Guidance	As part of the feasibility analysis process, the rate of planned progress should be reviewed to ensure it is reasonable and not unusually steep. In addition, the plan should be checked to ensure it reflects the total number of units estimated for the system. During performance analysis, in addition to using the decision criteria, any major changes in the rate of actual progress should be investigated for the root cause. Once an actual trend line is established, it is difficult to modify the rate of completion unless a corrective action is applied or the process is altered. Also, a more detailed analysis is often required when actual progress lags behind planned progress. For example, analyzing progress by subsystem may help identify which components are most behind schedule. Staffing levels, experience levels, changes in scope, and quality problems may all be contributors to lack of progress and should be investigated. This is easier to collect if a disciplined process is in place, with documented entrance or exit criteria. For example, a project might require a design walkthrough to occur prior to turnover of the design to configuration management. This helps ensure that all units are completed using similar criteria and reduces rework. Similar measures are often used for other phases (e.g. Code Progress, Test Progress).
Implementation Considerations	Work unit progress measures are typically collected and reported only for a specified project time period, i.e., during the time that the design is being developed. Reporting should be at least monthly and possibly weekly for smaller, shorter projects and where data is available weekly. The "owners" of the work units being measured (e.g., the designers) are usually responsible for data delivery. Unit completeness measures are only as good as the criteria used to determine whether a unit is complete. The aggregation structure used is typically "component." For large systems with many hundreds of units, indicators should be able to show which areas of the system are having trouble with completion as well as whether the system as a whole is on track.



	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15
Plan 1 (1/14)	5	12	22	30	39	51	66	72	80	91	97	105		
Plan 2 (5/14)					26	39	54	69	77	88	101	108	117	115
Actual	3	8	15	21	26									
% Complete	60%	67%	68%	70%	100%									