Mission Success in Complex Environments (MSCE)

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Mission Success in Complex Environments (MSCE) Project

Part of the SEI Acquisition Support Program (ASP), the MSCE Project develops methods, tools, and techniques for

- Advancing the state-of-the-practice for risk management
- Assuring success in complex, uncertain environments

The project builds on more than 17 years of SEI research and development in risk management.

- Continuous Risk Management for software-development projects
- Operationally Critical Threat, Asset, and Vulnerability Evaluation (OCTAVE®) for organizational security

Widespread Use of Risk Management

Most programs and organizations implement some type of risk management approach when developing and operating software-intensive systems.

- Risk management plan
- Processes
- Tools

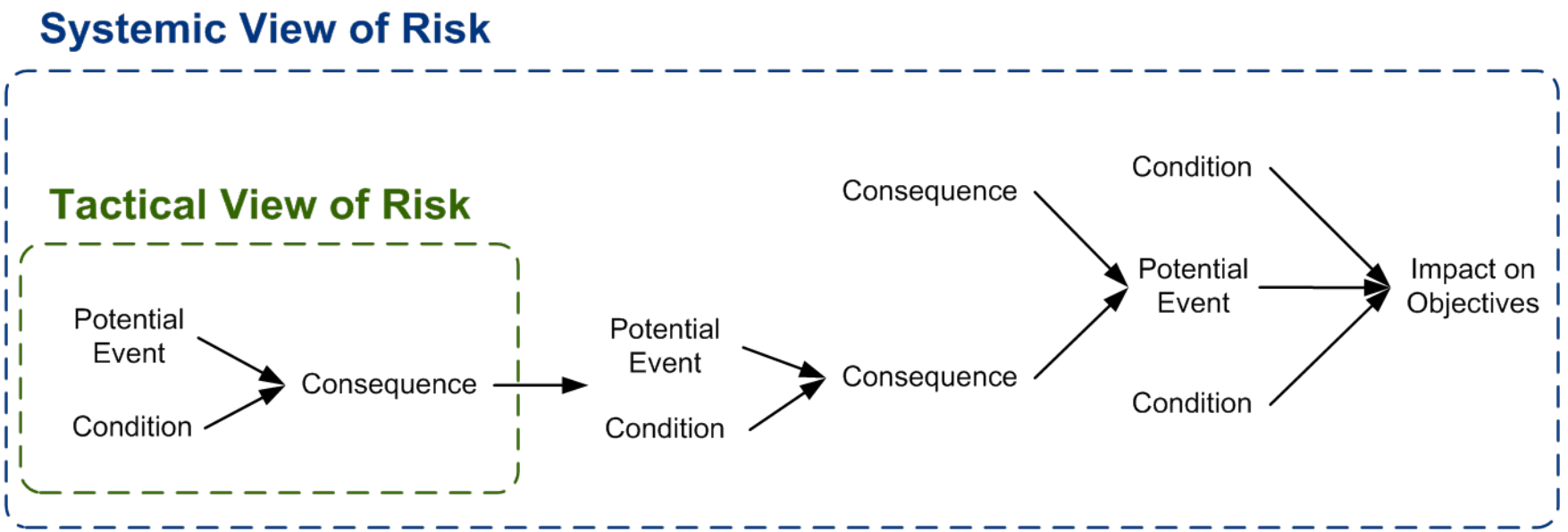
However, preventable failures continue to occur.

- Uneven and inconsistent application of risk-management practice
- Significant gaps in risk-management practice
- Ineffective integration of risk-management practice
- Increasingly complex management environment

Changing Risk Paradigm

From Traditional Paradigm	To New Paradigm
Tactical analysis that produces point mitigation solutions	Systemic analysis that produces strategic mitigation solutions
Failure-oriented (“playing not to lose”)	Success-oriented (“playing to win”)
Narrow tradeoff space based on type of risk (e.g., program, security)	Broad tradeoff space based on mission and objectives
Applicable to a specific life-cycle phase and a single group or team	Applicable across the life cycle and supply chain (multi-enterprise/system environments)
Stand-alone management practice	Integrated with program and organizational management practices
Bureaucratic and time-intensive	Practical, straightforward, and easy to apply

Tactical and Systemic Approaches



Mosaic

What

A suite of risk-based methods and guidance for managing systemic risk across the life cycle and supply chain

Benefits

Focused on achieving operational success

Enables continuous management of risk

Applicable across all life-cycle phases

Designed for multi-enterprise, multi-system environments

Provides a means of analyzing risk in relation to management models, frameworks, and standards

Mosaic: *Focus on Assessment*

Every organization has preferred management practices

The foundation of the Mosaic approach is a suite of methods for assessing risk continuously

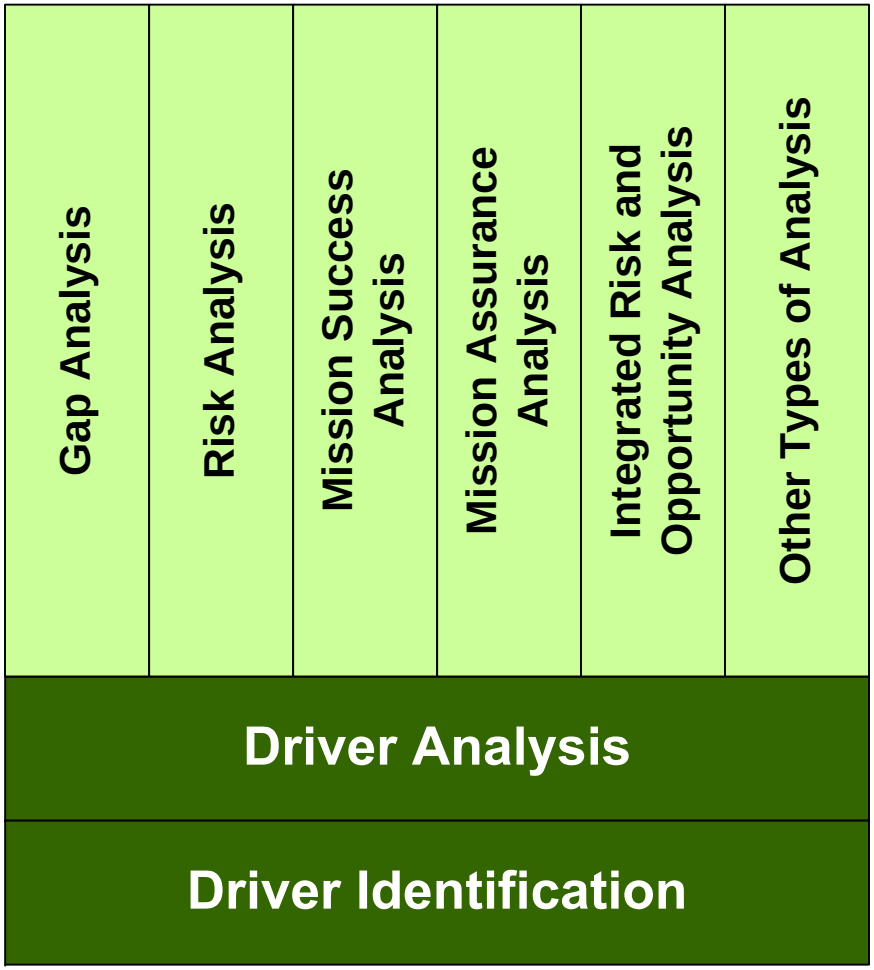
Mosaic also provides guidance for leveraging existing management practices to develop, implement, and track risk mitigation plans

Mosaic Assessments

Mosaic provides a suite of methods for assessing risk

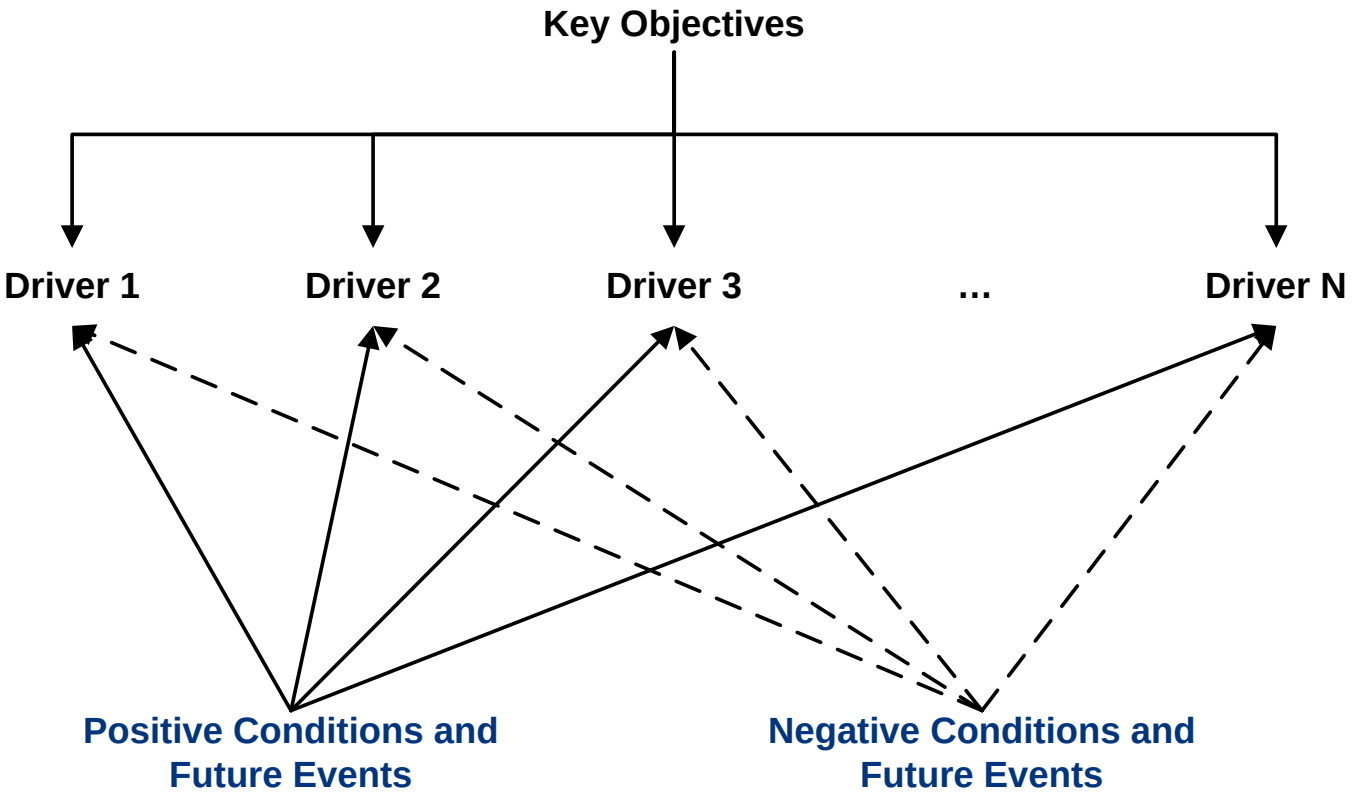
Mosaic assessments are modular in design

Driver identification and analysis provide a common front end for multiple back-end analyses

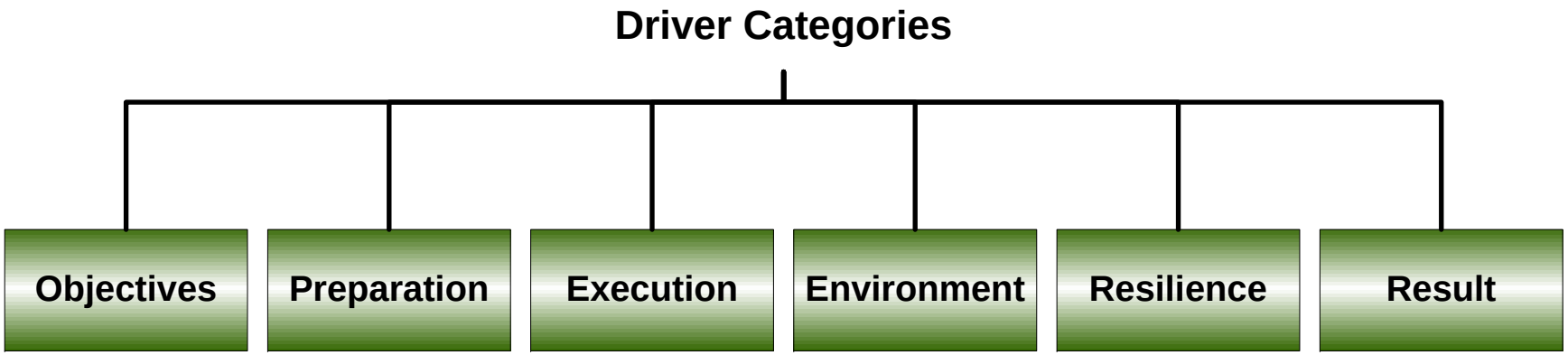


Mosaic: *Driver-Based Assessment*

A driver is a factor that has a strong influence on the eventual outcome or result.



Driver Framework



The driver framework is a common structure for classifying a set of drivers.

Driver Attributes

Attribute	Description	Example
Name	A concise label that describes the basic nature of the driver	Process
Success State	A driver exerts a positive influence on the outcome	The process being used to develop and deploy the system is sufficient.
Failure State	A driver exerts a negative influence on the outcome	The process being used to develop and deploy the system is insufficient.
Category	The category to which the driver belongs	Preparation

Basic Set of Drivers for Software Development

1. Program Objectives
2. Plan
3. Process
4. Task Execution
5. Coordination
6. External Interfaces
7. Information Management
8. Technology
9. Facilities and Equipment
10. Organizational Conditions
11. Compliance
12. Event Management
13. Requirements
14. Design and Architecture
15. System Capability
16. System Integration
17. Operational Support
18. Adoption Barriers
19. Operational Preparedness
20. Certification and Accreditation

Driver Analysis

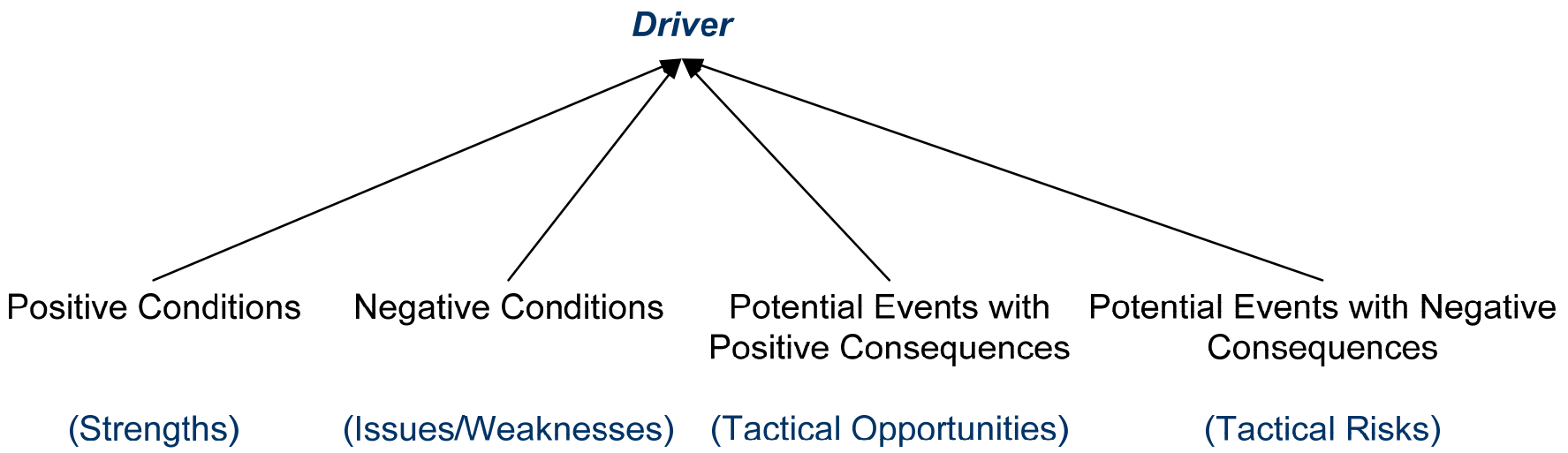
Question	Answer					
	No	Likely no	Equally likely	Likely yes	Yes	Don't Know
3. Is the process being used to develop and deploy the system sufficient?	❑	☒	❑	❑	❑	❑
Consider: Process design; measurements and controls; process efficiency and effectiveness; acquisition and development life cycles; training						

Driver questions are phrased from the success perspective.

Probability is incorporated into the range of answers for each driver.

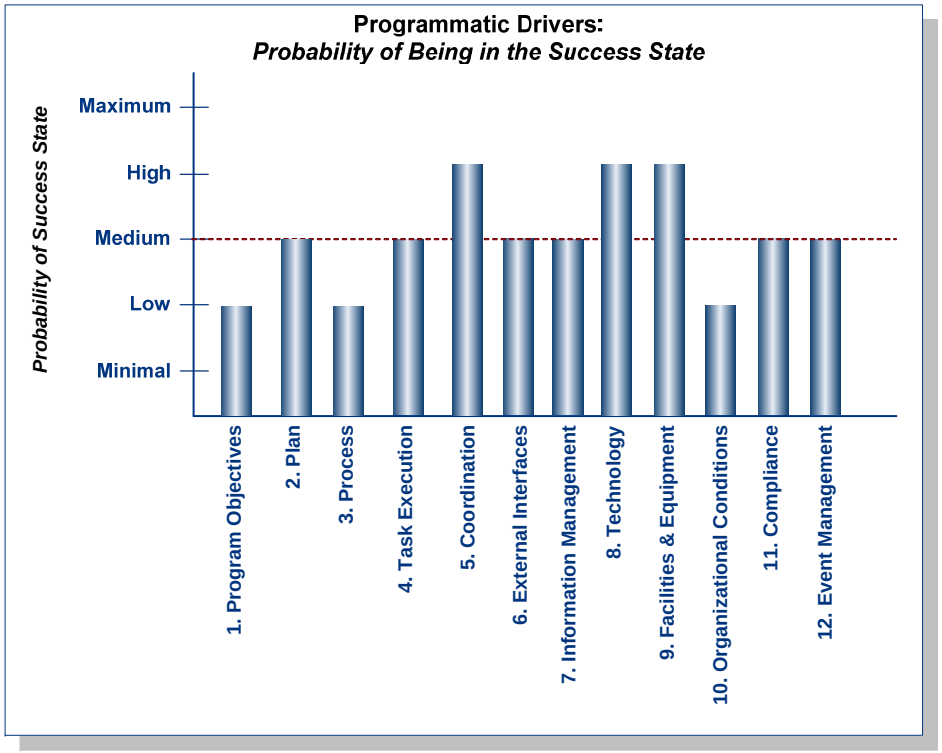
The rationale for selecting an answer is recorded.

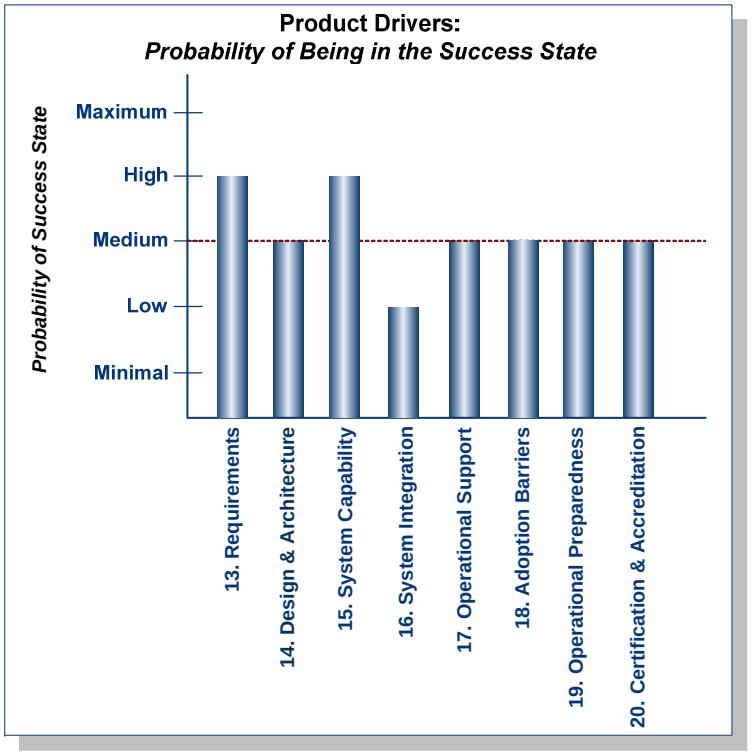
Integrating Tactical Data



A driver-based approach enables integration of tactical data.

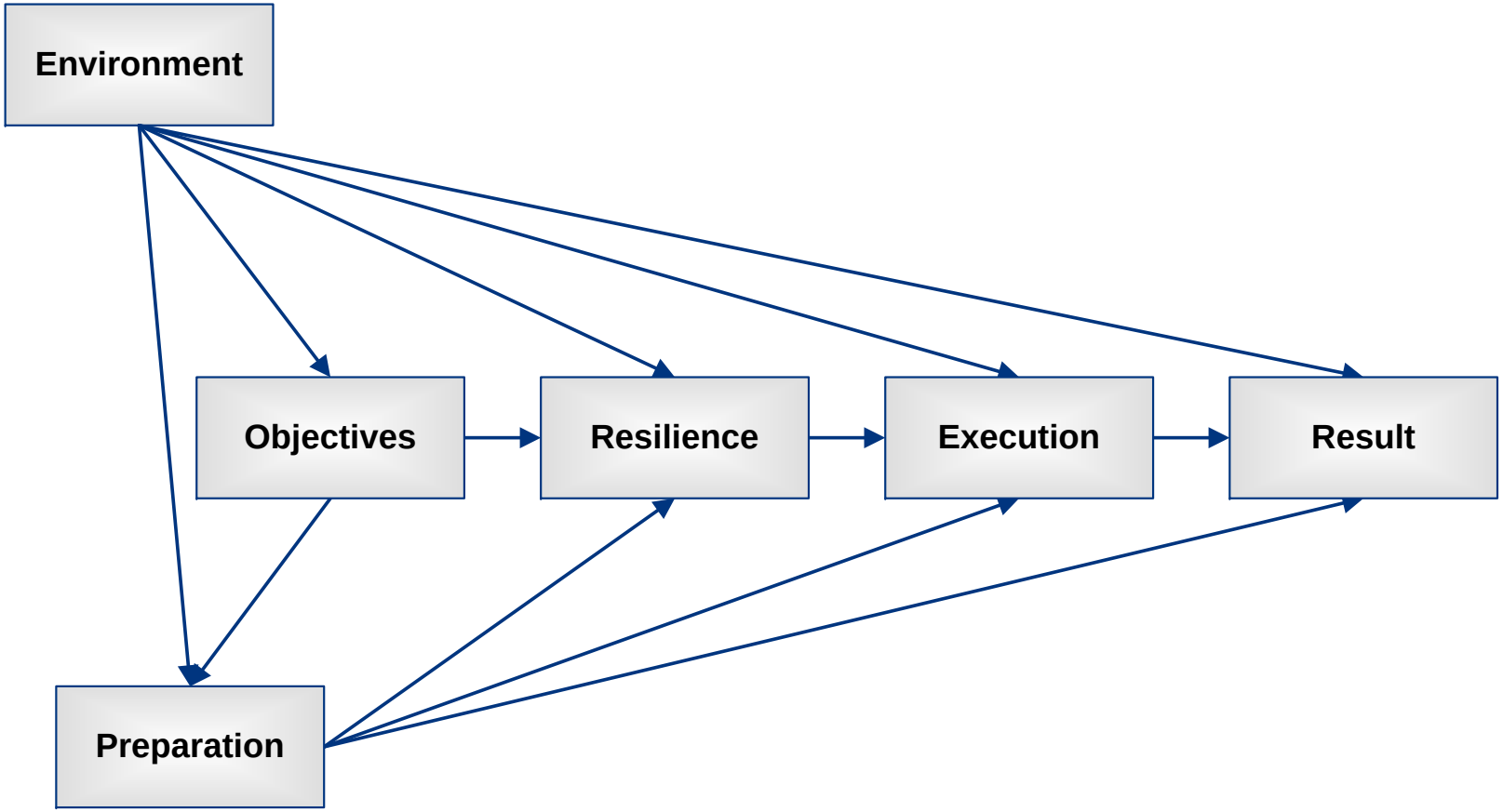
Driver Profile





A simple analysis provides insight into current conditions.

Primary Relationships among Driver Categories



Additional Analysis of Drivers

Drivers provide a foundation for program decision making.

A variety of back-end analyses can be used to analyze a set of driver values.

- Gap analysis
- Risk analysis
- Mission success analysis
- Mission assurance analysis
- Integrated risk and opportunity analysis

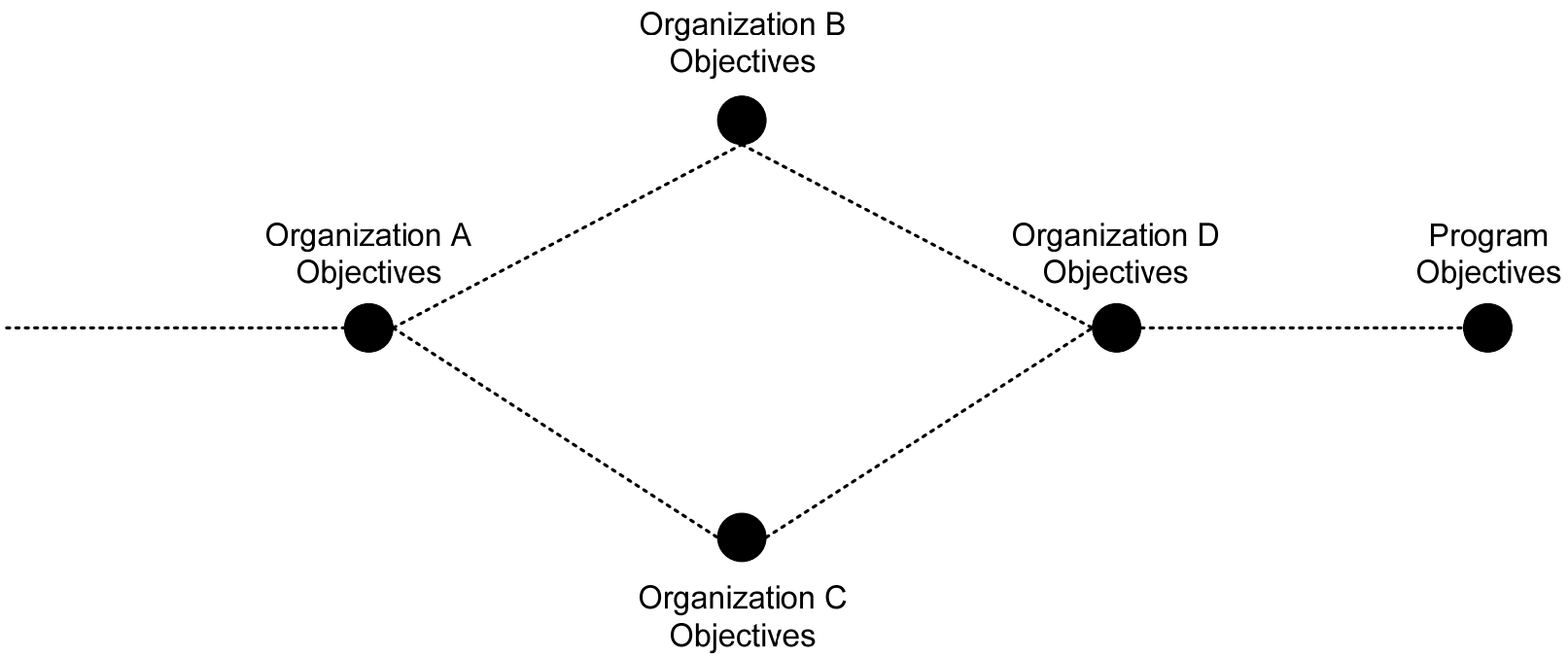
From Drivers to Risks

Risk	Probability	Impact	Risk Exposure
3. The process being used to develop and deploy the system is insufficient.	High	Severe	High

Determined using results of driver analysis

Determined using standard risk analysis methods

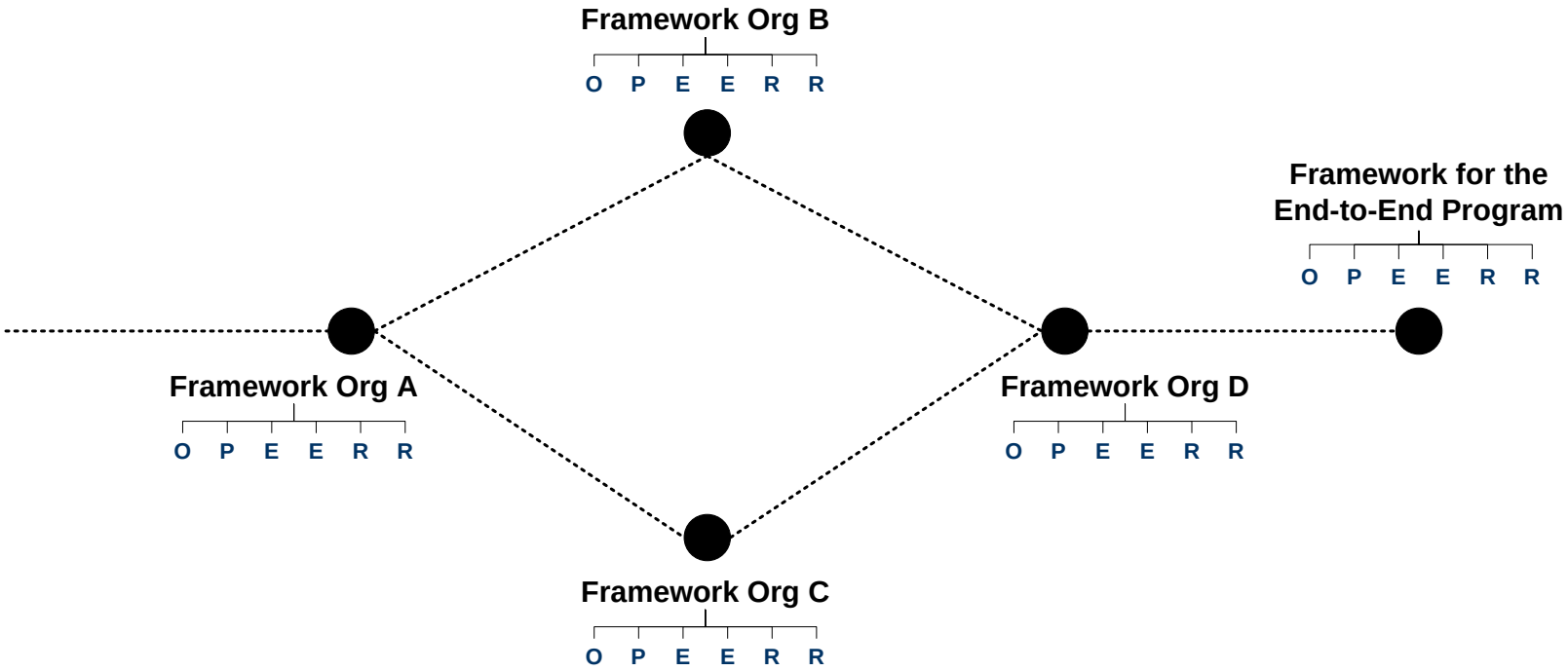
Multi-Enterprise Environments: *Network of Objectives*



Multi-Enterprise Environments: *Applying the Driver Framework*

Assessing a distributed program requires examining

- Each individual group
- The end-to-end program



Mosaic Assessments: *Application in Multiple Domains*

Software acquisition and development programs

Process improvement

Mission assurance

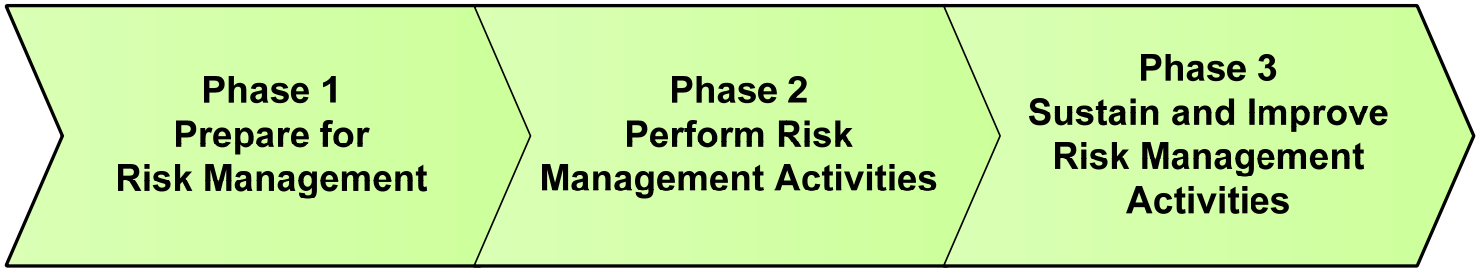
Software assurance

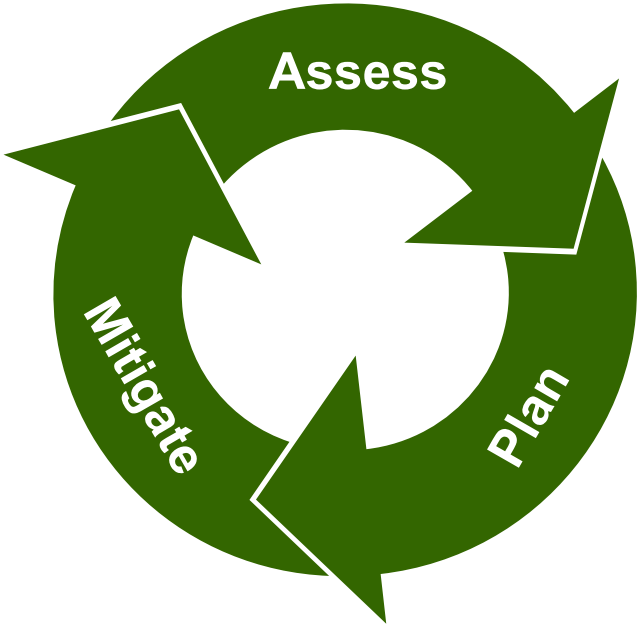
Information technology management

Cyber security management

Critical infrastructure protection

Risk Management Framework -1





Risk Management Framework -2

The Risk Management Framework is implementation independent.

- Defines risk management activities
- Does not specify how to perform those activities

The framework provides a

- Foundation for a comprehensive risk management methodology
- Basis for improving a risk management practice

Mosaic Portfolio - 1

Courses

- Risk Management Framework: Best Practices in Risk Management
- Introduction to Practical Risk Management
- Practical Risk Management: Framework and Methods

Workshops

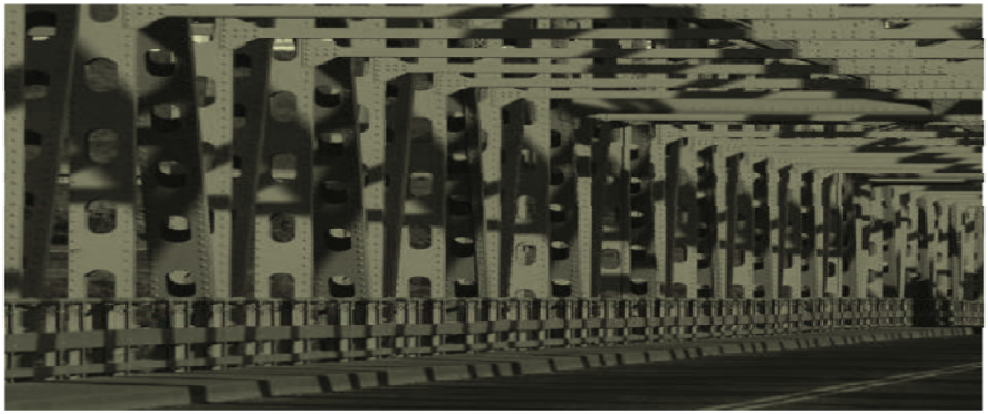
- Risk Management Tailoring and Improvement Workshops

Course and Workshop Combinations

Mosaic Portfolio - 2

Evaluations

- Program Risk Evaluation
- Mission Success Evaluation
- Risk Management Framework Evaluation
- Custom Evaluation

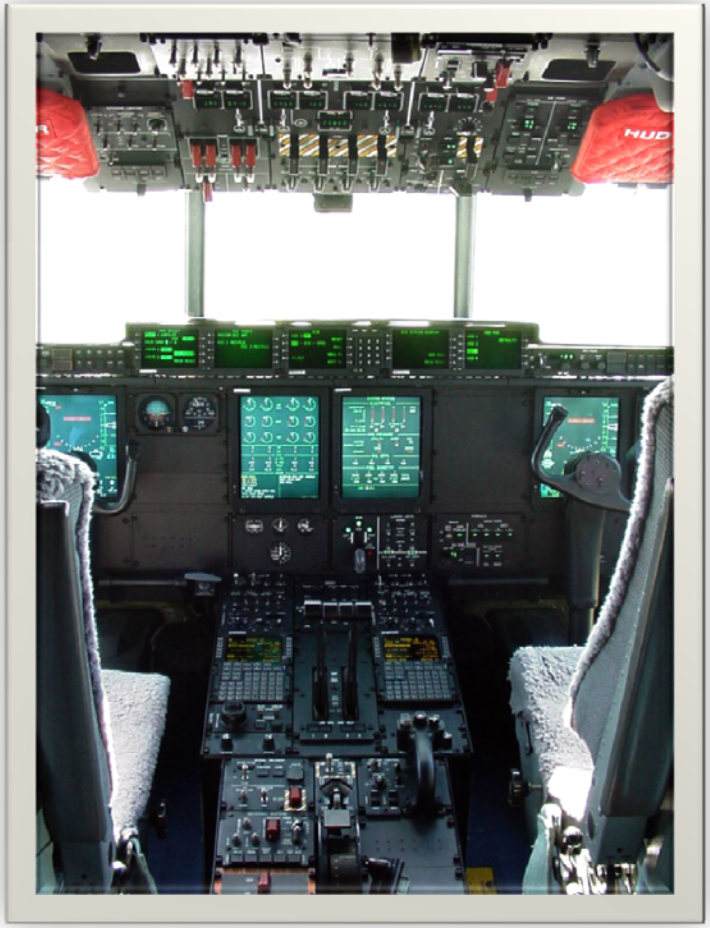


Future Research

Metrics

Risk-based improvement

Modeling and simulation



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