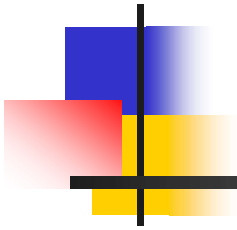


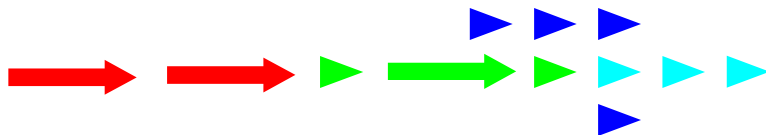
Systemically-Focused Effective Risk Management



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Introduction

- Risk analysis and management is a key strategy that should be known, understood, and applied within nearly any organization and on nearly all projects
- Traditional risk management generally focuses on risk identification, analysis, and handling



Introduction

- This presentation describes an enhanced approach to risk management
 - The systemic emphasis in this approach adds additional steps and techniques to the traditional approach
 - These additions help you achieve maximum leverage from the limited money, time, and resources available for risk mitigation and contingency actions

Example Risk Strategy

- Identify
- Classify
- Prioritize
- Respond
 - Acceptance
 - Mitigation, and Fall-back Mitigation
 - Contingency, and Fall-back Contingency

Traditional Risk Management

- Probability (> 0% and < 100%)
- Impact (one or more areas of adverse impact)
- Exposure (product of the above)

Exposure = Probability * Impact

Example: \$1500 = 25% \$6000

Systemic Risk Management

1. **Launch** (Risk description of something adverse that might occur)
2. **Likelihood** (Probability range: lower and upper threshold percents)
3. **Location** (Impact areas such as cost, schedule, reputation, legal exposure, etc. All impact areas are analyzed for Limits, Losses, Labor, and Later.)
4. **Limits** (Dollar impact range: lower & upper threshold dollars)
5. **Losses** (Exposure range, for each Location)

Systemic Risk Management

6. **Labor** (Mitigation, Primary and Fallback)
7. **Later** (Contingency, Primary and Fallback)
8. **Lattice** (Systemic relationships; 1-n relationship analysis between each mitigation and all risks)
9. **Leverage** (Analysis of the consequences of applying the same amount of investment across different mitigation/contingency actions)
10. **Landscape** (Systemic analysis of relationships between risks, mitigations, contingencies, and return on investment)

Applied Systemic Risk Management Scenario (with framework and filled-in templates)

- Scenario Context: IV&V Service Provider
 - You responded to an RFP for IV&V services and you proposed to provide 30 FTEs to initiate IV&V activities as of the 1st of the year
 - All hardware must be purchased and installed at your facility and be operational by January 1st
 - All personnel resources must be hired, and trained as needed, prior to January 1st
 - An IV&V strategy, test plan, test scenarios, and related material were submitted as part of your proposal
 - You just won the award—**now, what are your risks?**

1. **Launch** Risk description of something that might occur

- **Risk1:** The testing environment might not be fully operational when testing is scheduled to start
- **Risk2:** A significant number of identified personnel positions allocated to the IV&V project might not yet be onboard when IV&V is scheduled to commence
- **Risk3:** Currently documented testing strategies and techniques might not sufficiently evaluate system compliance with customer requirements.
- **Risk4:** Even if the requirements are satisfied, the customer might still insist on further testing and evaluation

2. Likelihood

Probability range:
lower and upper threshold percents

- Risk1: Lack Environmental Readiness
 - 5% to 15%
- Risk2: Lack Resource Availability
 - 20% to 30%
- Risk3: Lack Requirements Coverage
 - 10% to 40%
- Risk4: Have Customer Insistence
 - 50% to 90%

3. **Location** Impact areas, such as cost, schedule, reputation, legal exposure, etc.

- Risk1: Lack Environmental Readiness
 - **Cost** (late delivery & capacity penalty)
- Risk2: Lack Resource Availability
 - **Schedule** (delayed delivery; slipped milestones)
- Risk3: Lack Requirements Coverage
 - **Reputation** (defects released to field)
- Risk4: Have Customer Insistence
 - **Cost** (unplanned, unbudgeted effort)
 - **Schedule** (resources kept longer than planned)

4. **Limits** Impact range: lower & upper threshold dollars

- Risk1: Lack Environmental Readiness
 - \$250,000 to \$1,000,000 (scaled penalties)
- Risk2: Lack Resource Availability
 - \$50,000 to \$100,000 (increased hiring costs)
- Risk3: Lack Requirements Coverage
 - \$5,000,000 to \$10,000,000 (possible loss of client; damage to reputation)
- Risk4: Have Customer Insistence
 - \$43,000 to \$129,000 (cost of 1 to 4 weeks of overrun)
 - \$10,000 to \$50,000 (reduced morale; possible increased staff turnover due to schedule slippage)

5. Losses

Exposure range, for each Location

Risk ID	<i>Likelihood</i>		<i>Limits</i>		<i>Losses</i>		Average
	Low	High	Low	High	Low	High	
Risk1/\$	5%	15%	250,000	1,000,000	12,500	150,000	81,250
Risk2/Sc	20%	30%	50,000	100,000	10,000	30,000	20,000
Risk3/Re	10%	40%	5,000,000	10,000,000	500,000	4,000,000	2,250,000
Risk4/\$	50%	90%	43,000	129,000	21,500	116,100	68,800
Risk4/Sc	50%	90%	10,000	50,000	5,000	45,000	25,000

6. Labor Mitigation, Primary and Fallback

- Risk1: Lack Environmental Readiness
 - \$25,000 (Primary: Accelerated purchasing and daily supplier monitoring)
 - \$10,000 (Fallback: Seek alternative suppliers)
- Risk2: Lack Resource Availability
 - \$10,000 (Primary: Increased recruitment efforts)
 - \$50,000 (Fallback: \$5,000 bonus for in-house referrals that are hired – 10 positions)

6. Labor Mitigation, Primary and Fallback

- Risk3: Lack Requirements Coverage
 - \$10,000 (Primary: Pre-emptive analysis of test strategy, plans, use cases, scripts, etc.)
 - \$10,000 (Fallback: Update strategy, plans, use cases, scripts, etc. as necessary)
- Risk4: Have Customer Insistence
 - \$20,000 (Primary: Pre-emptive customer expectation management)
 - \$10,000 (Fallback: Pre-emptive management of staff expectations related to possible schedule slip)

7. **Later** Contingency, Primary and Fallback

- Risk1: Lack Environmental Readiness
 - **\$50,000** (Primary: Buy and install locally available equipment)
 - **\$35,000** (Fallback: Temporarily transfer client-owned hardware and equipment into our environment)
- Risk2: Lack Resource Availability
 - **\$25,000** (Primary: Transfer personnel from other projects)
 - **\$100,000** (Fallback: Hire contract workers until adequate staff has been identified and hired)

7. **Later** Contingency, Primary and Fallback

- Risk3: Lack Requirements Coverage
 - **\$150,000** (Primary: Re-analyze and re-plan; add additional test resources and continue testing)
 - **\$500,000** (Fallback: Hire several highly experienced experts to support the team)
- Risk4: Have Customer Insistence
 - **\$10,000** (Primary: Increase involvement of executive management in customer relationship management)
 - **\$100,000** (Fallback: Allow minor scope creep if requests are easy to satisfy)

8. **Lattice** Systemic relationship analysis 1-n between mitigation and all risks

- Accelerated purchasing and daily supplier monitoring)
 - Risk1: Lack Environmental Readiness
- Seek alternative suppliers
 - Risk1: Lack Environmental Readiness
- Increased recruitment efforts
 - Risk2: Lack Resource Availability
 - Risk4: Have Customer Insistence
- Bonus for in-house referrals that are hired – 10 positions
 - Risk2: Lack Resource Availability
 - Risk4: Have Customer Insistence

8. **Lattice** Systemic relationship analysis 1-n between mitigation and all risks

- Pre-emptive analysis of test strategy, plans, use cases, scripts, etc.
 - Risk3: Lack Requirements Coverage
 - Risk2: Lack Resource Availability
 - Risk4: Have Customer Insistence
- Update strategy, plans, use cases, scripts, etc. as necessary
 - Risk3: Lack Requirements Coverage
- Pre-emptive customer expectation management
 - Risk4: Have Customer Insistence
- Pre-emptive management of staff expectations related to possible schedule slip
 - Risk4: Have Customer Insistence

9. **Leverage** Systemic analysis of applying a fixed amount investment in various areas

- Consider the primary mitigations for risks 3 and 4
 - **\$10,000**: Pre-emptive analysis of test strategy, plans, use cases, scripts, etc.
 - **\$20,000**: Primary: Pre-emptive customer expectation management
- What are the expected consequences of spending \$5,000 on each?
 - Risk 3: High likelihood drops from 40% to 30%
 - Risk 4: High limit drops from \$179,000 (total of both cost and schedule impact) to \$159,000

9. Leverage Systemic analysis of applying a fixed amount investment in various areas

- The new calculations for Risks 3 and 4 are:

Risk ID	Likelihood		Limits		Losses		Average	
	Low	High	Low	High	Low	High		
Risk1/\$	5%	15%	250,000	1,000,000	12,500	150,000	81,250	
Risk2/Sch	20%	30%	50,000	100,000	10,000	30,000	20,000	
Risk3/Rep	10%	40%	5,000,000	10,000,000	500,000	4,000,000	2,250,000	
Risk4/\$	50%	90%	43,000	129,000	21,500	116,100	68,800	93,800
Risk4/Sch	50%	90%	10,000	50,000	5,000	45,000	25,000	

Risk ID	Likelihood		Limits		Losses		Average	
	Low	High	Low	High	Low	High		
Risk1/\$	5%	15%	250,000	1,000,000	12,500	150,000	81,250	
Risk2/Sch	20%	30%	50,000	100,000	10,000	30,000	20,000	
Risk3/Rep	10%	30%	5,000,000	10,000,000	500,000	3,000,000	1,750,000	500,000
Risk4/\$	50%	90%	28,000	129,000	14,000	116,100	65,050	88,800
Risk4/Sch	50%	90%	5,000	50,000	2,500	45,000	23,750	5,000

9. Leverage Systemic analysis of applying a fixed amount investment in various areas

- Spending \$5,000 on the primary mitigation for Risk3 resulted in a reduction of average loss by \$500,000, *a return on investment of 100 to 1*
- Spending \$5,000 on the primary mitigation for Risk4 resulted in a reduction of average loss by \$5,000, *a return on investment of absolutely nothing*

9. **Leverage** Systemic analysis of applying a fixed amount investment in various areas

- A critical principle in systemically-focused risk management is to include careful analysis into which mitigations receive the limited funds you have available.
- Build a couple 'what-if' spreadsheets and explore the consequences of investing in various mitigations and adjusting Likelihood and Limits
- Don't forget, as we saw in step 8, many mitigation investments may have simultaneous positive impacts on *multiple* risks

10. Landscape Systemic analysis of investment relationships: *focus on ROI*

- The purpose of this step is to remind you that you
 - Are ***not*** attempting to manage individual risks
 - Are managing an entire system of risks
- Allocation of time, effort, and money yields the greatest benefit—and best return on investment—when risks are managed as an interrelated system of risks

10. **Landscape** Systemic analysis of investment relationships: *focus on ROI*

- Use simple spreadsheets to help you *systemically* evaluate and compare the consequences of adjustments to
 - Launch (risks), Likelihoods, Locations, Limits, Losses, Labor, Later
 - Lattice, Leverage, Landscape
- And please keep in mind, Landscape is a constantly shifting theater of threat—frequent attention is definitely in your best interests...



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Biographical Highlights

Dr. Bechtold is a senior consultant for Abridge Technology, a Virginia-based company he founded in 1996. **Abridge Technology is an SEI Partner** and is authorized to provide SEI licensed training and appraisal services. Dr. Bechtold is an SEI Certified Lead Appraiser for both CMMI-DEV and CMMI-SVC. He is also a Certified Instructor for both. Dr. Bechtold provides consulting, training, and support services in the areas of project management, process improvement, process definition, measurement, and risk management. Dr. Bechtold has assisted government and industry with implementing the Software CMM since 1992, the Acquisition CMM since 1996, and the CMMI since 2000. Dr. Bechtold's expertise spans organizations of all types and sizes, from multi-billion dollar companies and agencies to organizations with less than 20 personnel.