

Project Risk Management

Identify Risks | Assess Risks | Control Risks

Module Overview

- Lesson 1: Key Concepts & Terms
- Lesson 2: Plan Risk Management
- Lesson 3: Identify Risks
- Lesson 4: Perform Qualitative Risk Analysis
- Lesson 5: Perform Quantitative Risk Analysis
- Lesson 6: Plan Risk Responses
- Lesson 7: Implement Risk Responses
- Lesson 8: Monitor Risks

Lesson 1: Key Concepts & Terms

- Definition of Risk
- Project Risk Types
- Project Risk Management
- Key Terms
- Trends & Emerging Practices
- Tailoring Considerations
- Considerations for Adaptive Environment

Definition of Risk

- **Risk** is effect of uncertainty on objectives, and an effect is a positive or negative deviation from what is expected. [ISO31000]
- **Individual project risk** is uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives. [PMBOK6]
- **Overall project risk** is the effect of uncertainty on the project as a whole, arising from all sources of uncertainty, including individual project risks, representing the exposure of stakeholders to the implications of variations in project outcome, both positive & negative. [PMBOK6]

Project Risk Types

- **Event** risk

Something that has not yet happened & it may not happen at all, but if it does happen then it has an impact on one or more objectives.

- **Variability** risk

Uncertainty exists about some key characteristics of a planned event or activity or decision.

- **Ambiguity** risk

Uncertainty exists about what might happen in the future arising from lack of knowledge or understanding.

- **Emergent** risk

Risks that emerge from our blind-spots arising from limitations in our conceptual frameworks or world-view.
Also known as unknowable-unknowns.

Risk Types Examples

- Event risk
 - A key supplier may go out of business during project.
- Variability risk
 - Unseasonal weather conditions may occur during construction phase.
- Ambiguity risk
 - Inherent systemic complexity in the project
- Emergent
 - (things outside of our current mind set or cognizance).

Project Risk Management

- Project risk management is the process of identifying, evaluating, and planning responses to events, both positive and negative, that might occur throughout the course of a project. [RITA9]
- The objective is to increase probability and/or impact of positive risks and decrease probability and/or impact of negative risks, in order to optimize the chances of project success.

Key Terms

- **Threat:** negative risks
- **Opportunities:** positive risks
- **Uncertainty:** lack of knowledge about an event that reduces confidence in conclusions drawn from the data
- **Risk factors:**
 - Probability: how likely the event will occur
 - Impact: the range of possible outcomes
 - When: expected timing
 - How often: anticipated frequency of risk events

Key Terms (continued)

- **Risk exposure (risk score):** quantifiable loss potential of business; usually calculated by multiplying the probability by its impact
- **Risk appetites (risk tolerance):** the level (description) of risk and individual or group is willing to accept
- **Risk threshold:** specific point at which risk becomes unacceptable
- **Risk averse** refers to someone who does not want to be negatively impacted by the threats. Its opposite is **Risk Prone**.
- **Risk trigger:** events or conditions that indicates that a risk is about to occur

Trends & Emerging Practices

- Non-event risk: variability, ambiguity
- **Project resilience** tackles emergent risks
 - Right level of budget & schedule contingency
 - Flexible project processes
 - Empowered project team
 - Frequent review of early warning sign
 - Clear input from stakeholders in scope & strategy adjustments as emergent risk response
- Integrated risk management
 - Coordinated approach to enterprise-wide risk management

Tailoring Considerations

- Project size
- Project complexity
- Project importance
- Development approach

Considerations for Adaptive Environments

- Adaptive environment incurs more uncertainty & risk
- Addressed by frequent reviews of incremental work products
- Risks are identified, analyzed, & managed during individual iteration

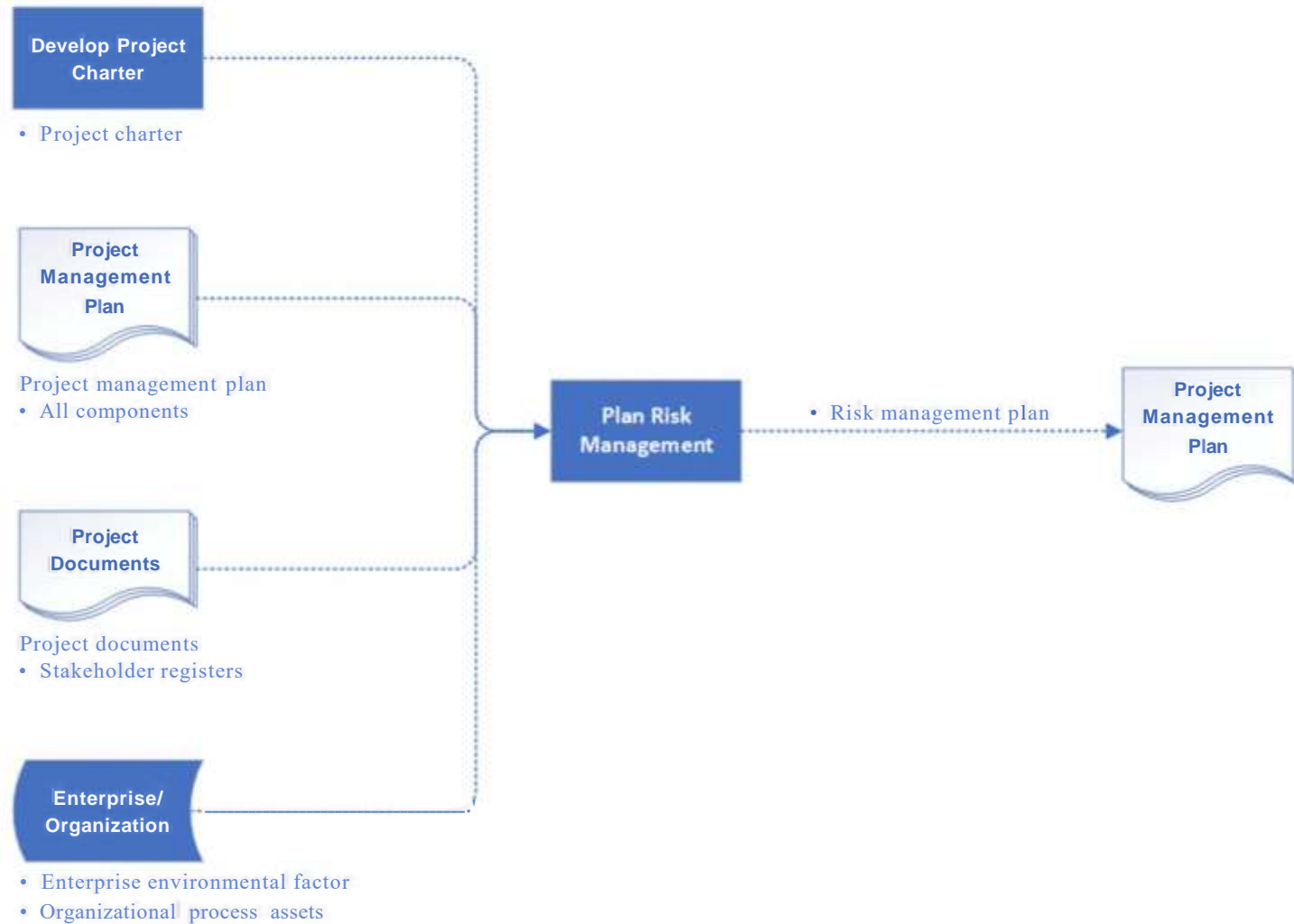
Lesson 2: Plan Risk Management

- Plan Risk Management Overview
- Plan Risk Management Data Flow
- Plan Risk Management Input
- Plan Risk Management Tools & Technique
- Plan Risk Management Output

Plan Risk Management Overview

The process of defining how to conduct risk management on a project.

Plan Risk Management Data Flow



Plan Risk Management Input

- Project charter
- Project management plan
- Project documents
 - Stakeholder register
- Enterprise environmental factors
- Organizational process assets

Plan Risk Management Tools & Techniques

- Expert judgment
- Data analysis
 - Stakeholder risk appetite analysis
- Meetings

Plan Risk Management Output

- Risk management plan
 - Risk strategy
 - Methodology
 - Roles & responsibility
 - Funding
 - Timing
 - Risk categories → Risk Breakdown Structure (RBS)
 - Stakeholder risk appetite
 - Definitions of risk probability and impacts
 - Probability and impact matrix
 - Reporting format
 - Tracking

Risk Categories & Risk Classification

- Risk categories:
 - External
 - Internal
 - Technical
 - Commercial
 - Unforeseeable
- Risk classification:
 - Business risks; risk of a gain or loss
 - Pure (insurable) risks; risk of loss (such as fire, theft, personal injury etc.)

Risk Sources

- Schedule
- Cost
- Quality
- Scope
- Resources
- Customer/stakeholder satisfaction

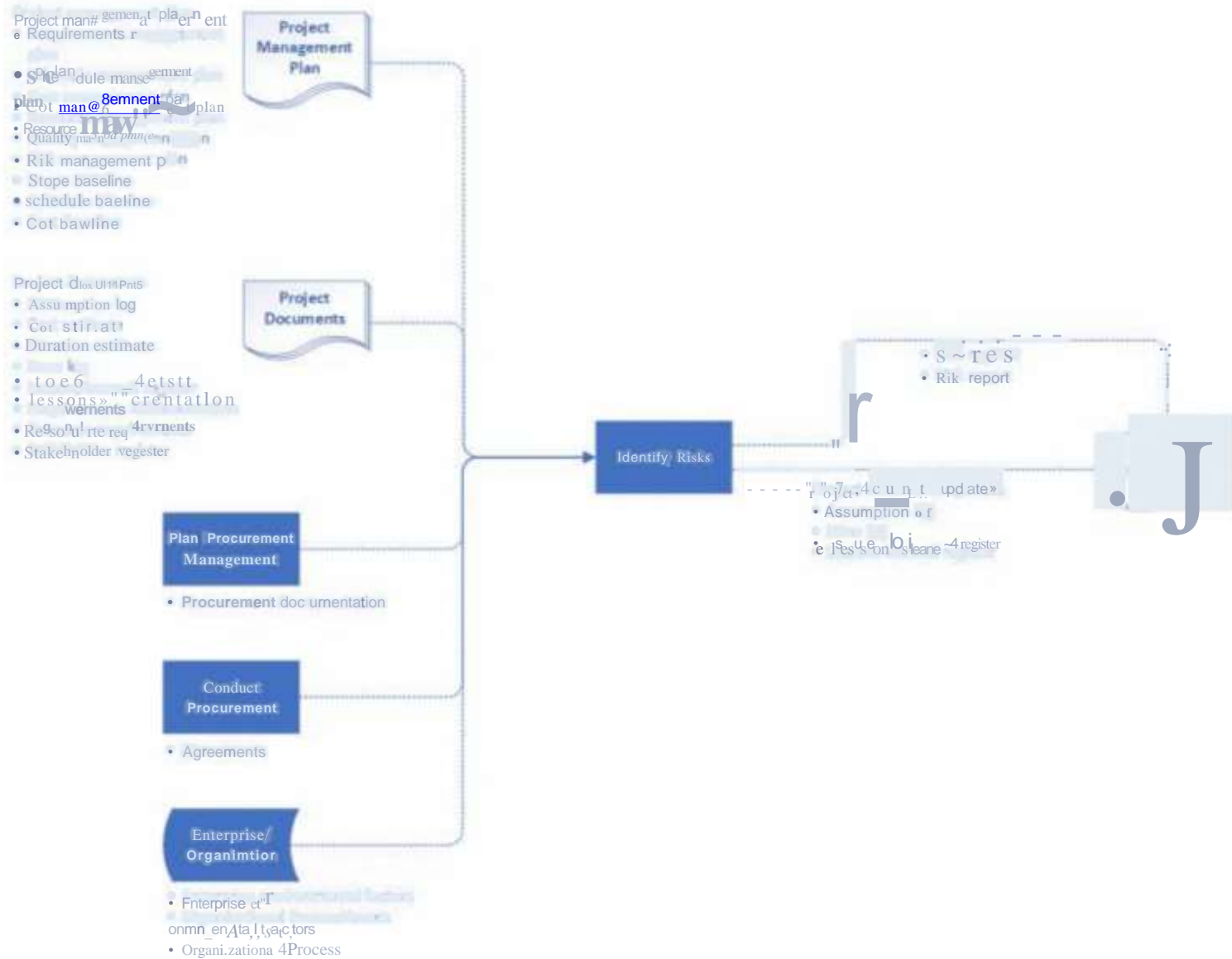
Lesson 3: Identify Risks

- Identify Risks Overview
- Identify Risks Data Flow
- Identify Risks Input
- Identify Risks Tools & Techniques
- Identify Risks Output

Identify Risks Overview

The process of identifying individual project risks as well as sources of overall project risk and documenting their characteristics.

Identify Risks Data Flow



Identify Risks Input

- Project management plan
 - Requirements management plan
 - Schedule management plan
 - Cost management plan
 - Quality management plan
 - Resource management plan
 - Risk management plan
 - Scope baseline
 - Schedule baseline
 - Cost baseline
- Project documents
 - Assumption log
- Cost estimates
- Duration estimates
- Issue log
- Lessons learned register
- Requirements documentation
- Agreements
- Procurement documentation
- Enterprise environmental factors
- Organizational process assets

Identify Risks Tools & Techniques

- Expert judgment
- Data gathering
 - Brainstorming
 - Checklists
 - Interviews
- Data analysis
 - Root cause analysis (RCA)
 - Assumption & constraint analysis
 - SWOT (strength, weakness, opportunity, threat) analysis
- Document analysis
- Interpersonal & team
 - Skill
 - Facilitation
- Prompt lists
- Meetings/ risk workshop

Framework to Identify Sources of Overall Project Risks

- PESTLE (political, economic, social, technological, legal, environment)
- TECOP (technical, environmental, commercial, operational, political)
- VUCA (volatility, uncertainty, complexity, ambiguity)

Identify Risks Output

- Risk register
 - List of identified risks
 - Potential risk owners
 - List of potential risk responses
- Risk report
 - Sources of overall project risk
 - Summary information on individual project risks
- Project documents updates
 - Assumption log
 - Issue log
 - Lessons learned register

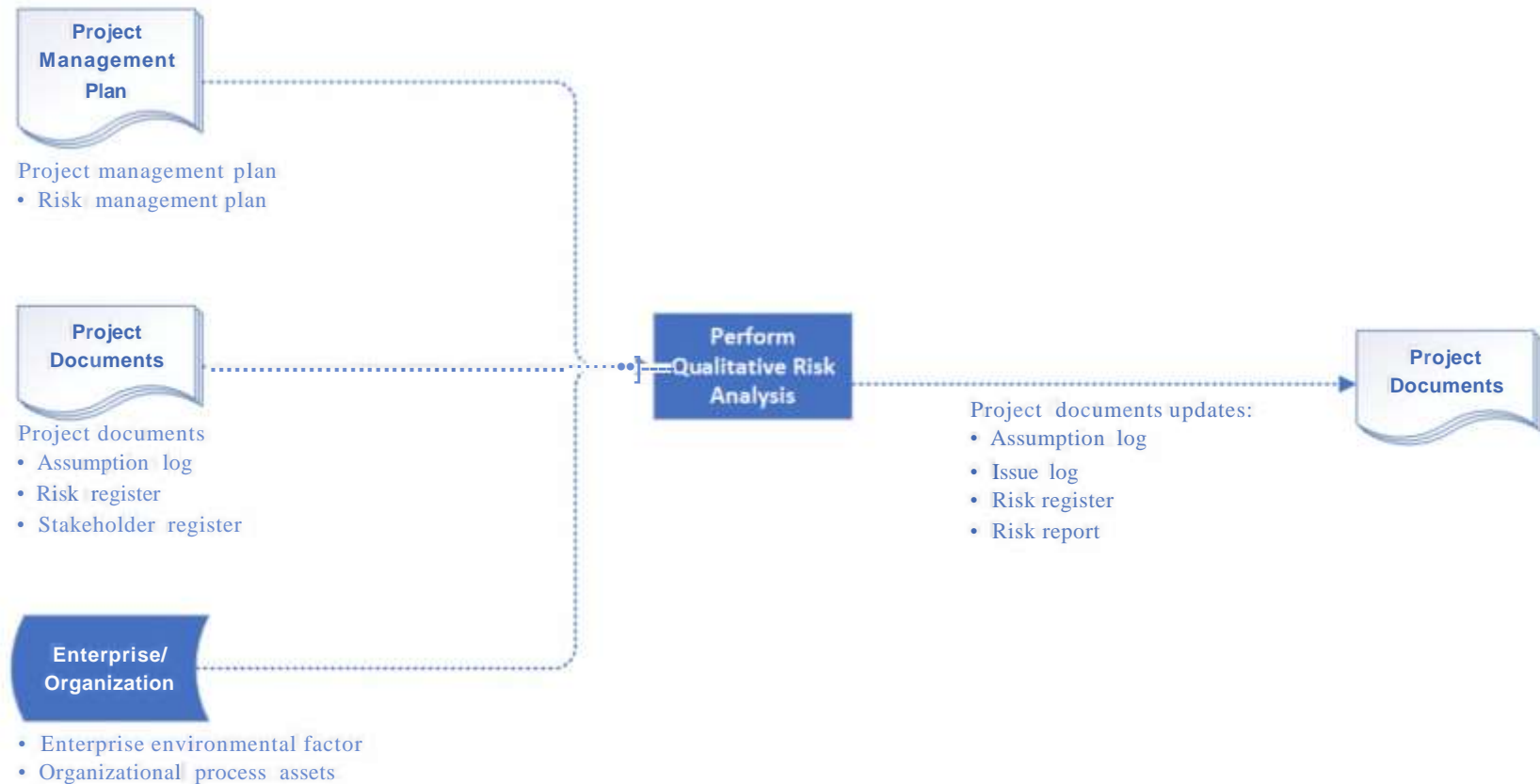
Lesson 4: Perform Qualitative Risk Analysis

- Perform Qualitative Risks Analysis Overview
- Perform Qualitative Risks Analysis Data Flow
- Perform Qualitative Risks Analysis Input
- Perform Qualitative Risks Analysis Tools & Techniques
- Perform Qualitative Risks Analysis Output

Perform Qualitative Risk Analysis Overview

The process of prioritizing individual project risks for further analysis or action by assessing their probability of occurrence and impact as well as other characteristics.

Perform Qualitative Risk Analysis Data Flow



Perform Qualitative Risk Analysis Input

- Project management plan
 - Risk management plan
- Project documents
 - Assumption log
 - Risk register
 - Stakeholder register
- Enterprise environmental factors
- Organizational process assets

Perform Qualitative Risk Analysis Tools & Techniques

- Expert judgment
- Data gathering
 - Interviews
- Data analysis
 - Risk data quality assessment
 - Risk probability & impact assessment
 - Assessment of other risk parameters
- Interpersonal & team skills
 - Facilitation
- Risk categorization
- Data representation
 - Probability & impact matrix
 - Hierarchical charts: bubble chart
- Meetings/ risk workshop

Risk Parameters

- **Urgency:** the period of time within which a risk response is to be implemented in order to be effective
- **Proximity:** the period of time before the risk might have an impact
- **Dormancy:** the period of time elapsed after a risk has occurred before its impact is discovered
- **Manageability:** the ease with which risk owner can manage the occurrence or impact of a risk
- **Controllability:** the degree to which risk owner is able to control the risk' outcome
- **Detectability:** the ease with which the result of the risk occurring can be detected

Risk Parameters (continued)

- **Connectivity:** the extent to which a risk is related to other risks
- **Strategic impact:** the potential for the risk to have positive or negative effect on strategic goals
- **Propinquity:** the degree to which a risk is perceived to matter by one or more stakeholders

Perform Qualitative Risk Analysis Output

- Project documents updates
 - Assumption log
 - Issue log
 - Risk register

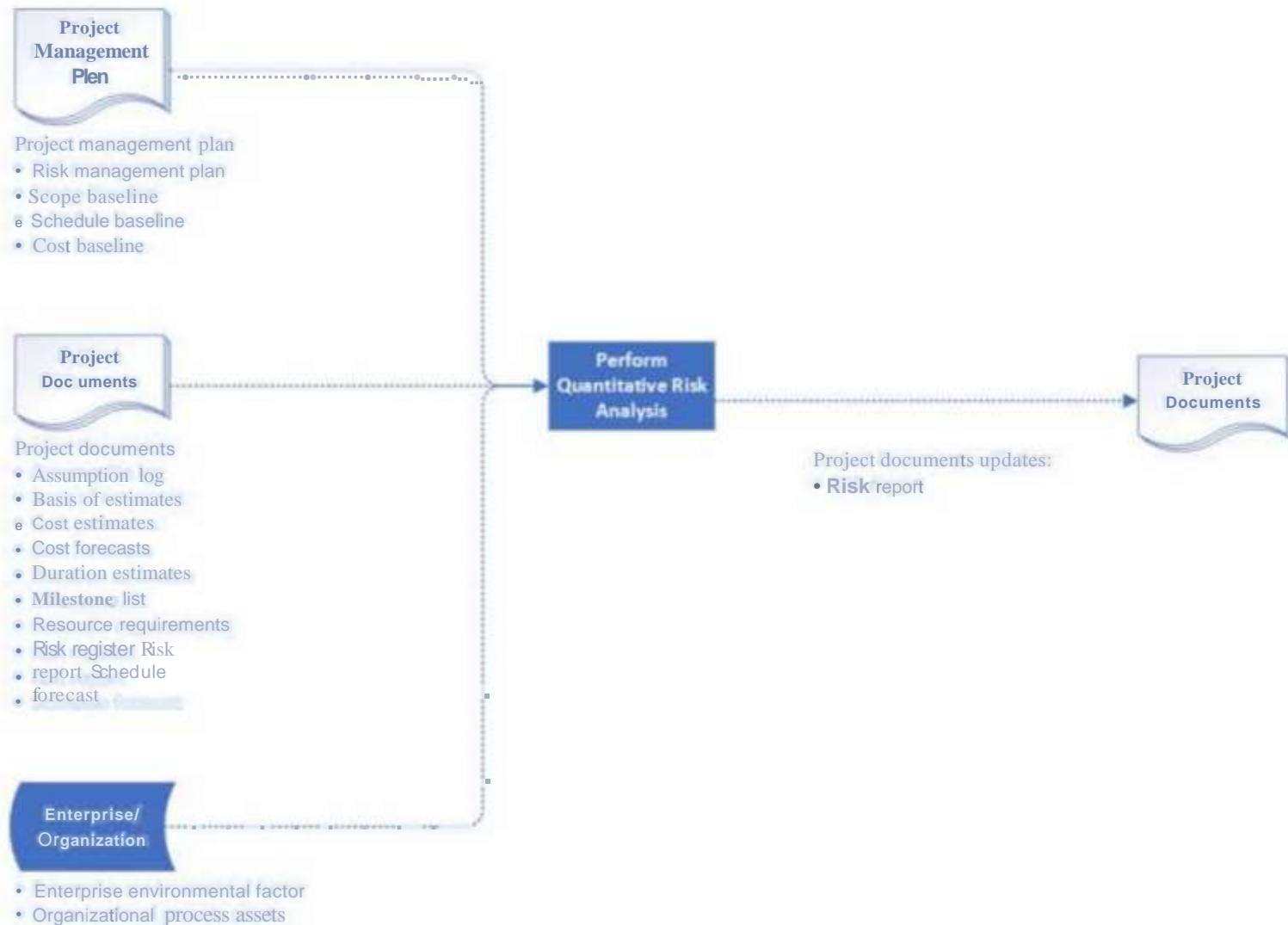
Lesson 5: Perform Quantitative Risk Analysis

- Perform Quantitative Risks Analysis Overview
- Perform Quantitative Risks Analysis Data Flow
- Perform Quantitative Risks Analysis Input
- Perform Quantitative Risks Analysis Tools & Techniques
- Perform Quantitative Risks Analysis Output

Perform Quantitative Risk Analysis Overview

The process of numerically analyzing the combined effect of identified individual project risks and other sources of uncertainty on overall project objectives.

Perform Quantitative Risk Analysis Data Flow



Perform Quantitative Risk Analysis Input

- Project Management Plan
 - Risk management plan
 - Scope baseline
 - Schedule baseline
 - Cost baseline
- Project documents
 - Assumption log
 - Basis of estimates
 - Cost estimates
 - Cost forecasts
 - Duration estimates
 - Milestone list
 - Resource requirements
- Risk register
- Risk report
- Schedule forecast
- Enterprise environmental factors
- Organizational process assets

Perform Quantitative Risk Analysis Tools & Techniques

- Expert judgment
- Data gathering
 - Interviews
- Interpersonal & team skills
 - Facilitation
- Representations of uncertainty
 - Probability distributions: triangular, normal, lognormal, beta, uniform, and discrete
- Data analysis
 - Simulation: Monte Carlo analysis
 - Output: histogram or S-curve
 - Sensitivity analysis
 - Tornado diagram
 - Decision tree analysis
 - Influence diagram

Perform Quantitative Risk Analysis Output

- Project documents updates
 - Risk report
 - Assessment of overall project risk exposure
 - Detailed probabilistic analysis of the project
 - Prioritized list of individual project risks
 - Trends in quantitative risk analysis result
 - Recommended risk responses

Expected Monetary Value (EMV)

- $EMV = P \times I$
 - P: probability
 - I: impact
- Usually used in decision tree analysis

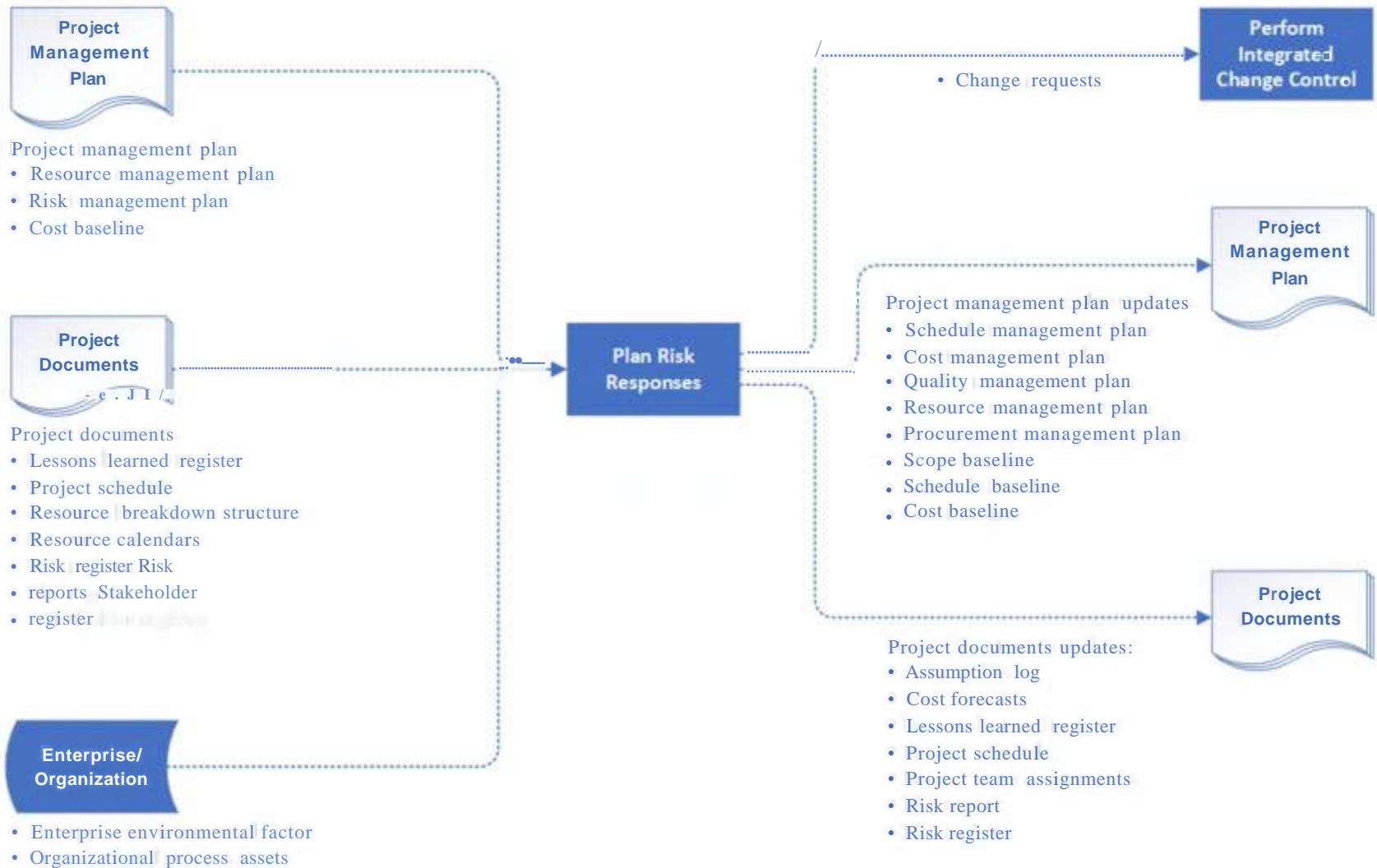
Lesson 6: Plan Risk Responses

- Plan Risk Responses Overview
- Plan Risk Responses Data Flow
- Plan Risk Responses Input
- Plan Risk Responses Tools & Techniques
- Plan Risk Responses Output

Plan Risk Responses Overview

The process of developing options, selecting strategies, and agreeing on actions to address overall project risk exposure, as well as to threat individual project risks.

Plan Risk Responses Data Flow



Plan Risk Responses Input

- Project management plan
 - Resource management plan
 - Risk management plan
 - Cost baseline
- Project documents
 - Lessons learned register
 - Project schedule
 - Project team assignments
 - Resource calendars
- Risk register
- Risk report
- Stakeholder register
- Enterprise environmental factors
- Organizational process assets

Plan Risk Responses Tools & Techniques

- Expert judgment
- Data gathering
 - Interviews
- Interpersonal & team skills
 - Facilitation
- Strategies for threats
 - Escalate
 - Avoid
 - Transfer
 - Mitigate
 - Accept
- Strategies for opportunities
 - Escalate
 - Exploit
 - Share
 - Enhance
 - Accept
- Contingent response strategy

Plan Risk Responses Tools & Techniques (continued)

- Strategies for overall project risk
 - Avoid
 - Exploit
 - Transfer/share
 - Mitigate/enhance
 - Accept
- Data analysis
 - Alternative analysis
 - Cost benefit analysis
- Decision making
 - Multicriteria decision analysis

Plan Risk Responses Output

- Change requests
- Project management plan updates
 - Schedule management plan
 - Cost management plan
 - Quality management plan
 - Resource management plan
 - Procurement management plan
 - Scope management plan
 - baseline
 - Schedule baseline
 - Cost baseline
- Project documents updates
 - Assumption log
 - Cost forecasts
 - Lessons learned register
 - Project schedule
 - Project team assignments
 - Risk register
 - Risk report

Risk Register Updates

- **Residual risks:** remaining risks after response planning
- **Contingency plan:** describing the specific actions that will be taken if a risk occurs
- **Fallback plan:** describing the specific actions that will be taken in contingency plan is not effective
- **Risk owners:** the one assigned to carry out the risk response
- **Secondary risks:** new risks created by the implementation of selected risk responses
- **Risk triggers:** events that trigger contingency response
- Contracts
- Reserves (contingency): cost and schedule

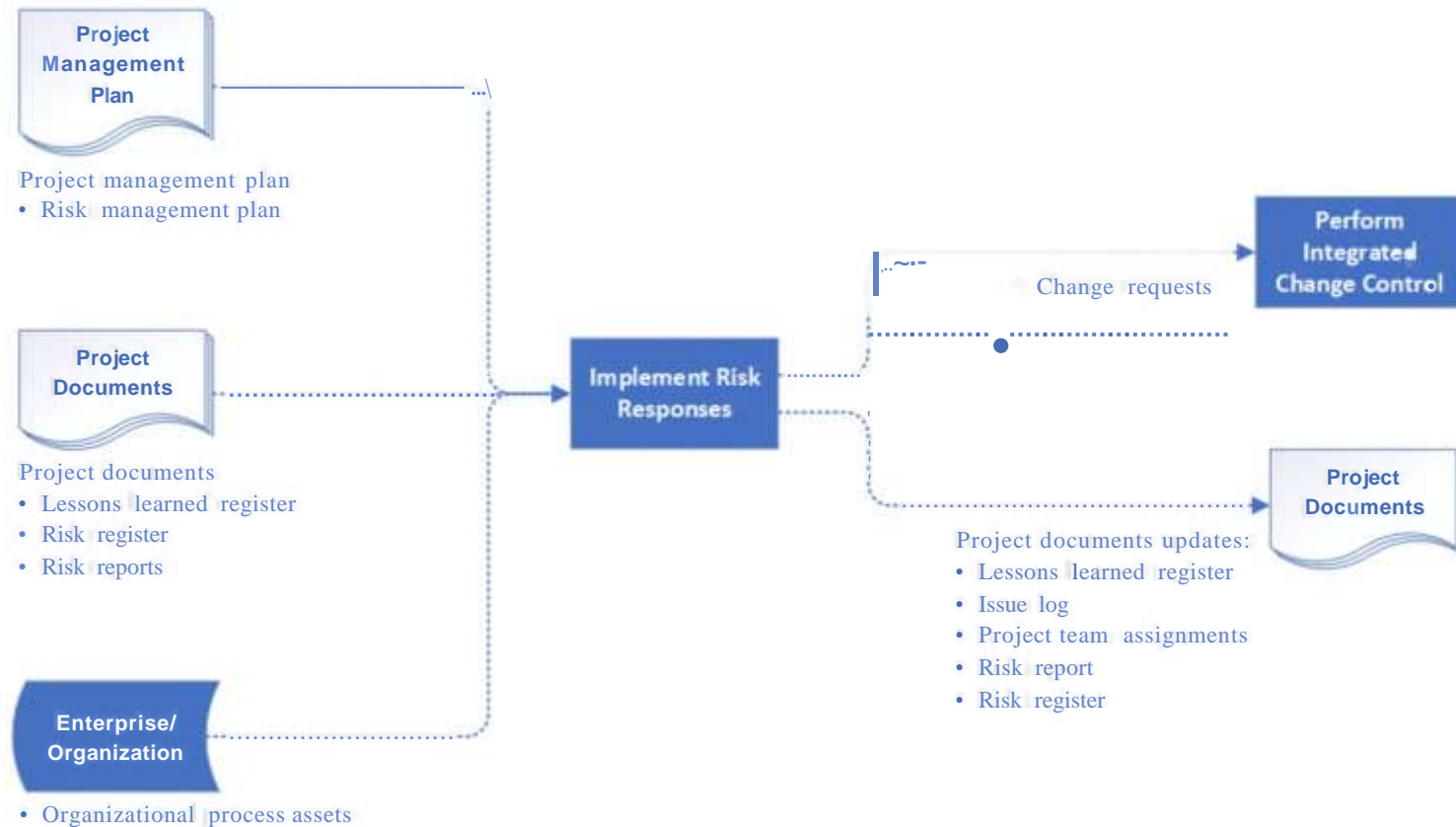
Lesson 7: Implement Risk Responses

- Implement Risk Responses Overview
- Implement Risk Responses Data Flow
- Implement Risk Responses Input
- Implement Risk Responses Tools & Techniques
- Implement Risk Responses Output

Implement Risk Responses Overview

The process of implementing agreed-upon risk response plans.

Implement Risk Responses Data Flow



Implement Risk Responses Input

- Project management plan
 - Risk management plan
- Project documents
 - Lessons learned register
 - Risk register
 - Risk report
- Organizational process assets

Implement Risk Responses Tools & Techniques

- Expert judgment
- Interpersonal & team skills
 - Influencing
- Project management information system

Implement Risk Responses Output

- Change requests
- Project document updates
 - Issue log
 - Lessons learned register
 - Project team assignments
 - Risk register
 - Risk report

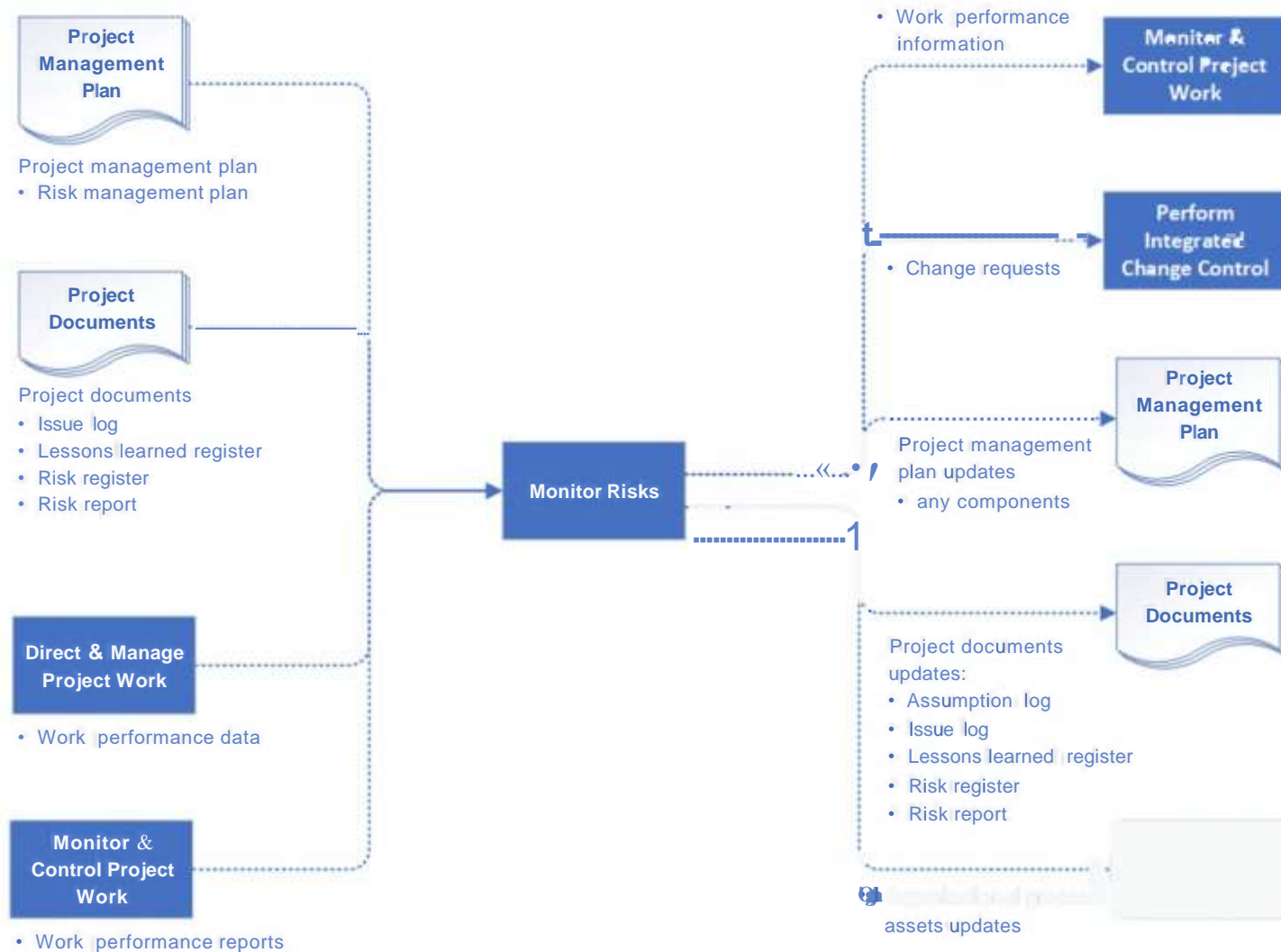
Lesson 8: Monitor Risks

- Monitor Risks Overview
- Monitor Risks Data Flow
- Monitor Risks Input
- Monitor Risks Tools & Techniques
- Monitor Risks Output

Monitor Risks Overview

The process of monitoring the implementation of agreed-upon risk response plans, tracking identified risks, identifying and analyzing new risks, and evaluating risk process effectiveness throughout the project.

Monitor Risks Data Flow



Monitor Risks Input

- Project management plan
 - Risk management plan
- Project documents
 - Issue log
 - Lessons learned register
 - Risk register
 - Risk report
- Work performance data
- Work performance reports

Monitor Risks Tools & Techniques

- Data analysis
 - Technical performance analysis
 - Reserve analysis -» burndown chart
- Audits
- Meetings -> risk reviews
- Workarounds:
 - Unplanned responses developed to deal with to unanticipated events
 - Dealing with risks that have been accepted
- Risk reassessment
 - Periodically review the risk management plan and risk register, and adjust the documentation as required.

Monitor Risks Output

- Work performance information
- Change requests
- Project management plan updates
- Project documents updates
 - Assumption log
 - Issue log
 - Lessons learned register
 - Risk register
 - Risk report
- Organizational process assets updates

References

- [PMBOK6] The PMBOK 6 edition from pmi.org
- [RITA9] -- Rita Mulcahy's PMP Exam Prep 9th edition from RMC Publications™
- [ISO31000] - <https://www.iso.org/iso-31000-risk-management.html>