

Supporting Project Management Professionals

A Construx White Paper

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Construx
Delivering Software Project Success

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Executive Summary

This paper describes Construx products and services that can be used to support a software development project based on the Project Management Institute's Guide to the Project Management Body of Knowledge. The Project Management Body of Knowledge (PMBOK) describes in detail the project management processes that apply to most projects, most of the time. The PMI has intentionally left the details of product-oriented processes to the discretion of individual project managers. The PMI states that product-oriented processes are typically defined by project lifecycles and vary by application area.

Construx services complement and extend the PMI's support for project management professionals to projects in the software industry. Construx's services define project management practices in terms commonly used within the software industry, and they support software industry-specific processes and practices. Construx's support includes pre-built document templates, checklists, standards, process flows, and other materials as well as customized professional development seminars, consulting, and outsource project services.

Overview

The Project Management Institute's Guide to the Project Management Body of Knowledge (PMBOK)¹ describes projects in terms of their component processes and their interactions. A process, a series of actions to bring about a result, generally falls into one of two major categories:

- *Project management processes* describe, organize, and complete the work of a project. Examples of artifacts created as a result of project management processes include the project charter, project plan, estimates, schedule, quality assurance plan, configuration management plan, and so on.
- *Product-oriented processes* specify and create a project's product. Examples of artifacts created as a result of product-oriented processes include the working software, source libraries, user manuals, installation utilities, requirements specifications, and so on.

In the PMBOK, the Project Management Institute (PMI) describes in detail the project management processes that apply to most projects, most of the time. PMI does not offer details on product-oriented processes. Instead, it states that product-oriented processes are typically defined by the project lifecycle and vary by application area.²

The following sections describe how Construx's services extend the PMBOK by:

- Defining project management practices in terms commonly used within the software industry, and
- Providing industry-specific (product-oriented) processes and practices.

¹ Project Management Institute, *A Guide the Project Management Body of Knowledge (PMBOK) 2000 Edition*, Newtown Square, PA: Project Management Institute, 2000. More information available at: www.pmi.org.

² PMBOK, pg 29-30

Supporting the Project Management Professional

While PMI's project management practices are generally applicable, the practices (e.g. tools, techniques, and domain expertise) behind the processes are substantially different in different application areas (e.g. the practices used to estimate a cost of a bridge are different than those used to estimate a software project).

Construx's approach to software project management is synthesized from industry sources including Construx's experience in consulting, training, and software projects; Steve McConnell's books and articles; IEEE software engineering standards; and the Software Engineering Body of Knowledge (SWEBOK).³

Common Knowledge Base

Significant commonality exists between PMI's project management practices and Construx's approach. Construx's services are organized using the organization of the SWEBOK knowledge areas. The SWEBOK acknowledges the many ways in which managing a software project is similar to managing complex projects in general. It recognizes PMI's extensive support to this area and cross-references the PMBOK.⁴

³ IEEE, *A Guide the Software Engineering Body of Knowledge (Trial Version 0.95)*, IEEE Computer Society Press, 2002, Available at: www.swebok.org.

⁴ SWEBOK, p. 8-2.

The following table maps the PMI Knowledge Areas onto applicable Construx knowledge areas.⁵

Mapping PMI Knowledge Areas onto Construx Knowledge Areas

Construx Knowledge Area	PMI Knowledge Area								
	Integration Management	Scope Management	Time Management	Cost Management	Quality Management	Human Resource Management	Communications Management	Risk Management	Procurement Management
Software Configuration Management	X	X							
Software Construction									
Software Design									
Software Engineering Management	X	X	X	X		X	X	X	X
Software Engineering Process					X				X
Software Engineering Tools and Methods									
Software Maintenance									
Software Quality					X				
Software Requirements		X							
Software Testing					X				

⁵ See Appendix A for a description of the PMI and Construx Knowledge Areas.

Software-Specific Materials



In addition to defining a project's tasks, the project management professional is often responsible for creating project management documents and other materials from scratch. Construx's CxOne is a full lifecycle software engineering process framework that provides many of the materials a project management professional needs. The core of CxOne is a toolbox of templates, checklists, patterns, and other materials⁶ designed to support the creation of real-world project and product artifacts. With its pragmatic focus on producing core artifacts, CxOne remains firmly grounded and supports the software team's real-world challenges.

CxOne provides project management professionals a foundation and set of building blocks that allows them to focus on defining the tasks needed to achieve project goals. The following table lists CxOne Materials that are produced by PMI's project management process.

CxOne Project Management Material

PMI Process Group ⁷	Example CxOne Material
Initiating Processes	Project Charter
Planning Processes	Project Management Standard Project Plan, Configuration Management Template, Quality Assurance Plan Template Estimate, Work Breakdown Structure, and Schedule Checklists Outsourcing Best Practices and Checklists
Executing Processes	Change Request Templates, Defect Patterns Project Roles Checklist, Staff Technical Development Guides Executive and Detail Status Report Templates Review, Inspection, and Testing Process Standards

⁶ See Appendix A for a list of the material types included in the CxOne toolbox.

⁷ See Appendix A for a description of the PMI Process Groups.

PMI Process Group ⁷	Example CxOne Material
Controlling Processes	Change Control Board Best Practices Top Ten Risks List Time Tracking Best Practices, Weekly Planning Best Practices, Earned Value Measurement Best Practices Review Metrics Guides and Best Practices
Closing Processes	Release Checklists, Signoff Pattern Project Assessment Templates and Checklists Project History Log and Checklists, Project Post Mortems

The following table provides additional examples of CxOne Materials that are produced by the team's product-oriented software processes.

CxOne Software-Specific, Product-Oriented Material

Construx Knowledge Area	Example CxOne Material
Software Construction	Construction Standards and Checklists Technology Specific Code Templates Construction Best Practices
Software Design	Design Standards, Guidance, and Templates Checklists for Architectures, Design Strategies, and User Interface Design
Software Engineering Tools and Methods	Technology Evaluation Templates and Checklists Engineering Tools and Methods Standards
Software Maintenance	Maintenance Plan Standards and Checklists Installation Checklists Deployment Plan Checklists

Professional Development Seminars



Construx is a recognized provider with the PMI Registered Educational Provider Program (PMI R.E.P.). Construx accepts and adheres to all PMI R.E.P. Program policies, requirements and rules concerning the provision of professional education activities and materials. Attendees receive Professional Development Units (PDUs) for completing each PMI Registered course.

The following table lists the PMI Knowledge Areas covered by selected Construx Seminars.⁸

PMI Knowledge Areas covered by Construx Seminars

Construx Seminars	PMI Knowledge Area									
	PDUs	Integration Management	Scope Management	Time Management	Cost Management	Quality Management	Human Resource Management	Communications Management	Risk Management	Procurement Management
Software Project Survival: In-depth Workshop	12	x	x	x	x	x	x	x	x	
Software Project Survival for Business Leaders		x	x	x	x	x	x	x	x	
Rapid Development: Accelerating Time to Market	12	x	x	x	x	x	x		x	
Software Estimation	12		x	x	x					

⁸ A complete list of Construx seminars, descriptions, and scheduling information is available at Construx's web site at: www.construx.com.

PMI Knowledge Area										
Construx Seminars	PDU's	Integration Management	Scope Management	Time Management	Cost Management	Quality Management	Human Resource Management	Communications Management	Risk Management	Procurement Management
Effective Software Project Management	12	x	x	x	x	x	x	x	x	
Success Through Risk Management	12								x	
Keys to Successful Project Outsourcing	12		x	x	x			x	x	x
Real World Requirements	4		x							
Object-Oriented Requirements Analysis & Design Using the UML	4		x							
Real World Testing						x				
Peer Reviews for Higher Quality and Productivity	4					x				
Black-Box Testing Fundamentals	1					x				

Project Services

The following table lists Construx's consulting and project services that project management professionals can use to help a team meet project objectives.⁹

Construx Service Offerings for PMI Processes

PMI Process Group	Sample Construx Service
Initiating Processes	Project Charters/Project Vision Statement Help project management professionals develop a project charter and vision statement that is a precise, publicly agreed upon definition of a project's success criteria.
Planning Processes	Project Planning Outline an efficient and effective plan that accomplishes the project management professional's organizational goals and objectives. Methodology Recommendation Recommend specific software best practices that best meet the organization's culture and business goals. Project Estimates Work with the project management professional and the project team to develop estimates of a project's scope, cost/effort, schedule, and quality. Requirements Workshops Facilitate working sessions to rapidly achieve consensus on critical project requirements.

⁹ More information on Construx's offerings is available at Construx's web site at: www.construx.com.

PMI Process Group	Sample Construx Service
	Risk Assessment/Management Assist with the identification, analysis (qualitative and quantitative), and prioritization of project risks. Develop specific action plans to help reduce or eliminate significant risks.
Executing Processes	Outsourced Contract Management Manage subcontractors and ensure the outsourced project runs smoothly. Project Recovery Determine corrective actions to put a failing project back on track. Software Project Solutions Deliver complex software with less risk than many in-house projects by using Construx management and technical personnel.
Controlling Processes	Planning Checkpoint Review Hold mid-project reviews to help the project management professional to determine whether to continue a project without change, make mid-course corrections, or cancel the project so that resources can be invested elsewhere. Project Recovery Determine corrective actions to put a failing project back on track.
Closing Processes	Post-Mortem/Lessons Learned Help determine the most effective approaches to software improvements by identifying effective and ineffective approaches on completed projects.

PMI Process Group	Sample Construx Service
General	<p>Coaching/Mentoring Apply one-on-one or team consulting on day-to-day issues to support the project management professional and the project team.</p> <p>Project Assessment Identify a project's strengths and weaknesses and provide recommendations to improve predictability, efficiency, quality, and other project or product characteristics.</p> <p>Technical Assessment Help the project management professional make an informed decision about a specific technical aspect of a software development project (e.g. whether to buy or build, rewrite or extend a legacy code base, and so on.)</p> <p>Training Needs Assessment Recommend a training plan to make the project management professional and the project team more efficient and effective.</p> <p>Professional Development Ladder Define a professional development ladder designed to meet the organization's specific needs.</p>

Conclusion

The Project Management Institute's PMBOK provides a detailed framework for project management processes that is applicable to most projects. The PMBOK intentionally leaves product-oriented details to be defined by the specific professional project manager. Construx's CxOne materials and software engineering services support the professional software project manager by filling in the spaces for software projects that the PMBOK leaves blank. Construx's products and services complement and extend the PMBOK by defining project management practices in terms commonly used by software teams and by providing software-specific processes and practices. Construx's products and services include pre-built document templates, checklists, standards, process flows, and other materials as well as customized professional development seminars, consulting, and out-source project capabilities.

Appendix A: Terms

Description of PMI Knowledge Areas

The Project Management Institute describes project management knowledge and practice in terms of their component processes. It has organized the project management processes into the following nine knowledge areas.¹⁰

Description of PMI Knowledge Areas

Knowledge Area	Description
Project Integration Management	Processes required to ensure that the various elements of a project are properly coordinated. It involves making trade-offs among competing objectives and alternatives to meet or exceed stakeholder needs and expectations.
Project Scope Management	Processes required to ensure that a project includes all the work required, and only the work required, to complete the project successfully. It is primarily concerned with defining and controlling what is or is not included in the project
Project Time Management	Processes required to ensure timely completion of a project.
Project Cost Management	Processes required to ensure that a project is completed within the approved budget.
Project Quality Management	Processes required to ensure that a project satisfies the needs for which it was undertaken. Project quality management includes all activities of the overall management function that determine the quality policy, objectives, and responsibilities.
Human Resource Management	Processes required to make the most effective use of the people involved with a project.
Project Communications Management	Processes required to ensure timely and appropriate generation, collection, dissemination, storage, and ultimate disposition of project information.

¹⁰ PMBOK, pp. 6 – 7.

Knowledge Area	Description
Project Risk Management	Processes used to identify, analyze, and respond to project risk. Project risk management includes maximizing the probability and consequences of positive events and minimizing the probability and consequences of events adverse to project objectives
Project Procurement Management	Processes required to acquire goods and services, to attain project scope, from outside the performing organization.

Description of PMI Process Groups

The Project Management Institute has further organized project management processes into the following five process groups, which run across knowledge areas.¹¹

Description of PMI Process Groups

PMI Process Group	Description
Initiating Processes	Processes that recognize when a project or phase should begin and establish the commitment to do so.
Planning Processes	Process that devise and maintain a workable scheme to accomplish the business need that the project was undertaken to address.
Executing Processes	Processes that coordinate people and other resources to carry out a project's plans.
Controlling Processes	Processes that ensure that project objectives are met by monitoring and measuring progress and taking corrective action when necessary.
Closing Processes	Processes that formalize acceptance of the project or phase and bring it to an orderly end.

Description of Construx Knowledge Areas

Construx Knowledge Areas are based on the SWEBOK knowledge areas. The following table describes Construx's knowledge areas:

¹¹ PMBOK, p. 30.

Description of Construx Knowledge Areas

Construx Knowledge Area	Description
Software Configuration Management	Identifying the configuration of a system at distinct points in time for the purpose of systematically controlling changes to the configuration and maintaining the integrity and traceability of the configuration throughout the system life cycle.
Software Construction	Covers the creation of software according to a specified design
Software Design	Defines the structure and dynamic state of the system at many levels of abstraction and through many views. Includes systems design, architecture, decomposition, data design, interface definition, processing models, algorithms for modules, user interface design, physical design, and so on.
Software Engineering Management	Covers all aspects of management ranging from business and personnel management issues (organizational management) to project management issues. This area is broken into three major sub-practices: Project management, Organizational management, and External management.
Software Engineering Tools and Methods	Covers the use of tools, technology, methodologies, and techniques for software engineering.
Software Engineering Process	Activities related to measuring and improving software development quality, timeliness, efficiency, productivity, and other project and product characteristics.
Software Maintenance	Activities related to system installation, deployment, migration, and operation. Includes activities associated with evolution and maintenance of already-deployed systems—revision and enhancement of existing software, related documentation, and tests.
Software Quality	Activities performed on static work products that are associated with providing confidence that a software item conforms or will conform to technical requirements. (Activities performed on dynamic work products are covered under testing.) Includes full life cycle quality planning, quality measurement and analysis, technical reviews, audits, and verification and validation.

Construx Knowledge Area	Description
Software Requirements	The discovery, analysis, modeling, and documentation of the functions to be implemented in software. This includes knowledge of how to elicit, specify, control, and communicate requirements.
Software Testing	Activities associated with executing software to detect defects and evaluate features. Testing includes test planning, test case design, automated test support, and specific kinds of tests including development tests, unit tests, component tests, integration tests, system tests, regression tests, stress tests, and acceptance tests.

Types of CxOne Material

The following table list the types of materials included in CxOne.

Types of CxOne Materials	
Material Type	Purpose
Checklists	Define the essential nature of a process, activity, or deliverable
Templates	Simplify artifact development by providing a pre-built starting point
Standards	Define the processes, terminology, and policies for creating artifacts, performing actions, and organizing work.
Guides	Provide detailed support for creating artifacts
Patterns	Capture reusable content in a modular, easy to use fashion
Process Flows	Outline the nominal workflows, lifecycles, and processes used in an organization.
Best Practices	Support the adoption of effective work processes and practices across an organization.
Samples	Simplify the creation of future artifacts by providing examples and reusable content