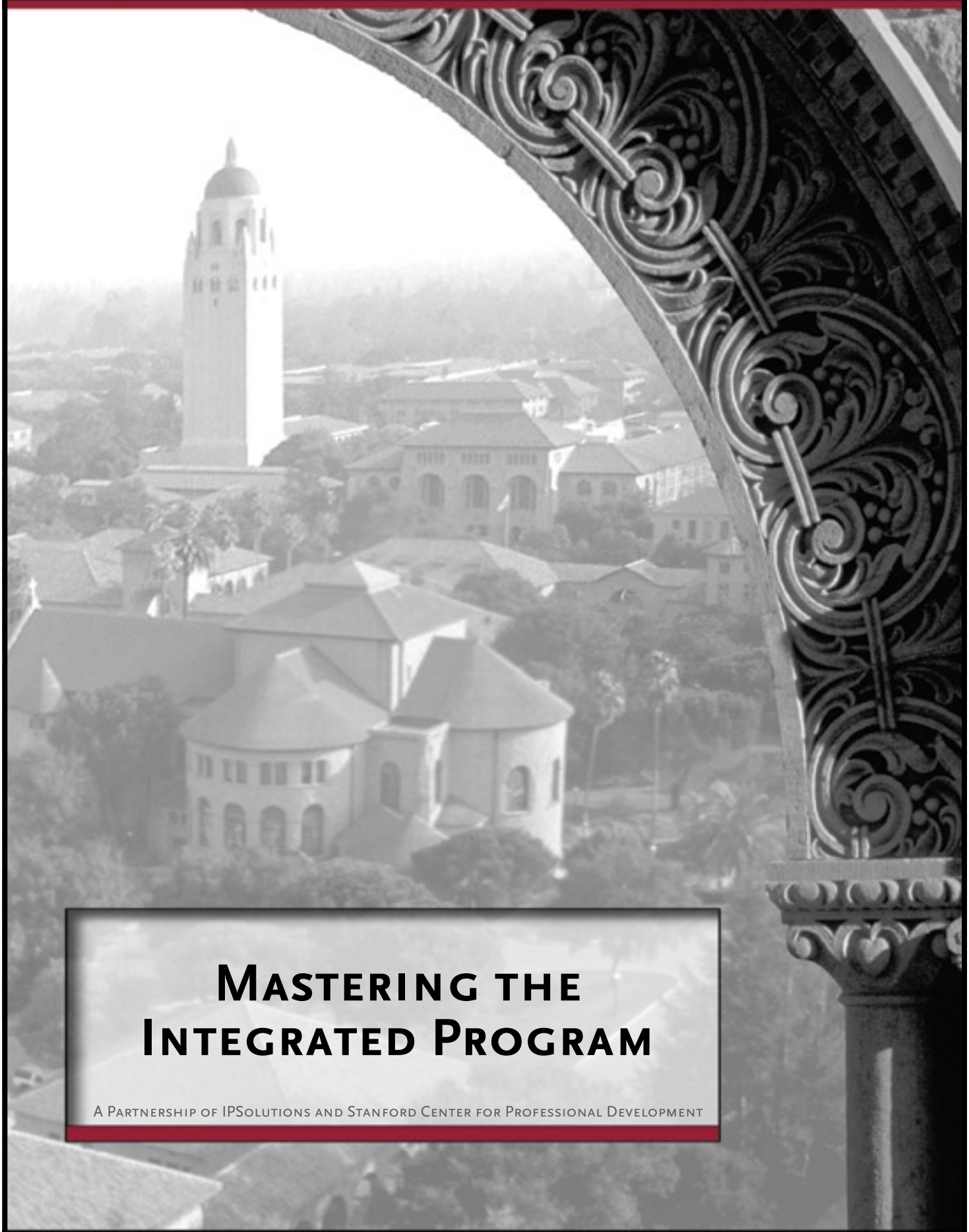
STANFORD ADVANCED PROJECT MANAGEMENT



Mastering the Integrated Program

A Partnership of IPSolutions and Stanford Center for Professional Development

MIP Stanford Online v1.0

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The Risks of a "Faster-Better-Cheaper" Strategy
Elisabeth Paté-Cornell

NASA's Jet Propulsion Laboratory hired Professor Paté-Cornell to develop a process and supporting technology for identifying and managing the risks associated with their 1990s strategy to complete projects faster, better, and cheaper. In this session you will have the unique opportunity of conversing directly with Professor Paté-Cornell about the methodology the Laboratory employed to lower risk while optimizing project budgets.

Program Management Exercise and Introduction to the Program Management Process
Mark Morgan

This session opens with a simulation exercise that explores the issues and challenges facing program teams as they strive to get diverse organizations to work together effectively toward a common goal.

At the conclusion of this eye-opening exercise, you will receive the *Program Management Process Guide* and an introduction to its practical format. You'll learn the five major process steps for managing an integrated program effectively, and consider various options and adaptations within a practical process framework.

Linking Business Strategy to the Integrated Project and Defining Stakeholder Expectations
Mark Morgan

Integrated projects are a fundamental building block of the enterprise implementation process. It is essential that an integrated project plan be developed in conscious alignment with the business case for a program. The process begins with the formation of an initial planning team charged with establishing the credibility of the program by, first, examining the validity of the business case on which it is based and, second, determining measurable success criteria.

This session features a case study that challenges you to model the process. Acting as program manager, you will be guided by the practical steps presented in the *Process Guide*. You'll work with other participants to develop success criteria that are both aligned with strategy and capable of being measured. As conditions arise in the course of the case study, you will see why these initial steps are demanding yet critical.

Preparing for Strategic Risks, Expanding the Program Management Team, and Defining the Program
Mark Morgan & Ray Levitt

This session presents a succinct, powerful process for identifying strategic risks to the program and developing appropriate approaches to managing them—approaches that will help shape the overall structure of the program plan and enable the program team to manage risks effectively.

As the case study from the previous session continues, you will take the next steps in defining and organizing the program. You will be challenged to produce risk-appropriate plans, and you'll see why it is essential to assemble a broad-constituency, high-powered program team to take over from the initial planning team and carry the program through to completion.

Preparing for Strategic Risks, Expanding the Program Management Team, and Defining the Program—continued
Mark Morgan & Ray Levitt

If interfaces within and across projects are not coordinated within the program organization, performance will suffer. This session will arm you with approaches for dramatically improving project interface management. Professor Levitt has developed an in-depth analysis of the types of interdependencies that can arise between project tasks. In this session, he and Mark Morgan help you anticipate typical cycles of interdependence and prepare to address them. You'll get an in-depth look at multi-project organizational design, along with an opportunity to explore questions about applicability within your organizational environment.

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Integrating Program Scope
Mark Morgan

Program teams and sponsors are usually eager to get down to the tasks at hand. Consequently, a natural tendency exists to overlook the need for clearly defining a program's scope before developing the program schedule. In this informative session, you'll learn how to save substantially on program plan rework by eliminating gaps and overlaps in program definition at the outset. You will practice using a defined process for making sure that program scope is a matter of shared understanding, and not left to assumption.

Evaluating Project Plan Quality and the Development of Interfaces
Mark Morgan

A program plan is only as strong as its weakest link. This session will prepare you to evaluate individual project plans in the context of the overall program. You will acquire a powerful process for developing dependable interfaces that will tie together the individual elements of the program organization. A fast-paced simulation based on the overall case study for the course will give you first-hand experience in applying the interface management process and techniques.

Creating an Optimized Integrated Program Schedule
Mark Morgan

Many program teams make the mistake of thinking independently in an interdependent program world. The integrated schedule is the only schedule that counts in program management; it is only when interfaces are taken into account that an accurate picture of the overall time requirements for the program becomes clear.

Based on the case study example, this session demonstrates how to create an integrated schedule. Then you will work with other participants to optimize that schedule, exploring and practicing a variety of techniques.

Developing Risk Management Plans and Preparing the Program for Launch
Mark Morgan

The subject of risk management is often avoided in program planning; we are so anxious to get to work on a project that we jump into action without preparing for what lies ahead. In this session you will learn how to apply a streamlined risk management process from IPS to develop clear risk management plans that can be implemented with a minimum of overhead. You'll practice using this process in a fast-paced exercise. Following the exercise, we will wrap up the course coverage on the program planning phase by exploring the processes of baseline setting, final business review, and program kickoff.

Tracking the Program to Successful Closure
Mark Morgan

Successful execution of the integrated program is highly dependent upon our ability to identify problems quickly, take appropriate corrective actions, and communicate across complex organizations. We need to be certain that we are receiving reliable data across the program and are watching the right indicators, at the right time, using the right measures.

In this final session, you will practice applying sound strategies and workable tactics for setting up and maintaining critical tracking and management processes—including issue, change, and risk management processes—in the program environment. You will see examples of various program level reporting and communication strategies and have the opportunity to explore them.

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Stanford Center for Professional Development

The Stanford Center for Professional Development (SCPD) collaborates with School of Engineering faculty and other Stanford University departments to provide academic graduate education and professional education short courses for engineers, scientists, technology professionals, and managers in industry and government worldwide. We offer degree and academic certificate programs, individual courses, seminars, and workshops in engineering, computer science, and engineering management, as well as emerging multidisciplinary areas such as bioengineering, biomedical informatics, and nanotechnology. All instruction builds on the Stanford tradition of dynamic exchange with industry—combining theory and practice, and focusing on the intersection between industry needs and faculty research. Courses are delivered via the Internet, television broadcast, videoconferencing, and videotape, as well as on campus. SCPD also works with companies to develop customized courses presented at the worksite. For more information, go to http://scpd.stanford.edu, call 650.725.3000, or e-mail SCPD-Customer-Relations@stanford.edu.

IPS

IPSolutions, Inc., an innovative global professional services firm focused on organizational mastery of implementation, enables organizations to convert business strategies into realities. An array of products and services is designed to drive strategy into meaningful execution. These products and services focus on the conversion of strategy into actionable projects and programs nested in a carefully crafted portfolio process. Services include planning facilitation, consulting, coaching and mentoring, project development workshops, and classroom training. The company has completed more than 7,500 engagements in over 250 cities and 35 countries worldwide, with clients including more than 200 of the Fortune Global 500 corporations.

Founded in 1988, IPS has corporate offices in San Mateo, California, as well as senior professionals located throughout the world. For more information, go to www.ipsassociates.com, call 650.578.6300, or e-mail info@ipsassociates.com.

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Professional Development Units (PDUs)

Project managers who seek to maintain their certification as a PMP® from the Project Management Institute (PMI®) will be awarded PDUs upon the successful completion of this course. Participants should contact PMI for information on how to apply for PDUs at http://www.pmi.org.

The course Program Number will be printed on the certificates given to successful participants.

The Stanford Center for Professional Development and IPSolutions are Global Registered Education Providers of PMI.

Continuing Education Units (CEUs)

Individuals who seek to maintain other professional certifications or who require a transcript verifying course participation have the opportunity to earn Continuing Education Units (CEUs) from Stanford University. Transcripts will indicate a grade of “pass/no pass.” CEUs are usually transferable into other professional or personal development programs, but are not typically accepted towards a graduate degree.

If you requested and paid the CEU fee as part of the registration process, your transcript will be sent to you automatically within three to four weeks of completion of this course. If you have not yet registered for CEU credits, please contact apm@scpdinfo.stanford.edu or call 650-725-4694.

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Raymond E. Levitt

Ray Levitt is academic director and founder of the Stanford Advanced Project Management program. He is Professor of Civil and Environmental Engineering, and Courtesy Professor of Medical Informatics, at Stanford University. He also co-founded and directed Stanford's Center for Integrated Facility Engineering. Before coming to Stanford in 1980, he served on the MIT civil engineering faculty. Currently, he teaches classes in strategic planning and organization design for project/matrix organizations to Stanford engineering undergraduate and graduate students as well as project and corporate executives.

Since 1975, he has served as a consultant to Fortune 1000 and other global companies in the design of project/matrix organization structures, work processes, and IT applications to support project work. His present research focuses on modeling and simulating the significant institutional costs that can arise in global projects due to substantial differences in goals, values, and cultural norms among project stakeholders. His Virtual Design Team (VDT) research group has developed ground-breaking organization theory, methodology, and computer simulation tools to design organizations that can optimally execute complex, fast-track projects and programs. He founded Vité Corporation in 1996 to commercialize the VDT research results. VDT methods and tools are currently being used to model and simulate work processes in fields such as health care delivery and offshore platform maintenance. He also co-founded Design Power, Inc., in 1989 to develop applications to automate many kinds of semi-custom engineering work.

He earned his PhD and MSCE in construction engineering and management from Stanford University and his BSCE, cum laude, from Witwatersrand University in South Africa.

M. Elisabeth Paté-Cornell

Elisabeth Paté-Cornell is the Burt and Deedee McMurtry Professor in Stanford University's School of Engineering. She has also been chair of the Department of Management Science and Engineering at Stanford since the department's creation in January 2000. Previously, she was a faculty member in the Industrial Engineering and Engineering Management Department at Stanford, and an assistant professor of civil engineering at MIT. She has also served as a consultant to numerous industries and government organizations.

Her primary areas of teaching and research include engineering risk analysis and risk management, decision analysis, and engineering economics. Recent research has focused on using risk analysis, probability, and decision theory to integrate organizational factors into assessments of the reliability of a final product or service, and to allow efficient and cost-effective risk management in industry as well as in government regulation. Recent applications include the NASA space shuttle, unmanned space programs, offshore oil and gas platforms, marine pipelines, and anesthesia during surgery. She is a member of the National Academy of Engineering and its Council, of the Air Force Advisory Board, and of the California Council on Science and Technology. In addition, she is past president and a fellow of the Society for Risk Analysis and was a member of NASA's advisory council from 1996–98.

She holds a PhD in engineering economics systems and an MS in operations research from Stanford University, as well as an MS in computer science and applied mathematics from the University of Grenoble, France.

Mark Morgan

Mark Morgan is a director of customer solutions with IPS and lead developer of the *Mastering the Integrated Program* course in the Stanford Advanced Project Management curriculum. He develops and delivers courses in project and program management as well as conducts custom workshops and other consulting engagements. His experience in project and program management stems from 25 years of experience, including a 13-year career with IBM spanning both hardware and software initiatives.

In IPS training engagements with Hewlett-Packard, he has increased organizational commitment to a sustained cultural shift to project management practice. He has created custom-tailored materials and delivered courses for hundreds of managers and engineers, with consistently outstanding reviews. In a consulting engagement for HP, he successfully supported an international project team in assessing the provision of consulting services via a Web-based customer interface. He also developed processes for the use of collaboration tools in managing distributed teams. Working with Inovant, he designed and conducted workshop sessions that brought a portfolio of projects to a consistent level of planning and in the process provided the company with critical planning information.

While at IBM, he led projects and programs in the areas of manufacturing engineering, quality systems development, business volume planning, circuit board and disk drive manufacturing, and test equipment design and build. As principal of Leadership Consulting Services, he provided management and leadership training for various technology firms.

He holds an MBA from Golden Gate University and a BS in engineering technology from California Polytechnic State University, and he is a Stanford Certified Project Manager (SCPM).

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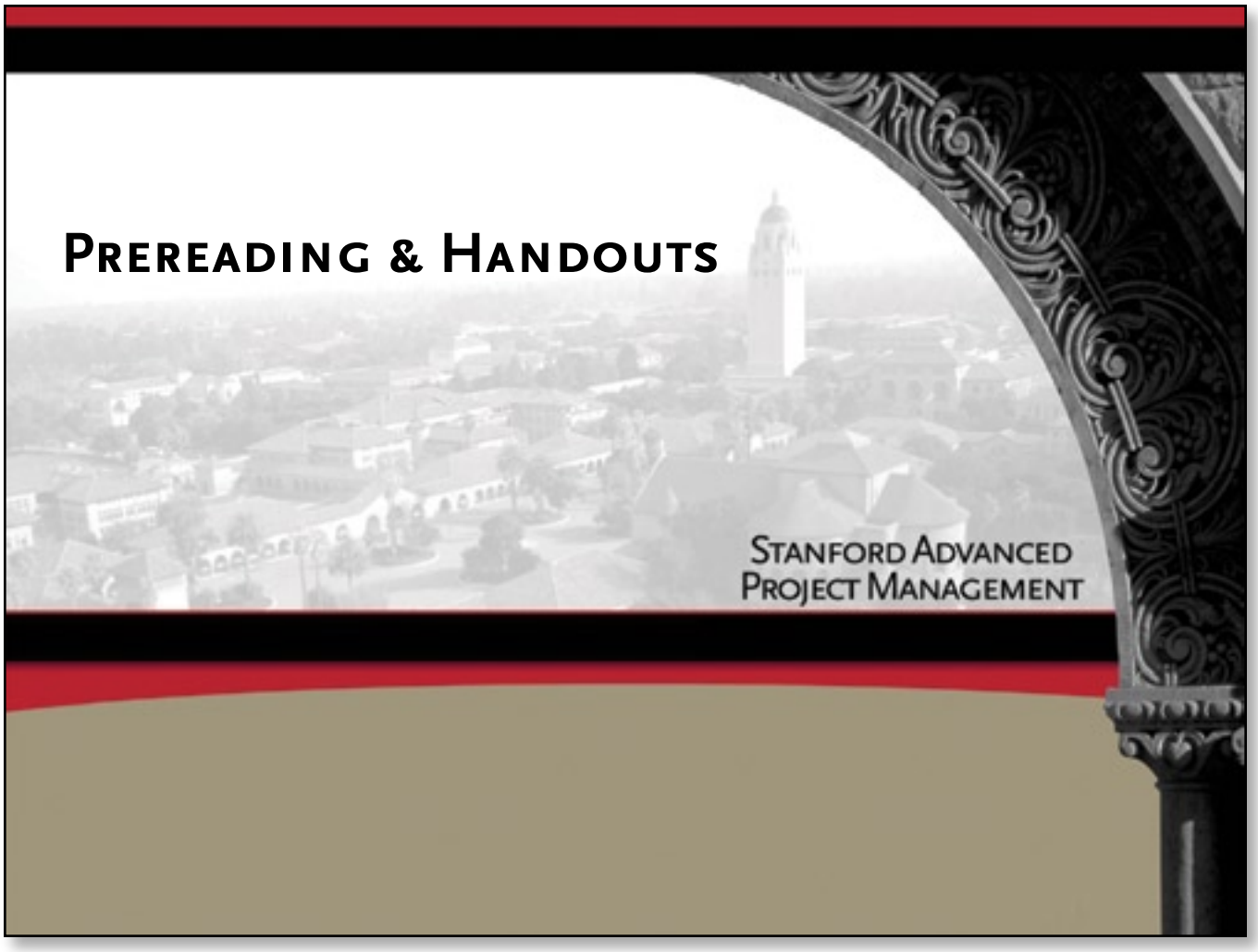

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Pre-Reading

You have no pre-reading assignments for *Mastering the Integrated Program* (MIP).

Reference

For reference throughout the course

- MIP and Program Integration models: Download from the MIP course Web page
- The MIP *Process Guide*: Download from the MIP course Web page

Handouts

For Mark Morgan's session 2, "Program Management Exercise and Introduction to the Program Management Process"

- "Whiz Bang Laptop Computer Program Instructions": Download from the MIP course Web page
- "Whiz Bang Memos": Download from the MIP course Web page

For Mark Morgan's session 3, "Linking Business Strategy to the Integrated Project and Defining Stakeholder Expectations"

- "MIP Case Study: SofTech Amalgomated DataMining": Download from the MIP course Web page

For Mark Morgan's session 7, "Creating an Optimized Integrated Program Schedule"

- "Dependency Diagram Wall Charts": Download from the MIP course Web page

For Mark Morgan's session 9, "Tracking the Program to Successful Closure"

- "Chips Ahoy Exercise Instructions": Download from the MIP course Web page

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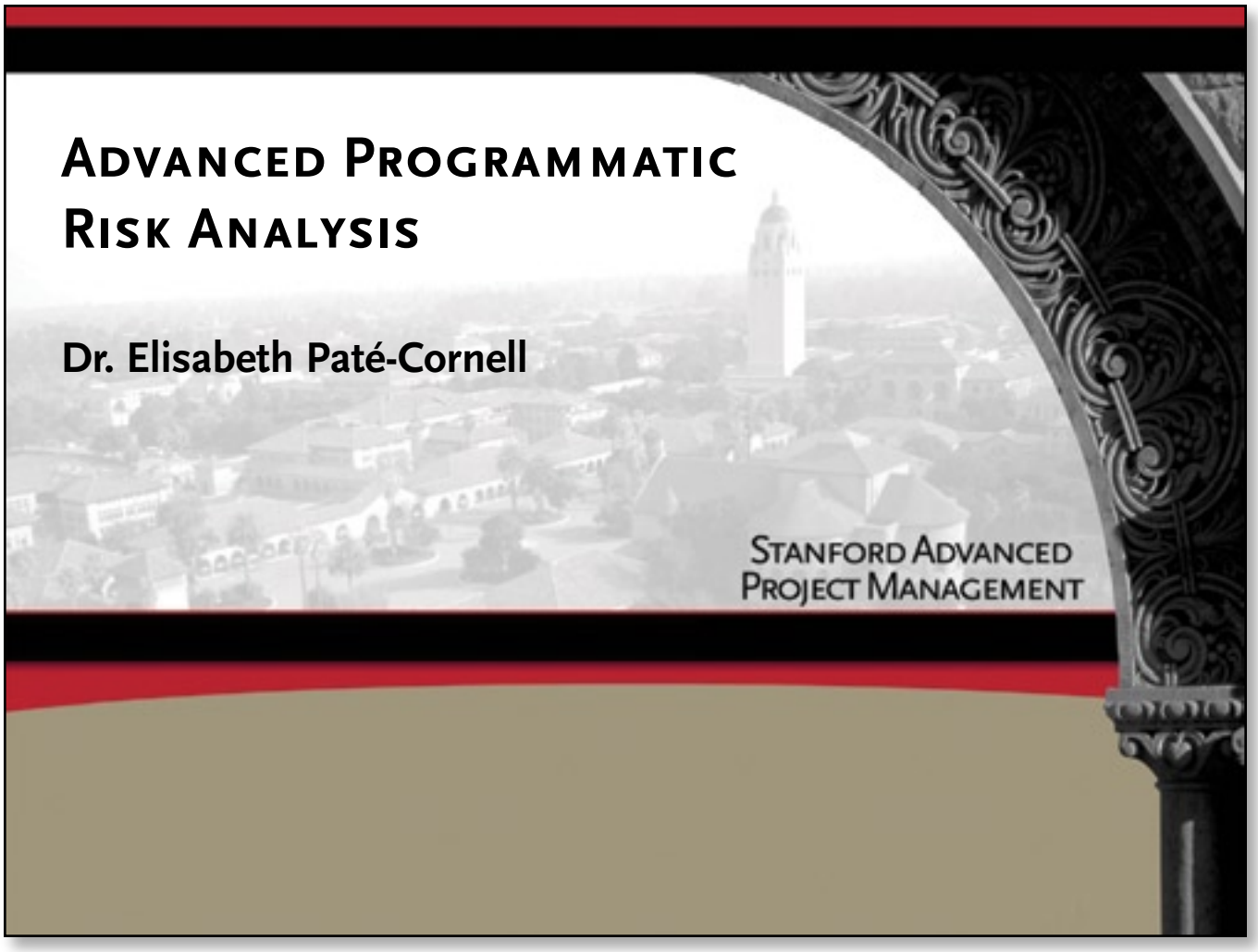

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Advanced Programmatic Risk Analysis

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Management strategies to improve operations are not necessarily easy to implement

- They often introduce new risks
- They challenge the way business is done
- They create challenges for those who do the work

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Advanced Programmatic Risk Analysis is a model and supporting tool developed to assess:

- Organizational risks of changing the way you do business
- Probability of technical success or failure among inter-dependent projects

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Advanced Programmatic Risk Analysis Project

- Part 1 - Key Learnings from four recent NASA/JPL Case Studies

  A review of the challenges experienced in the implementation of new strategies that contributed to mission success, the short-term key learnings, and the associated considerations for long-term implementation

- Part 2 - Advanced Programmatic Risk Analysis Model and Tool

  A description of the analysis model and associated tool for balancing management risks and technical risks among inter-dependent projects

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Part 1

Key Learnings from Recent NASA Projects

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NASA Unmanned Space Missions "Faster-Better-Cheaper" Program

Objectives of the Study

- Search for successful management factors in recent "Faster-Better-Cheaper" (F-B-C) missions
- Recommend improvements for continued success, leveraging lessons learned
- Develop an analytical tool to support managers' decisions
- Determine how to effectively manage risk under resource constraints

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NASA Missions "Faster-Better-Cheaper" Program

Case Studies

- Cassini (Flagship Mission: The Base Case)
- Mars Pathfinder
- Mars Global Surveyor
- Deep Space 1

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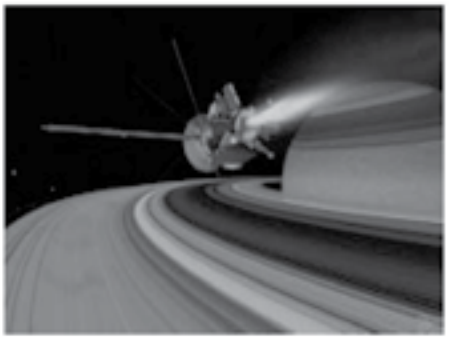
Cassini

Program Start:
November, 1989 (restructured in 1992)

Launch:
October, 1997

Mission:
7-year journey to Saturn
4-year study of the Saturn System
18 experiments, including the Huygens Probe



Cost:
$3.2 billion

Highlights:
Best instrumented probe sent to another planet
Largest quantity of information about a planet system

Thorough probabilistic risk analysis required because of plutonium fuel

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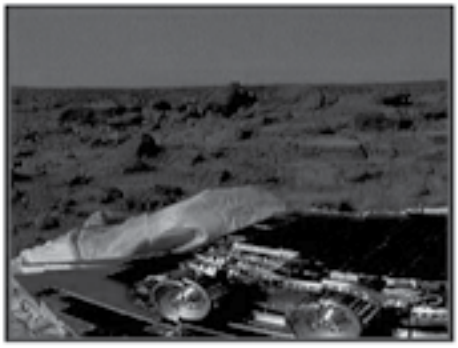
Mars Pathfinder

Planned Duration:
Lander - 1 month (actual duration was 3 months)
Rover - 1 week

Cost:
$171 million (excluding launch vehicle and rover)

Highlights:
Served as an engineering demonstration of key technologies for future Mars missions

Rover actually continued functioning until they lost contact with the lander



Major risk analysis involved failure mode and effects analysis, worst-case and parts-stress analysis

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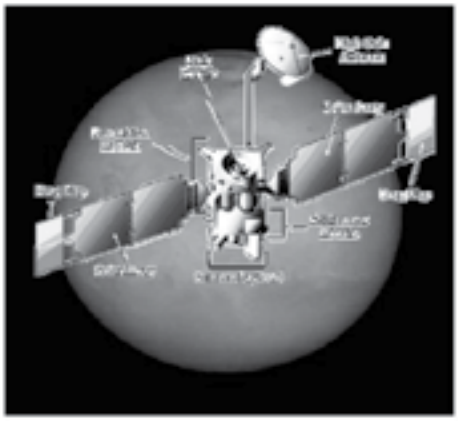
Mars Global Surveyor

Schedule:

28 months
Extended by one year to reach mapping orbit
Launched in September, 1997
Reached alternative mapping orbit in Feb., 1999



Cost:

$149.8 million

Highlights:

Designed as a quick, low-cost mission to recover from the loss of the Mars Observer

Damper arm failure caused damage to the solar panel upon deployment, requiring a change of the aerobraking schedule

Risk analysis included failure mode and effect analysis, and coarse quantification.

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Deep Space 1

Development Schedule:

39 months
Launched October, 1998

Cost:

$145 million

Highlights:

Included 12 advanced technologies, such as ion propulsion, advanced solar arrays, and deep space transponders

As of July 1999, eleven of the advanced technologies have received 100% of their needed testing - the spacecraft is preparing for its encounter with an asteroid

Risk analysis included failure mode and effect analysis, and parts-stress analysis.

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Part 1

Strategies

- implemented to accomplish "faster-better-cheaper" projects

Key Learnings

- Short-term success factors experienced while managing the challenges of implementing new strategies

Long-Term Considerations

- Enablers for assuring long-term successful implementation of "faster-better-cheaper" strategies

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Stricter Constraints on Schedules and Budgets

Key Learning

- Break questionable habits

Long-Term Consideration

- Set appropriate constraints and watch for short cuts

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Flat Management Structure

Key Learning

- Decision power is given to people close to the basic expertise

Long-Term Considerations

- Make sure that those who have the relevant technical expertise also have the big picture

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Revised Relationship with Industrial Contractors, Including an Incentive Program Based on Shared Risks

Key Learning

- Fee based on product performance, not contractor performance during development

Long Term Consideration

- Keep close to project contractors (in development and operations)

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Streamlined Proposal Processes

Key Learning

- Brings participants on board earlier

Long-Term Consideration

- Make sure there is time for truly innovative ideas
- Evaluate proposals through consistent multi-attribute criteria

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Contingency Planning Requiring Appropriate System Interfaces

Key Learning

- Plan for possible de-scoping and fall back positions

Long-Term Consideration

- Consider the consequences of fall back positions on related projects

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Simplified Review Process for Early Detection of Potential Problems

Key Learning

- Numerous peer reviews have worked

Long-Term Consideration

- Keep a mix of peer and formal reviews

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Assure Adequate Reserves and Front-loaded Funding Profile

Key Learning

- "F-B-C" may need to "jump start" the project to finish on time

Long-Term Consideration

- Don't spend too much money defining the project

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Advanced Programmatic Risk Analysis

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Summary

Common issues evidenced in the management of organizational strategies include the need to manage:

- Tradeoffs between "management risks" and "technical failure risks"
- Risks associated with the inter-dependencies of projects within programs.

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Part 2

Balancing Management Risks and Technical Risks

Minimizing Overall Risk among Inter-Dependent Projects in a Program

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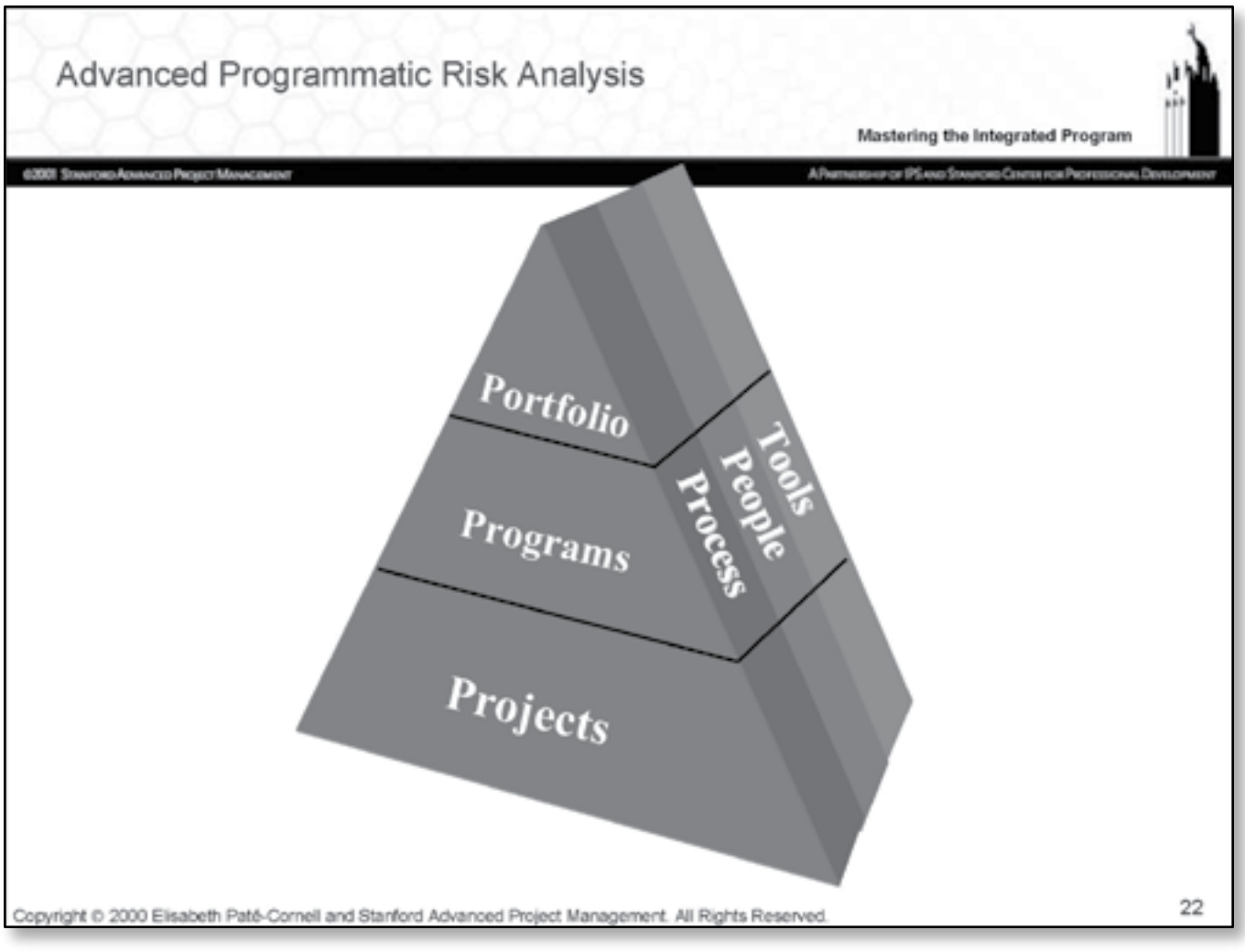

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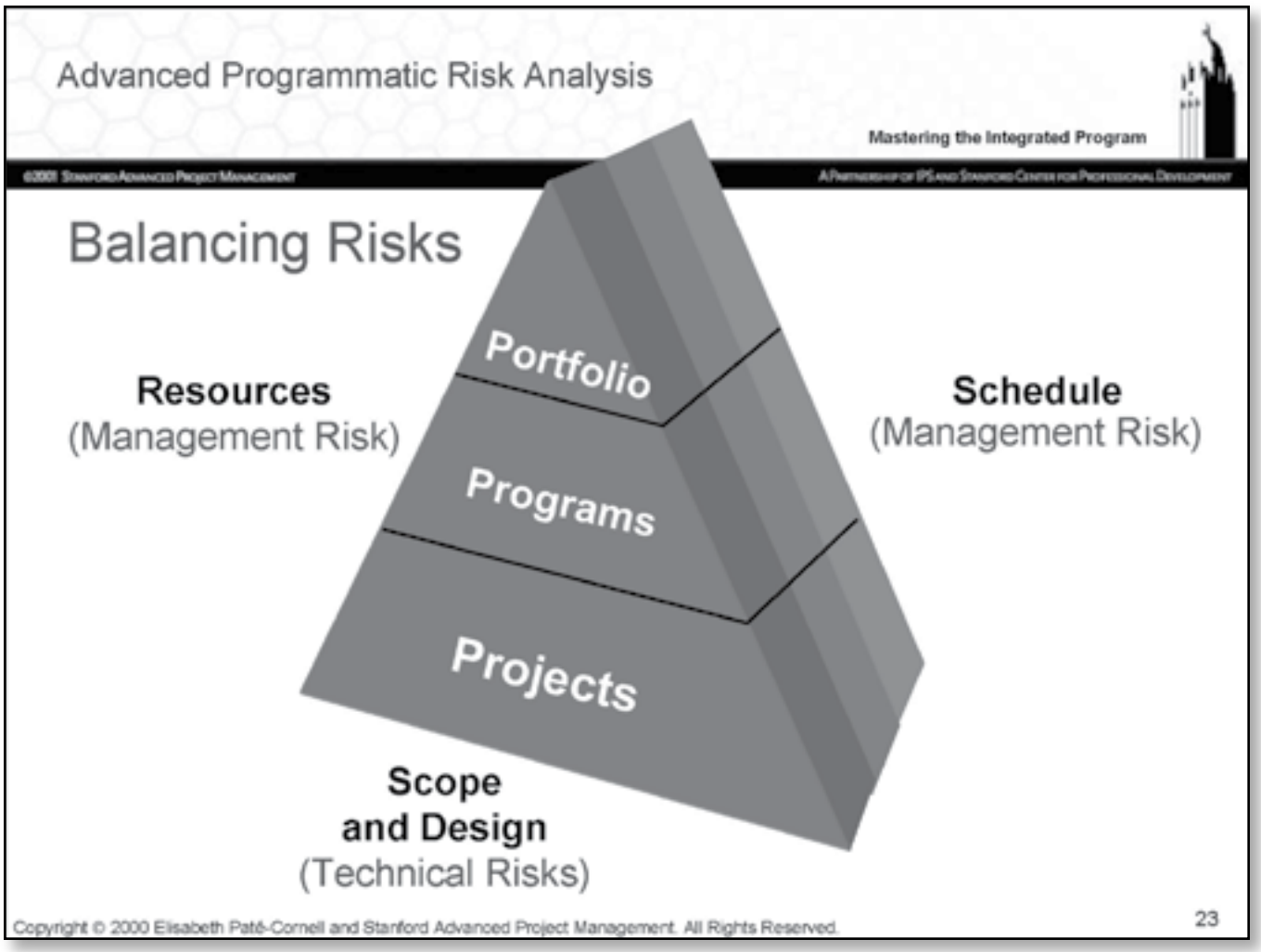

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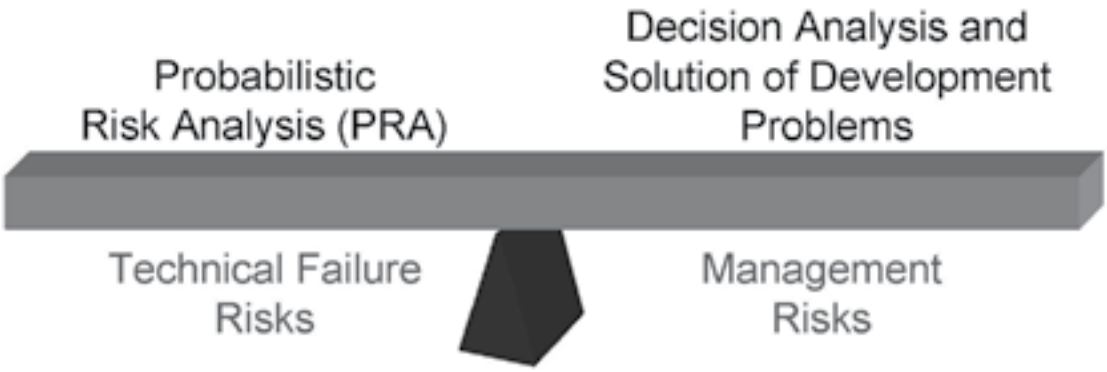
The Need to Balance Risk

Current Approach

Current risk analysis techniques lean heavily toward "management risks" and rely on personal expertise for managing "technical failure risks"

Our Approach



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Analytical Tool for Advanced Programmatic Risk Analysis

Features

- Facilitates tradeoffs between the Technical Failure and Management risks
- Considers the effects of inter-dependencies among projects in the program
- Provides improved:
  - physical system design process
  - management of budgeted resources
  - information for making management decisions

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Increasing Levels of Model Sophistication

Four levels of model sophistication involving multiple projects inside a single program.

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Advanced Programmatic Risk Analysis

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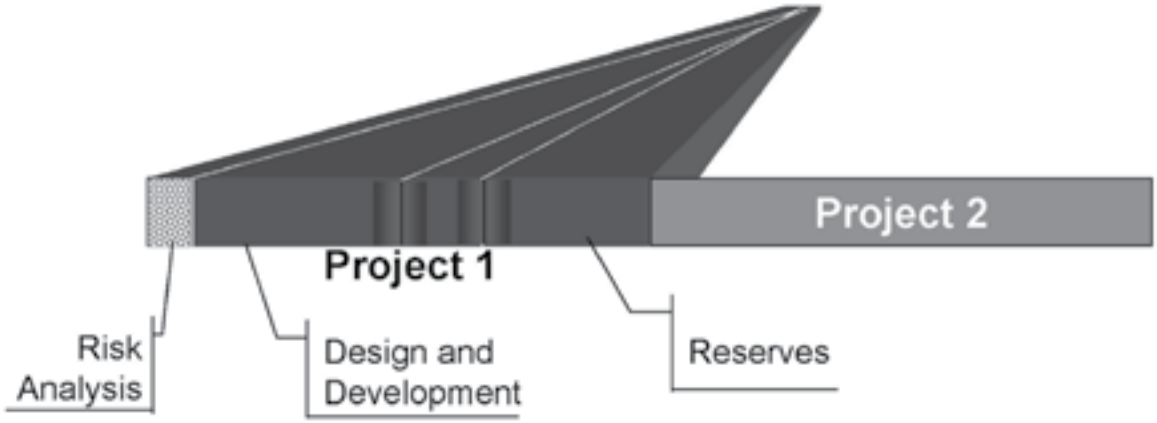
Levels of Model Sophistication



Level 1: Assumes all development problems are detected and corrected and that all failures are catastrophic. The objective is to find optimal design and reserve levels.

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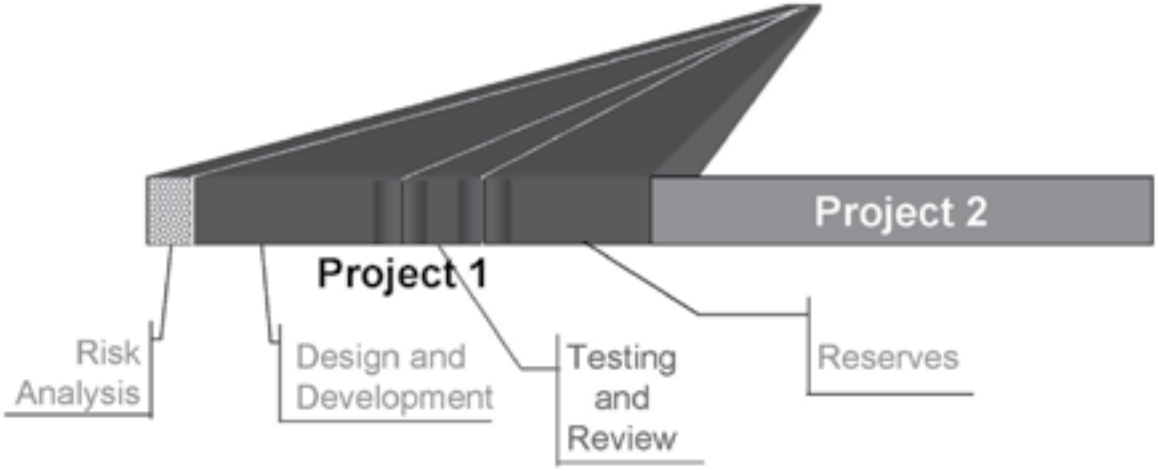
Levels of Model Sophistication



Level 2: Includes a "warning system" for problem detection by specifying a portion of the budget to testing and review. The objective is to find the optimal design, testing and review, and reserve levels.

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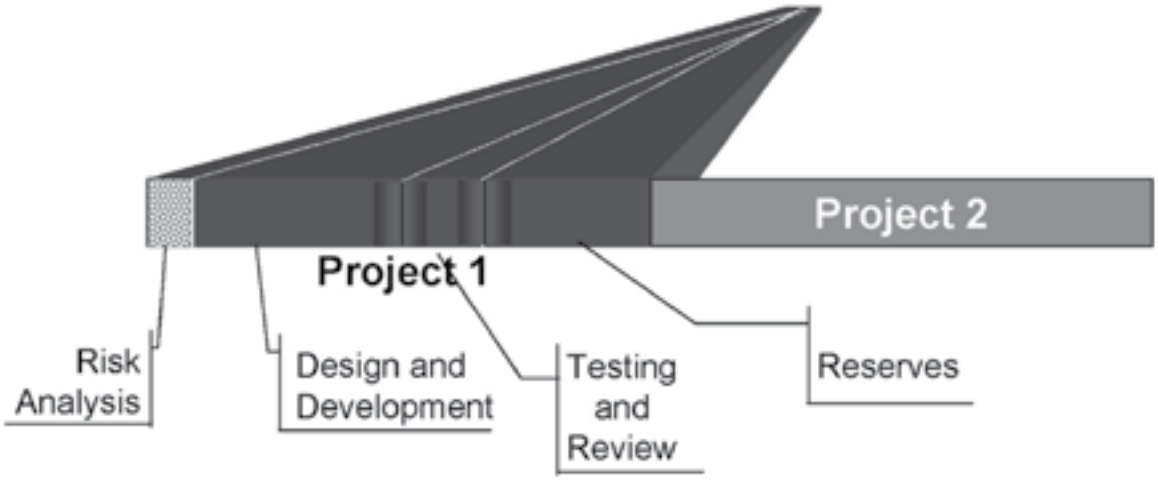
Levels of Model Sophistication



Level 3: Introduces ***partial technical failure and partial management failure.*** The objective is to find the optimal design, testing and review, and reserve levels, accounting for partial failures.

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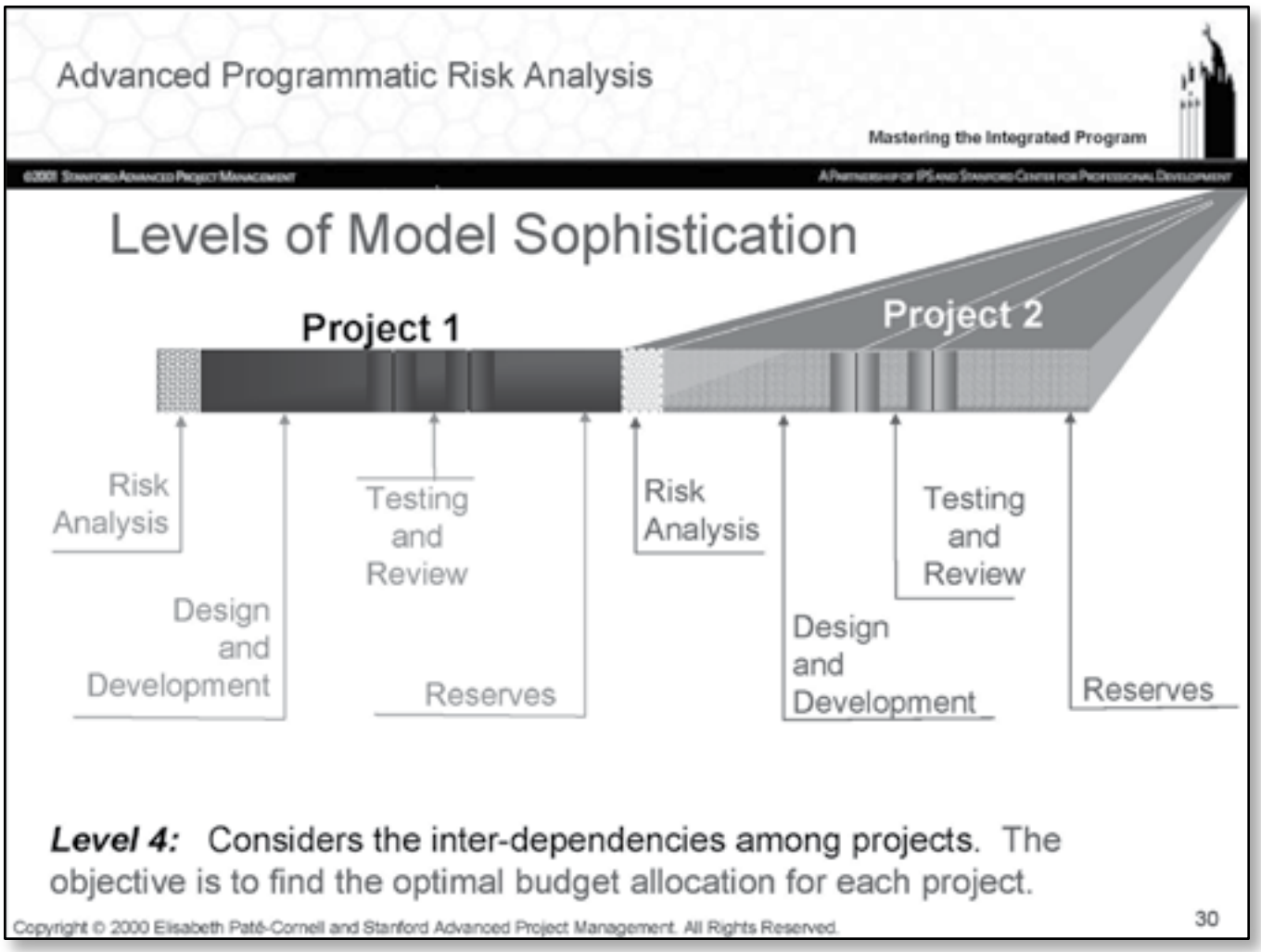

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Identify Possible Design Configurations	Identifying components
Find Minimum Cost Design	For each configuration: • the cheapest feasible components • the residual budget *(project budget - minimum cost)*
Optimize the Allocation of Residual Budget	Between: • reinforcing the minimum design • reserves
Determine the Optimal Project Budget Allocation	Among specific components, testing and review, and reserve budgets

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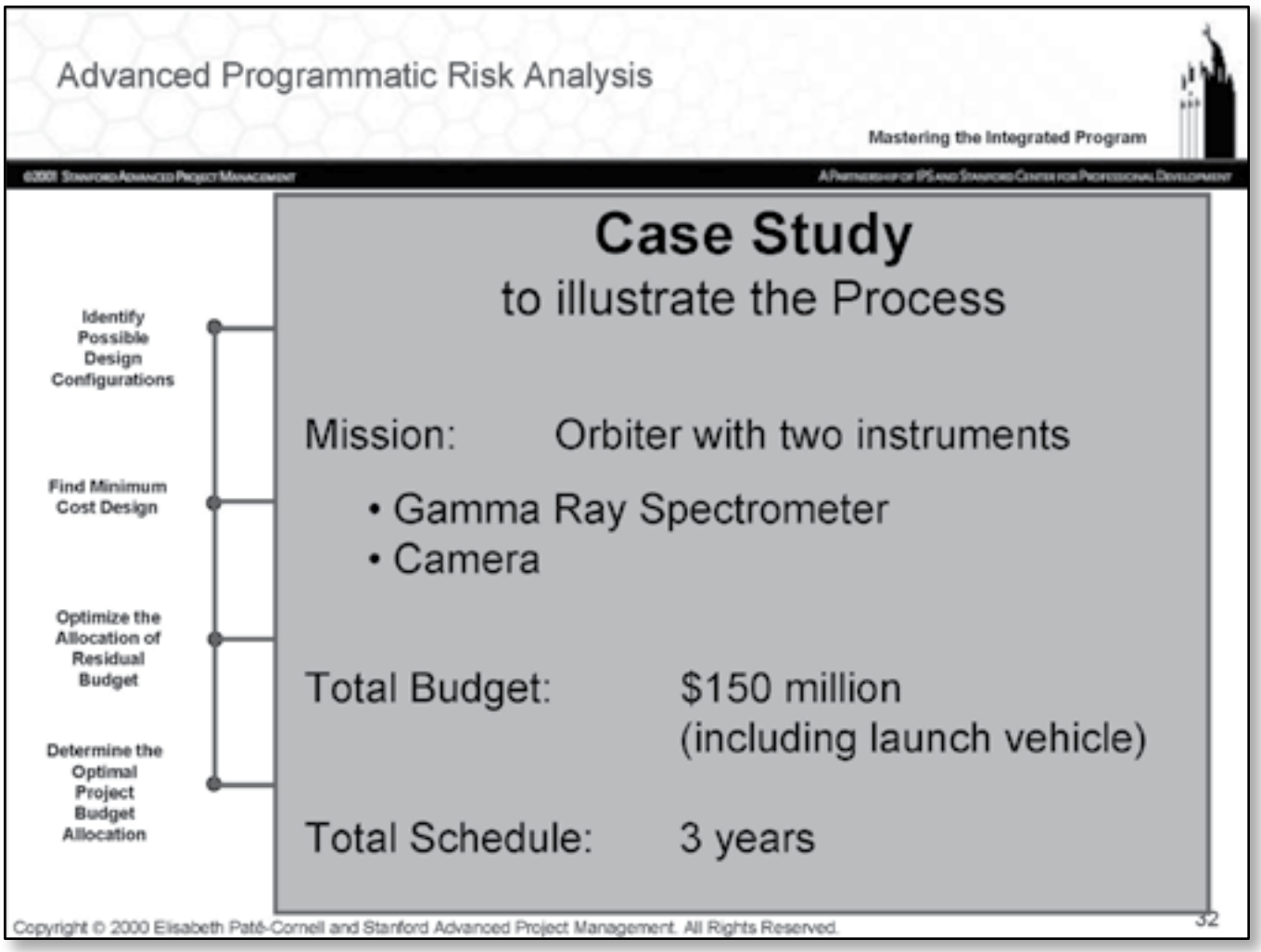

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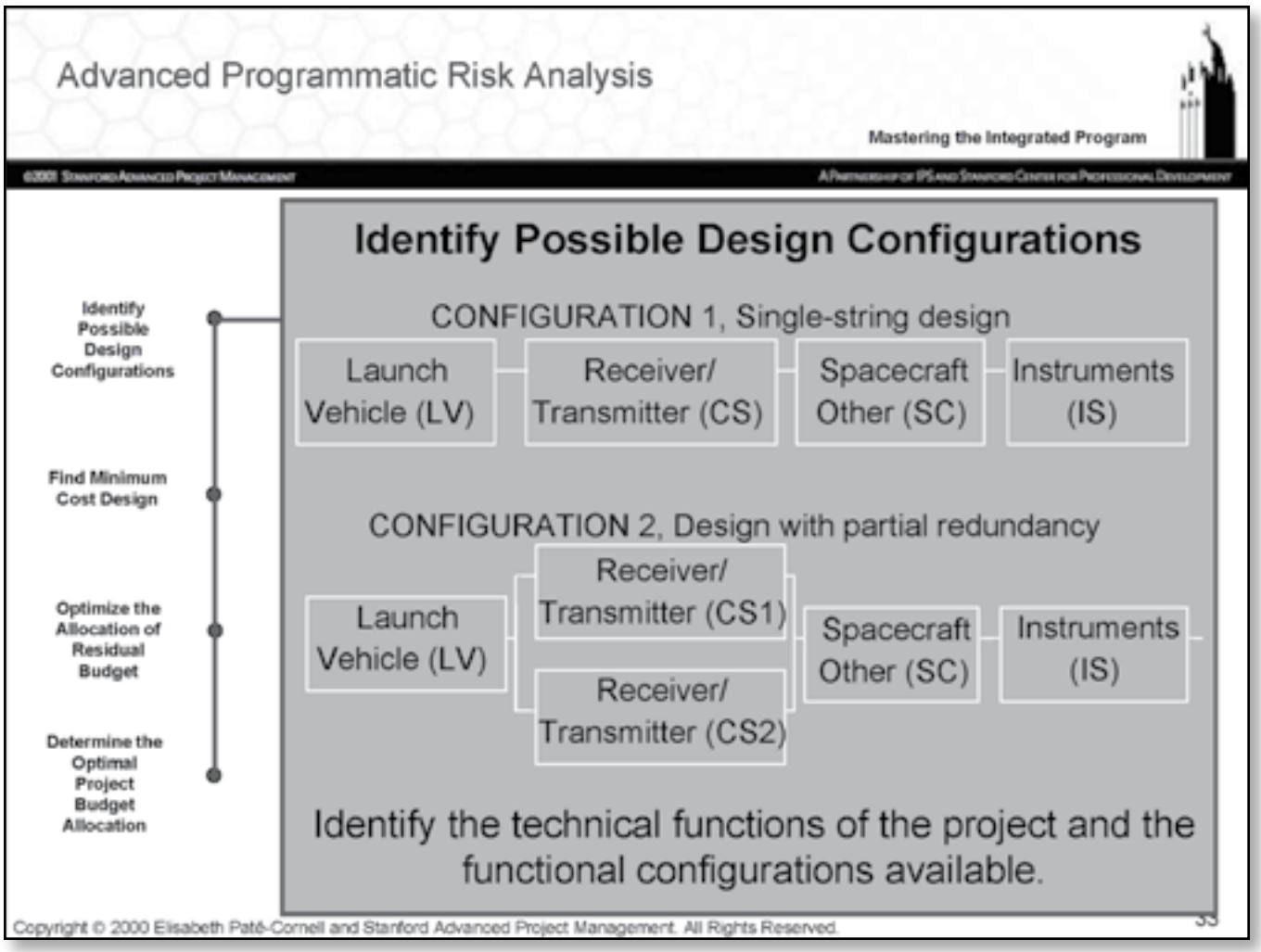

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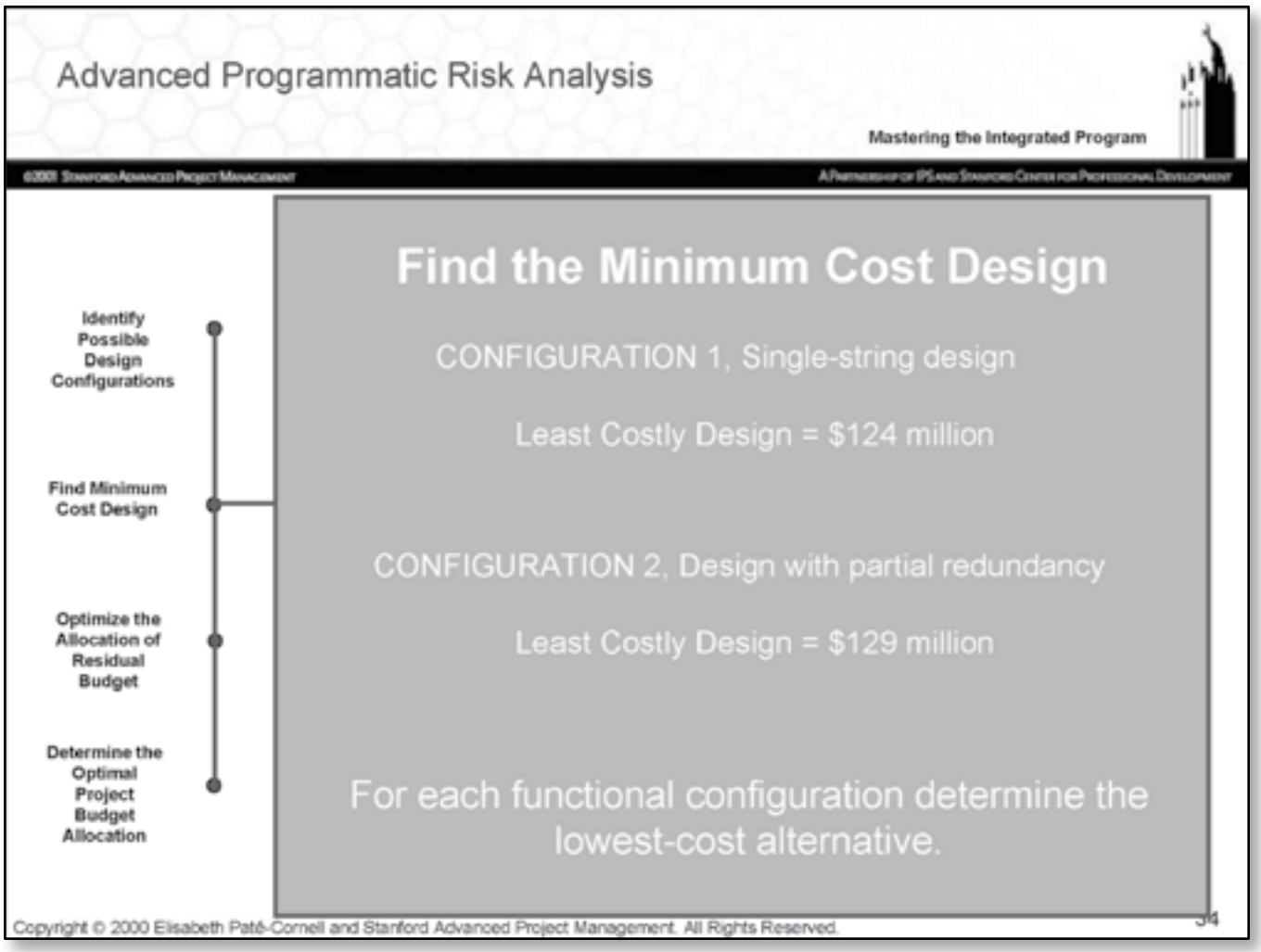

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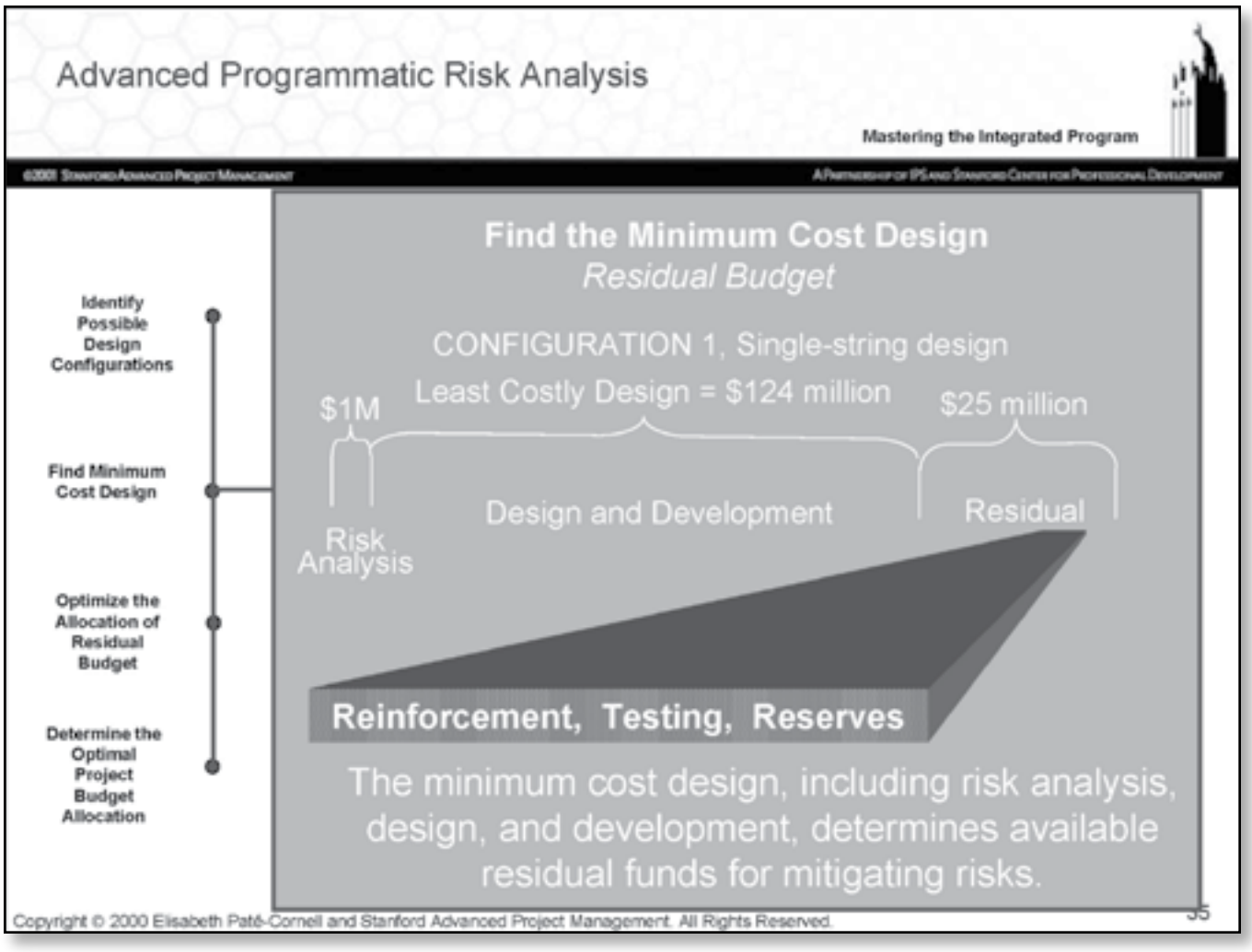

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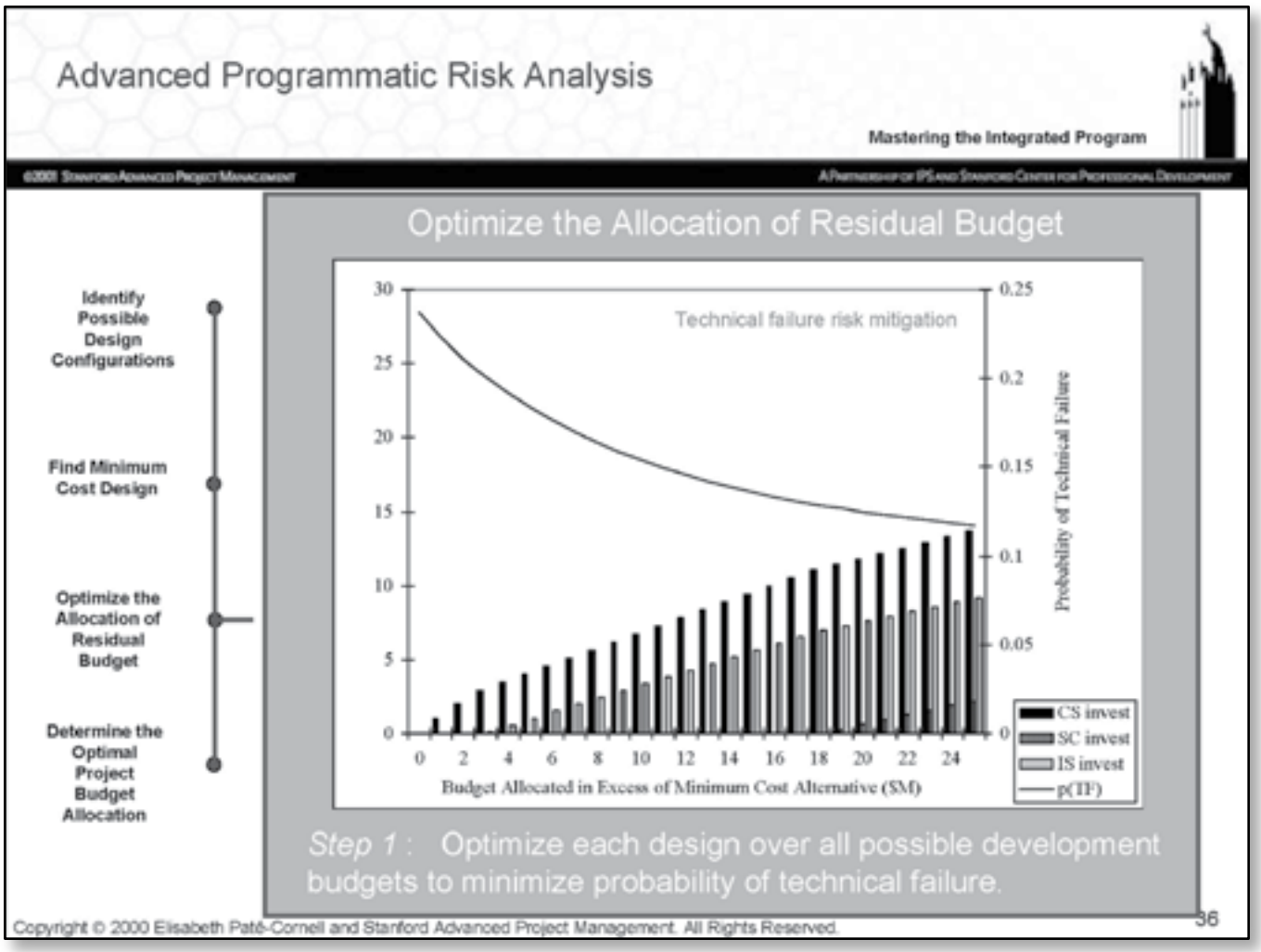

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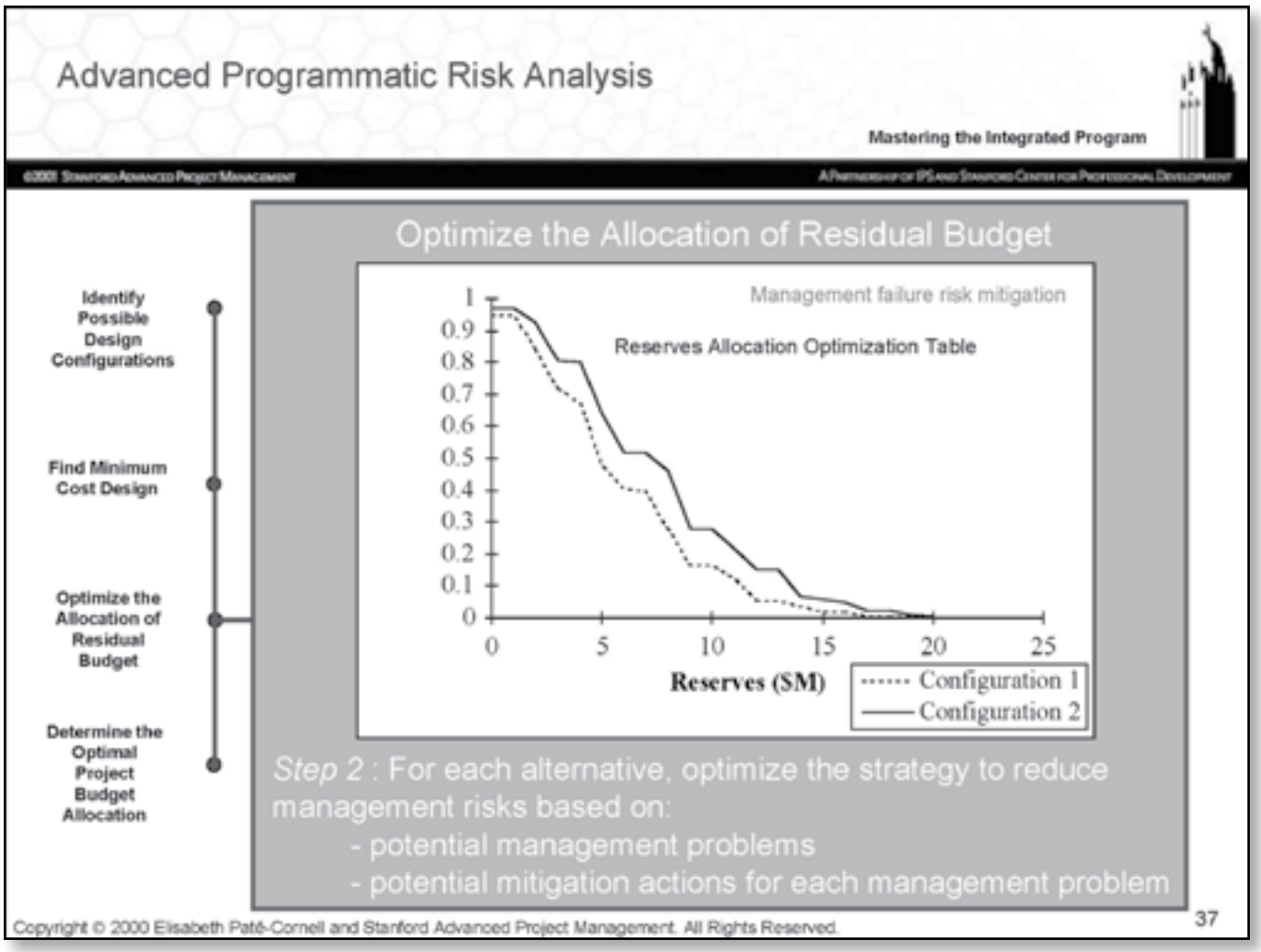

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Identify Possible Design Configurations

Find Minimum Cost Design

Optimize the Allocation of Residual Budget

Determine the Optimal Project Budget Allocation

Determine the Optimal Project Budget Allocation

Results of Configuration 1 (Single-string)
Total Budget = $150M, Minimum Cost Design = $124M

Development (M)	p(TF)	Reserves (M)	p(MF)	EV(COST OF FAILURE) ($M)
$150	0.12	$0	0.95	143.4
$145	0.13	$5	0.48	82.1
$140	0.14	$10	0.16	41.6
$136	0.15	$14	0.03	26.3
$135	**0.15**	**$15**	**0.02**	**25.1←x_1^***
$134	0.16	$16	0.02	26.5
$133	0.16	$17	0.01	25.3
$132	0.17	$18	0.00	25.5
$131	0.18	$19	0.00	27.0
$130	0.18	$20	0.00	27.0
$125	0.24	$25	0.00	36.0

Optimize the distribution of the residual funds based on the design for Configuration 1 resulting in the lowest Expected Value (EV) of the cost of failure.

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Identify Possible Design Configurations

Find Minimum Cost Design

Optimize the Allocation of Residual Budget

Determine the Optimal Project Budget Allocation

Determine the Optimal Project Budget Allocation

Results of Configuration 2 (Partial Redundancy)
Total Budget = $150M, Minimum Cost Design = $129M

Development (M)	p(TF)	Reserves (M)	p(MF)	EV(COST OF FAILURE) ($M)
$150	0.11	$0	0.97	146.0
$145	0.12	$5	0.64	102.5
$140	0.12	$10	0.28	55.0
$135	0.13	$15	0.06	27.3
$134	0.14	$16	0.05	27.5
$133	**0.14**	**$17**	**0.02**	**23.6←x_2^***
$132	0.15	$18	0.02	25.1
$131	0.15	$19	0.01	23.8
$130	0.16	$20	0.00	24.0

Consider the EV(cost of failure) for all alternative designs and configurations. The optimum alternative may not be the Minimum Cost Design.

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Identify Possible Design Configurations

Find Minimum Cost Design

Optimize the Allocation of Residual Budget

Determine the Optimal Project Budget Allocation

Determine the Optimal Project Budget

± Constraint (orig. $150M)	Config	Develop. ($M)	p(TF)	Reserves ($M)	p(MF)	E(Cost of Failure) ($M)	ΔE ($M)
+$1 M	1	$136	0.15	$15	0.016	$24.4	-0.6
	2	$134	0.14	$17	0.021	**$23.0**	
+$2 M	1	$135	0.15	$17	0.005	$23.7	-1.5
	2	$133	0.14	$19	0.009	**$22.1**	
+$3 M	1	$136	0.15	$17	0.005	$23.0	-2.2
	2	$134	0.14	$19	0.009	**$21.4**	
+$4 M	1	$139	0.14	$15	0.016	$22.9	-2.7
	2	$134	0.14	$20	0.005	**$20.9**	
+$5 M	1	$138	0.14	$17	0.005	$22.0	-3.2
	2	$135	0.13	$20	0.005	**$20.4**	
-$1 M	1	$134	0.16	$15	0.016	$25.9	+1.0*
	2	$132	0.15	$17	0.021	**$24.6**	
-$2 M	1	$133	0.16	$15	0.016	$26.6	+2.0*
	2	$131	0.15	$17	0.021	**$25.6**	
-$3 M	1	$132	0.17	$15	0.016	$27.5	+3.3
	2	$130	0.16	$17	0.021	**$26.9**	

Consider how much better or worse the EV(cost of failure) would be with minor variations in the total project budget (**shadow cost of constraint**).

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Identify Possible Design Configurations

Find Minimum Cost Design

Optimize the Allocation of Residual Budget

Determine the Optimal Project Budget Allocation

Level 1 : (No bugs left - Total Failure)

Optimum is Configuration 2 (Redundant design)

Total Budget = $150M, Minimum Cost Design = $129M

Development	p(TF)	Reserves	p(MF)	EV(Cost of Failure)
$133M	0.14	$17M	.02	**23.6**

Level 2 : (Testing & Review)

Optimum is Configuration 2 - "Perfect" Warning System

Total Budget = $148M + $2M, Minimum Cost Design = $129M

Development	p(TF)	Reserves	p(MF)	EV(Cost of Failure)
$131M	0.153	$17M	.02	**25.6**

Results of Configuration 2 - "Cheap" warning system

Total Budget = $149M + $1M, Minimum Cost Design = $129M

Development	p(TF)	Reserves	p(MF)	EV(Cost of Failure)
$132M	0.18	$17M	.010	**28.5**

Level 3 : (partial failures)

Optimum is Configuration 1 (Single-string)

Total Budget = $148M + $2M, Minimum Cost Design = $124M

Development	p(TF)	p(PTF1)	p(PTF2)	Reserves	p(MF)	p(PMF)	EV(Cost of Failure)
$133M	0.174	0.056	0.197	$15M	.010	.006	**36.8**

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Identify Possible Design Configurations

Find Minimum Cost Design

Optimize the Allocation of Residual Budget

Determine the Optimal Project Budget Allocation

Management of Dependent Project in a Program

- If projects are inter-dependent, then the outcome of Project 1 affects Project 2
  - Costs that Project 2 incurs if Project 1 fails to develop a new technology or component
  - Costs that Project 2 incurs if Project 1 fails, and Project 2 must re-design a dependent subsystem
  - Costs of failure of Project 2 if it is cancelled due to the failure of Project 1
- Additional costs of Project 2 are treated as penalty costs of Project 1

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Identify Possible Design Configurations

Find Minimum Cost Design

Optimize the Allocation of Residual Budget

Determine the Optimal Project Budget Allocation

Management of Dependent Projects in a Program

- Process Model steps are still applicable, but must be applied to ***all projects in the program***
- Proceed *backwards*, using the Principle of Dynamic Programming (like playing Chess)
  - Optimize Project 2, conditional on the possible failure states of Project 1
  - Optimize Project 1, with additional penalty costs (additional costs incurred) by Project 2 if Project 1 experiences total or partial failures

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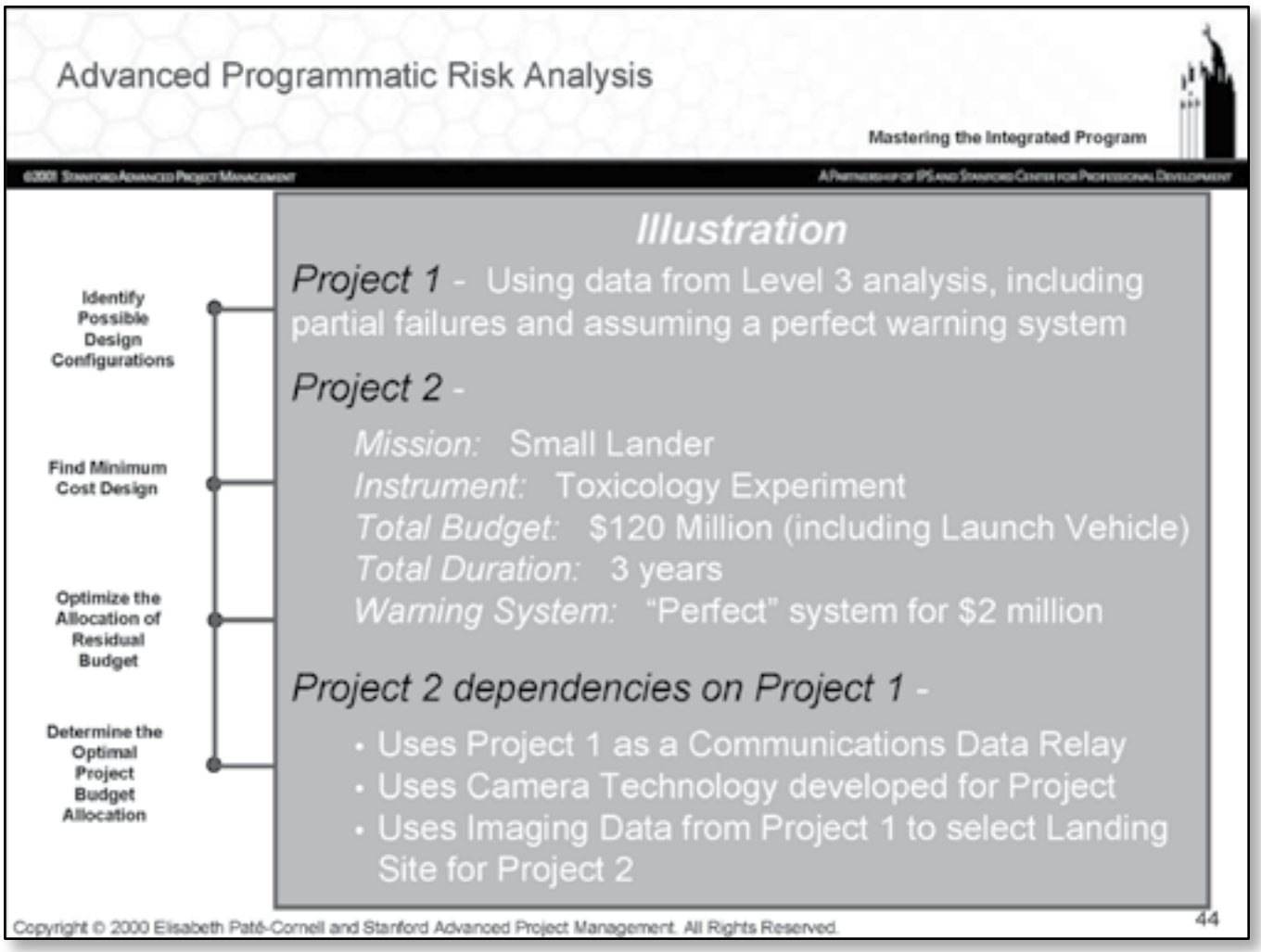

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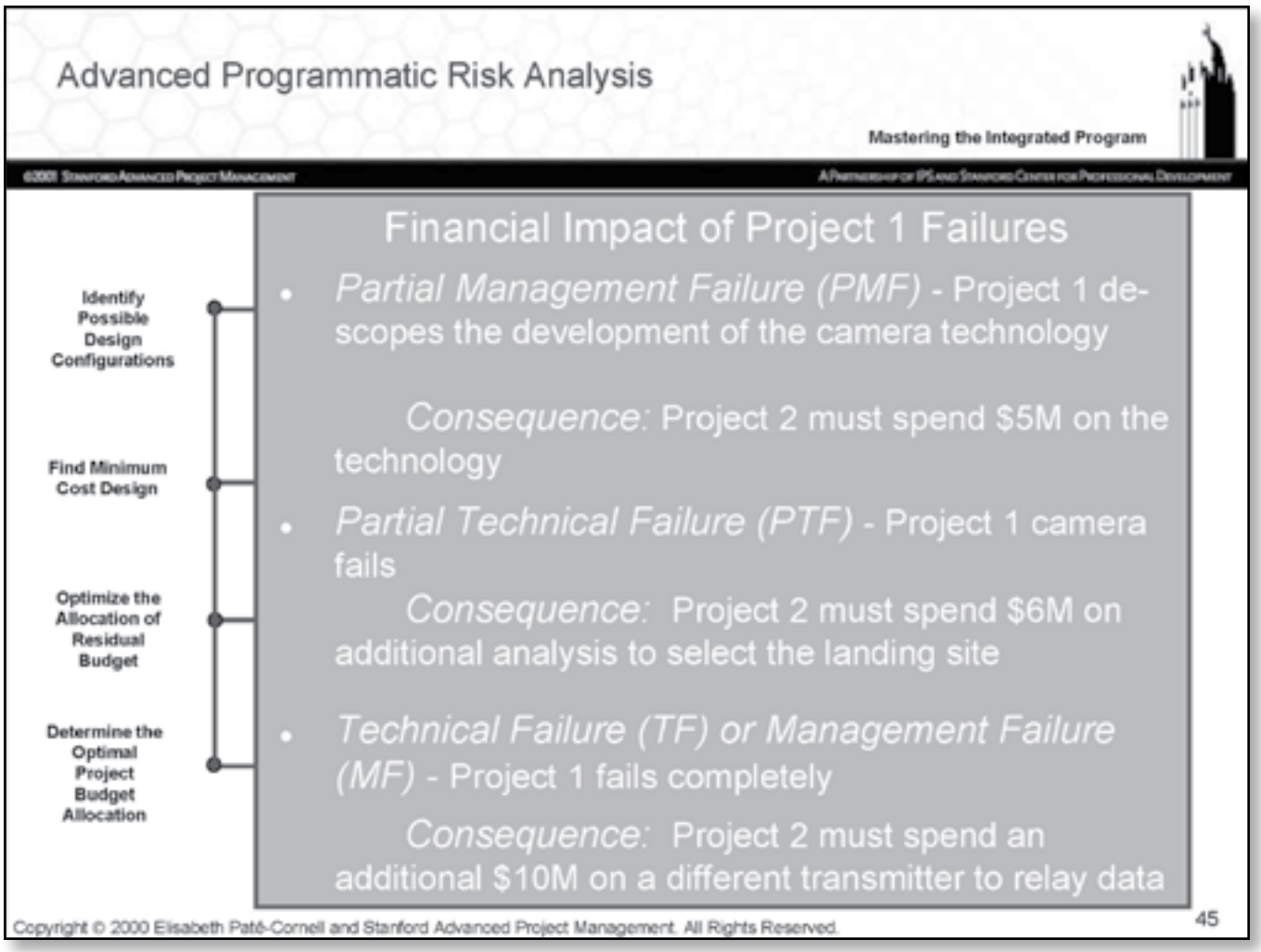

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Identify Possible Design Configurations

Find Minimum Cost Design

Optimize the Allocation of Residual Budget

Determine the Optimal Project Budget Allocation

Project 1 with Project 2 Failure Penalty

Total Available Budget = $148M + $2M (for warning system) with modified costs for Project 1

CONFIGURATION 1: (single-string)

Development (M)	p(1F)	p(P1F1)	p(P1F2)	Reserves (M)	p(MF)	p(PMF)	E(Cost of Failure) ($M)
$135	0.164	0.050	0.173	$13	0.038	0.016	58.5
$134	**0.169**	**0.053**	**0.184**	**$14**	**0.019**	**0.015**	**57.9***
$133	0.174	0.056	0.197	$15	0.010	0.006	58.0
$132	0.180	0.059	0.210	$16	0.010	0.006	60.0

CONFIGURATION 2: (Redundancy of CS)

Development (M)	p(1F)	p(P1F1)	p(P1F2)	Reserves (M)	p(MF)	p(PMF)	E(Cost of Failure) ($M)
$135	0.132	0.057	0.202	$13	0.128	0.022	62.9
$134	**0.135**	**0.062**	**0.224**	**$14**	**0.043**	**0.024**	**54.9***
$133	0.140	0.066	0.249	$15	0.041	0.017	56.2

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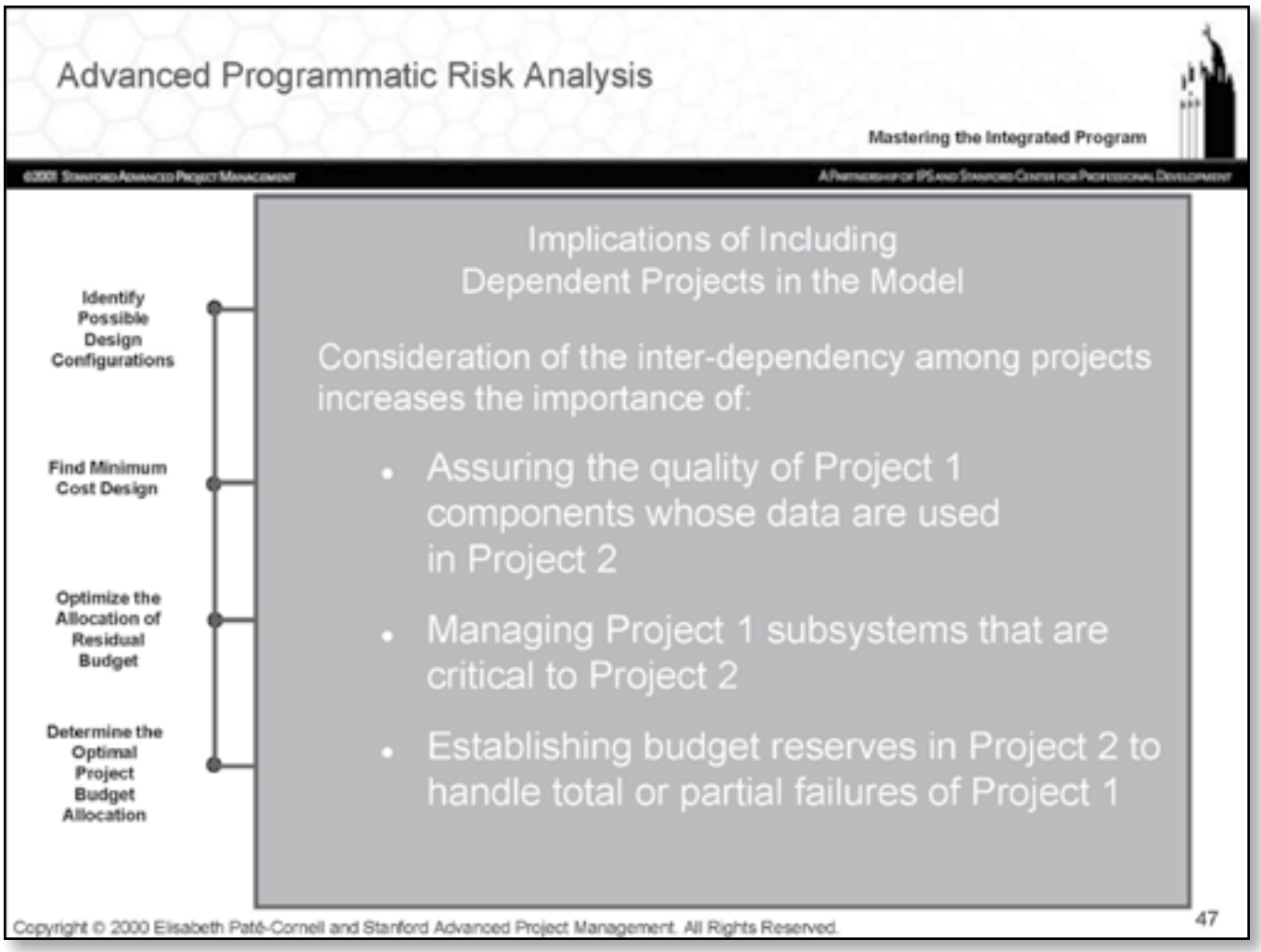

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Summary

Conclusions and Recommendations

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Conclusions

When resources are constrained:

- Technical Failure and Managerial Risks increase
- Adapted Management Practices are needed (e.g., flat management structure, simplified review processes, etc.)
- Inter-dependencies among projects must be explicitly considered
- Tradeoffs between management risks and technical failure risks must be considered

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Technology Recommendations

- Continue to invest research and development resources in new technologies
- Target and retain core expertise
- Ensure that all reviews and tests add value

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Management Recommendations

- Manage project staffing to capture the experience of previous projects and avoid employee "burnout"
- Be aware of the overhead burdens placed on small projects
- Provide project funding up-front (to resolve technical uncertainties early)
- Design the project plan and stick to it
- Use available analytical tools to optimize systems budgets and reserves

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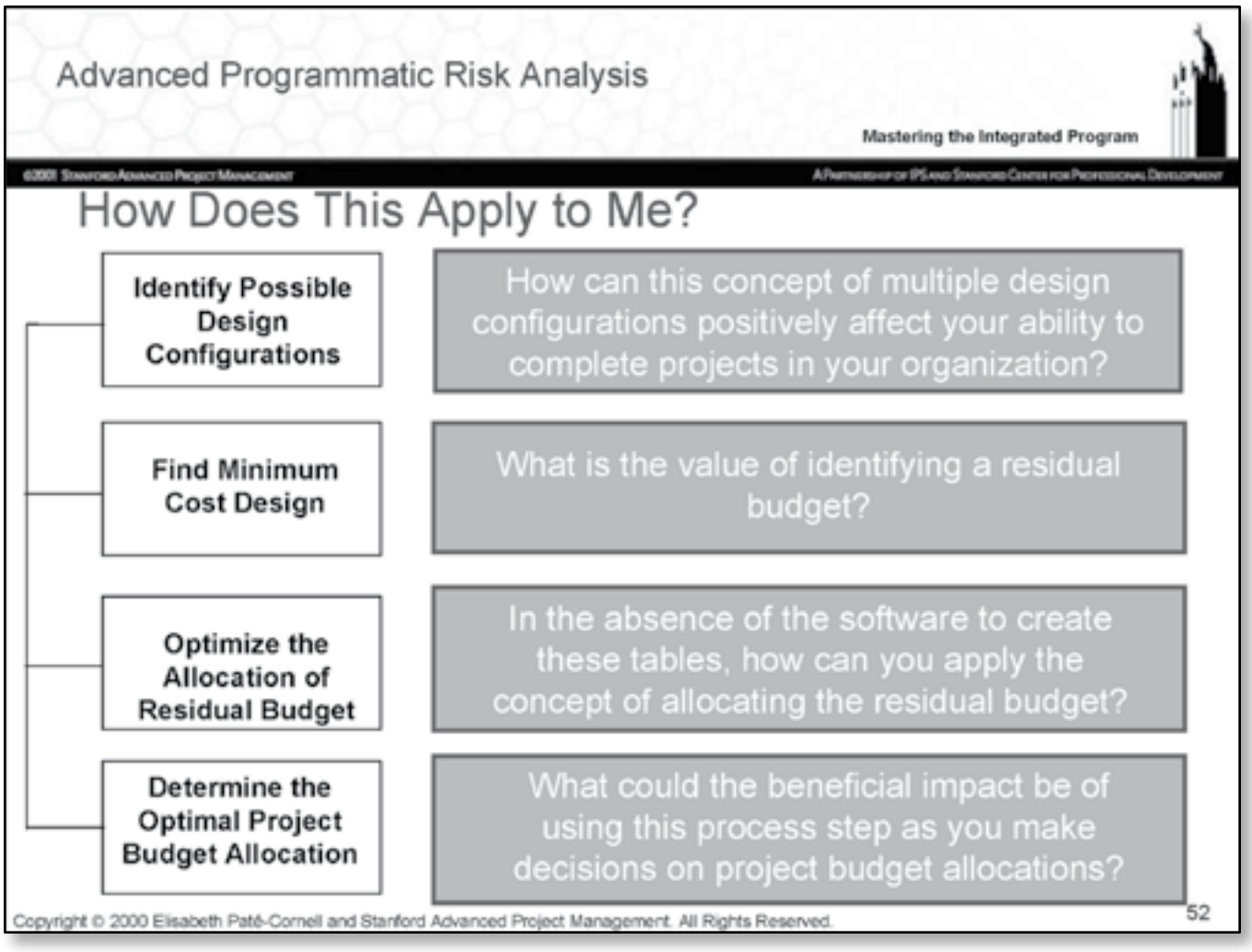

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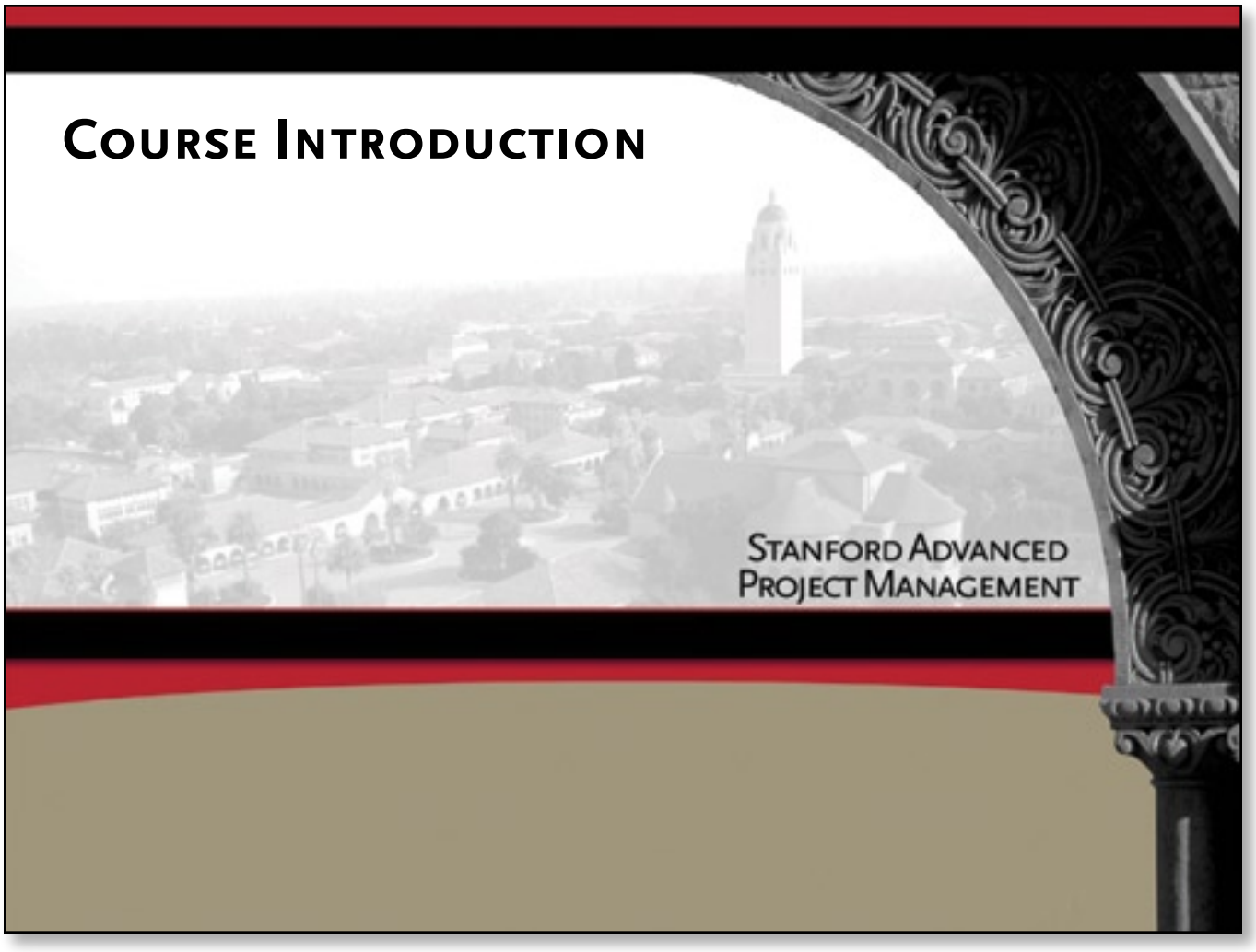

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Course Introduction

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Introductions

- Name
- Describe your job
- Current Programs
- Program Management Training
- One thing you would like to get from the course

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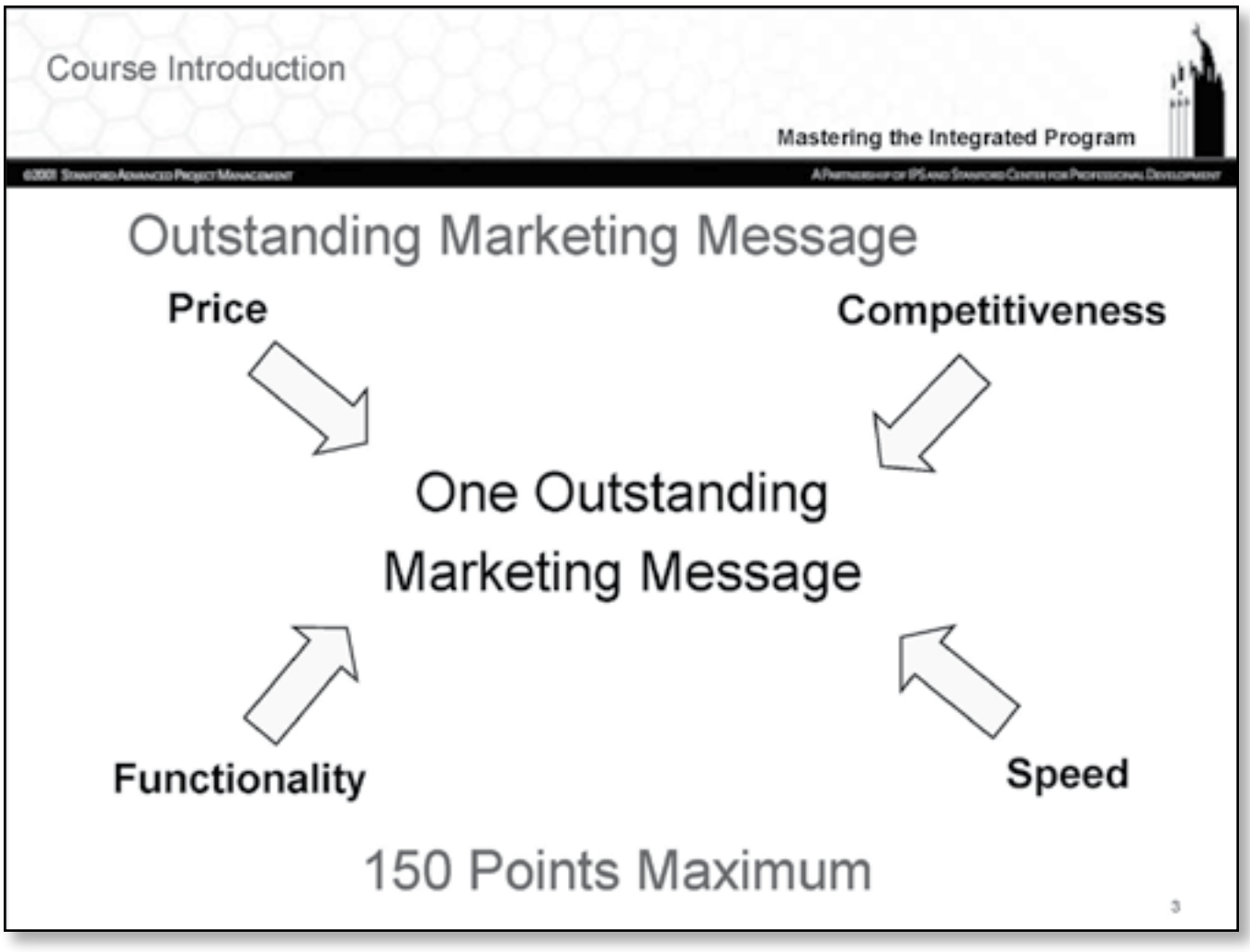

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Outstanding Marketing Message Rules

- 20 minutes to produce a single integrated message
- 150 points maximum
- Use e-mail to move messages and tiles
- 3 meetings maximum
- Only use meeting room if available
- Can only meet if there is an accepted invitation
- Status meeting after 10 minutes

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Lab – Challenges

- Consider the work environment in your current job
- Think about how the marketing message exercise relates to your environment
- Make a list on a flip chart of challenges to managing programs in your environment
- Select the top three
- Prepare to present to the group

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Challenges to Program Management

- Conflicting priorities
- More people
- Critical internal dependencies
- Incompatible internal processes
- Complex communication
- Knowing when to apply program management processes

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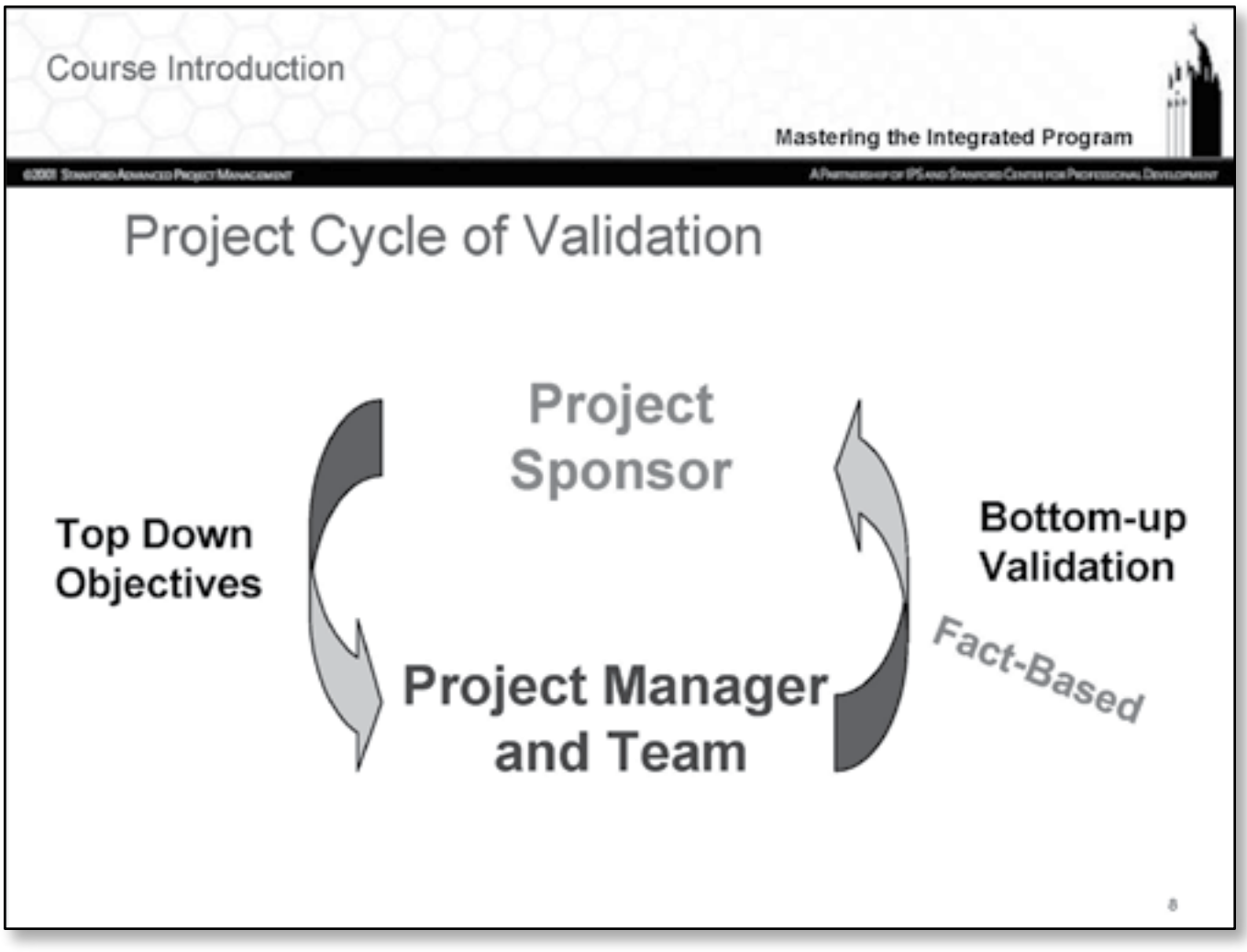

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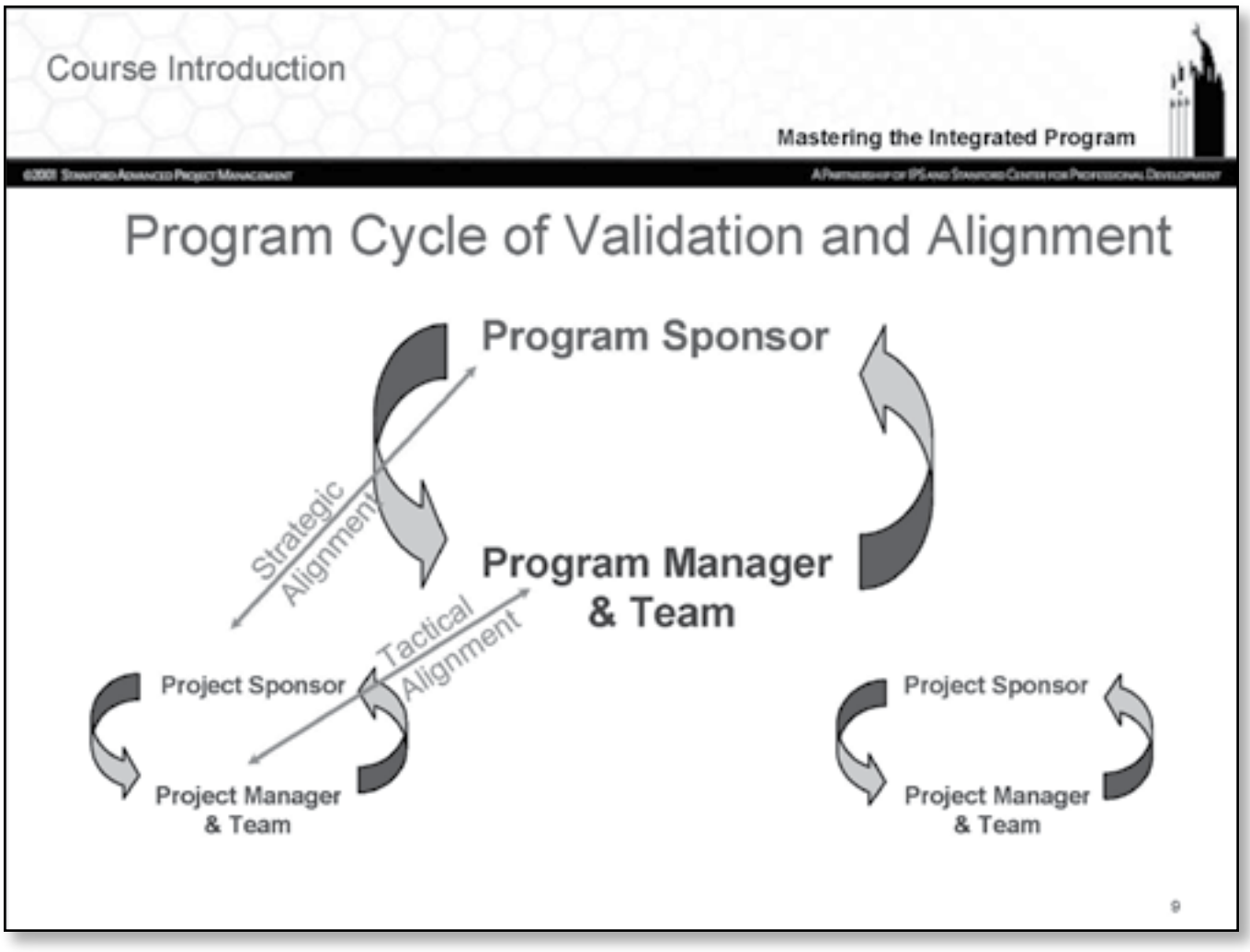

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Sponsor's Key Characteristics

- **Vision**
  - Has a strong vision of the strategic direction of the program
- **Commitment**
  - Is fully committed to being an engaged sponsor
- **Accountability**
  - Holds the Program Manager accountable
  - Is personally accountable for the Program
- **Empowerment**
  - Empowers the Program Manager to get the work done
  - Does not abdicate the sponsorship role

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Program vs. Project Sponsor

- Project Sponsorship
  - Mid-level Manager
  - Functionally aligned
  - Influence base across local organizations
  - Maintains strategic alignment
- Program Sponsorship
  - Executive level manager
  - Global alignment
  - Influence spans global enterprise
  - Strategy maker

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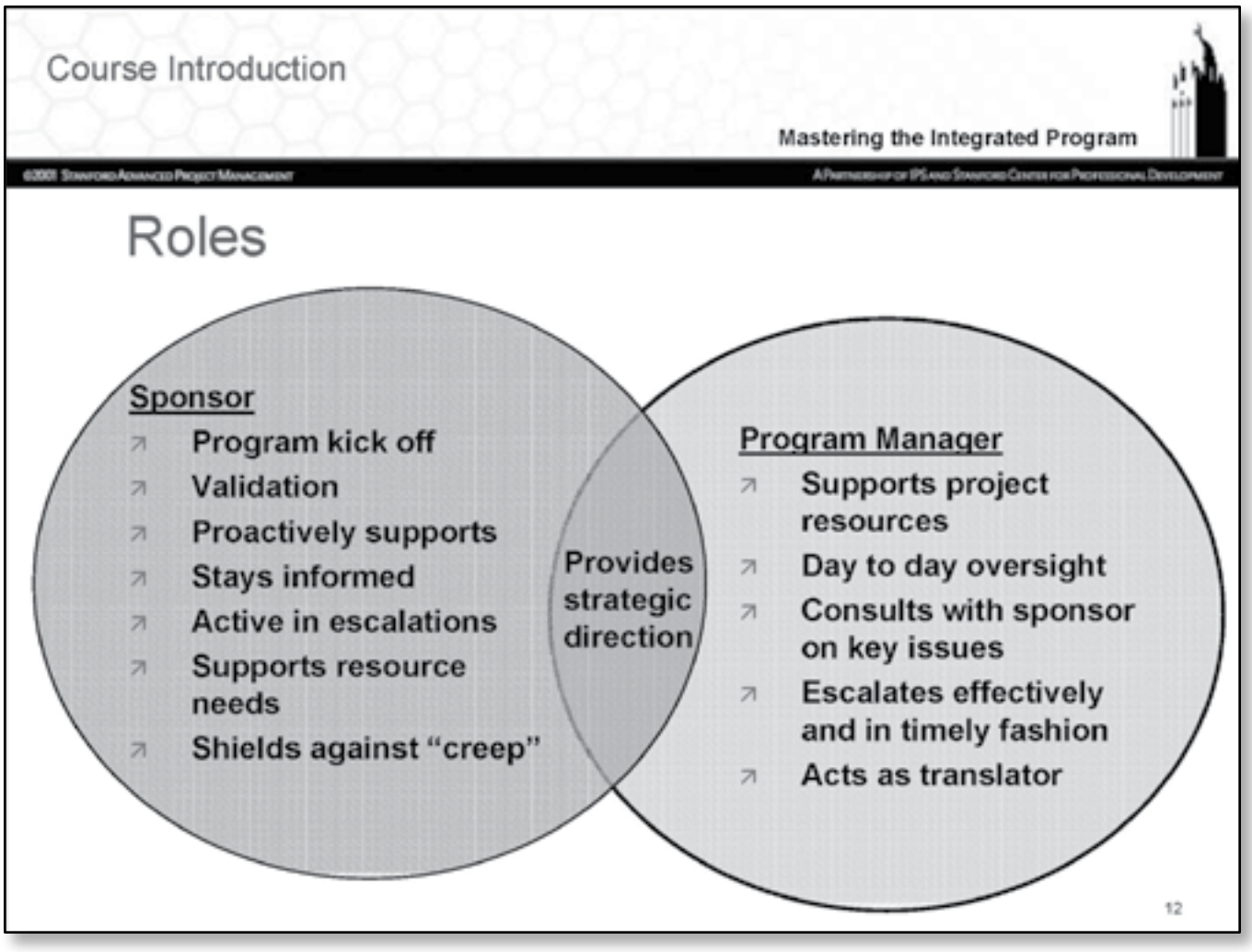

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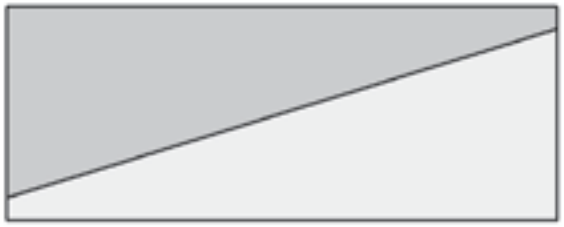
Project or Program?

Deliverable Complexity	Low ⟷	High
Deliverable Quantity	Few ⟷	Many
Deliverable Size	Small ⟷	Large
Number of People	Few ⟷	Many
Degree of Interdependence	Simple ⟷	Complex
Details of Agreements	Tasks only ⟷	Detailed Interfaces
Co-Location of the Team	Co-Located ⟷	Team Members around the Globe

Project Management



Program Management

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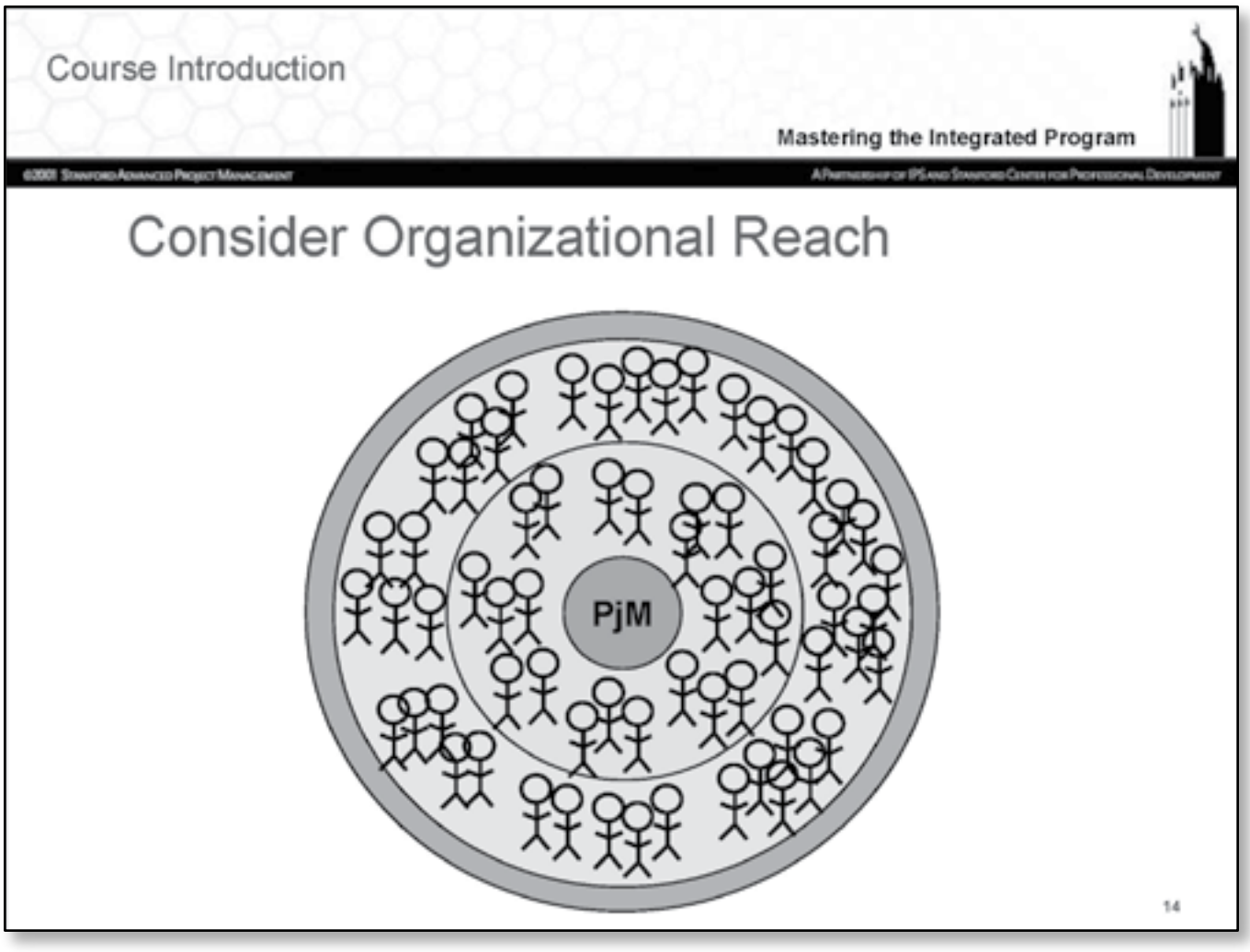

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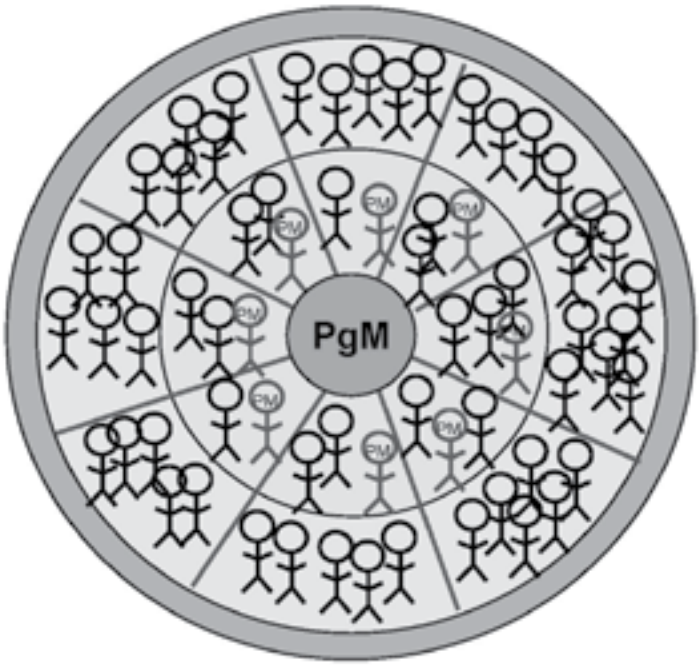
Segment and Integrate



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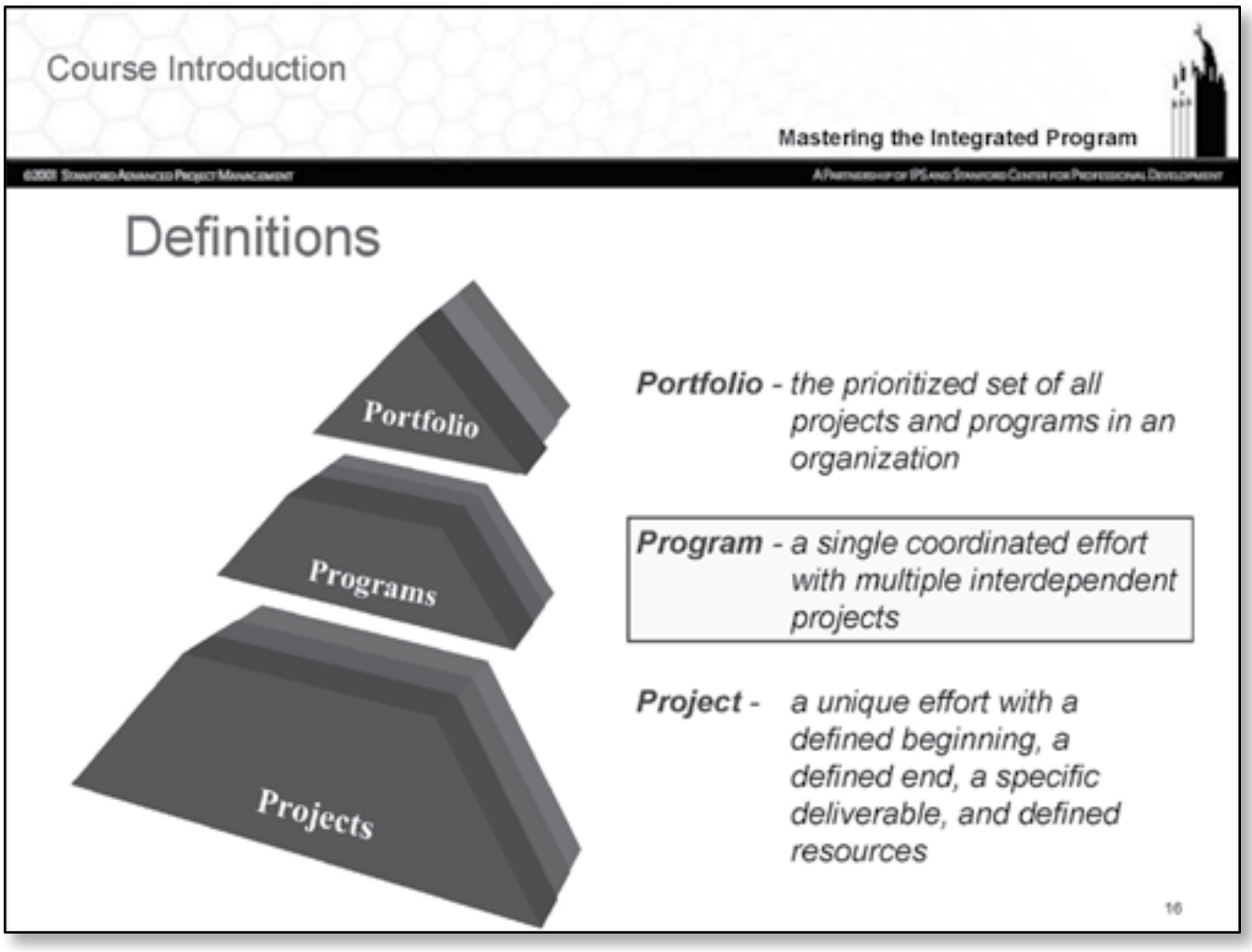

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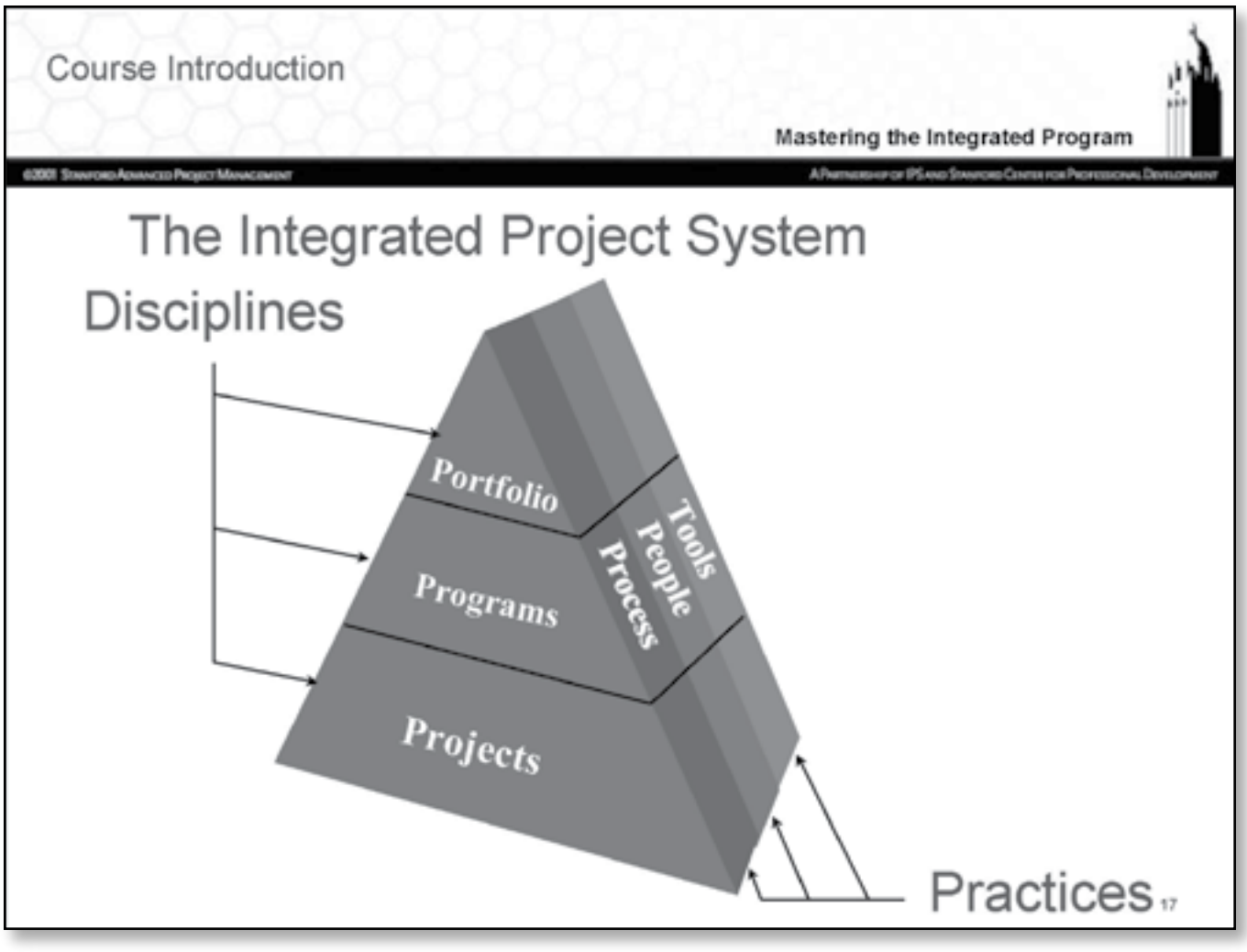

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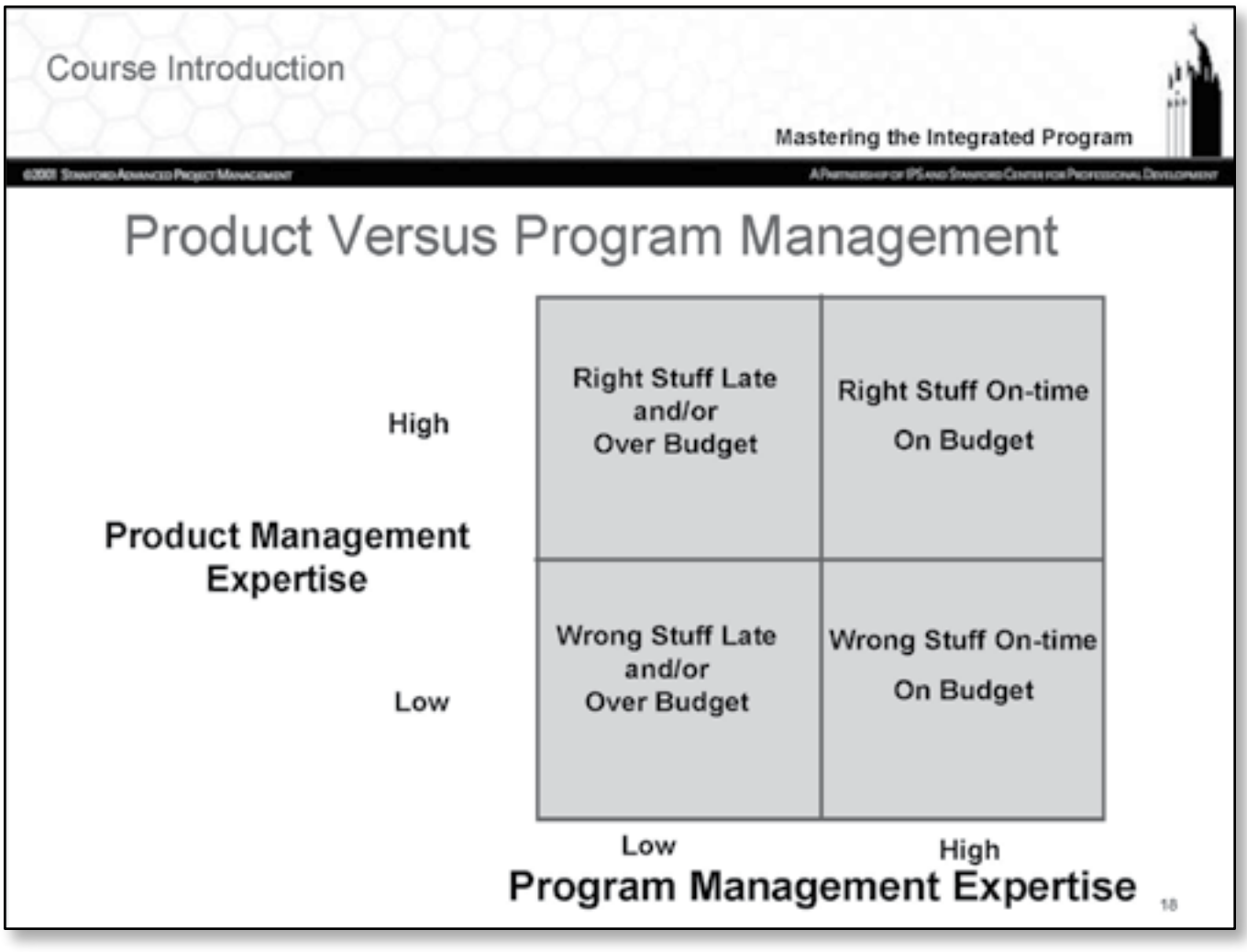

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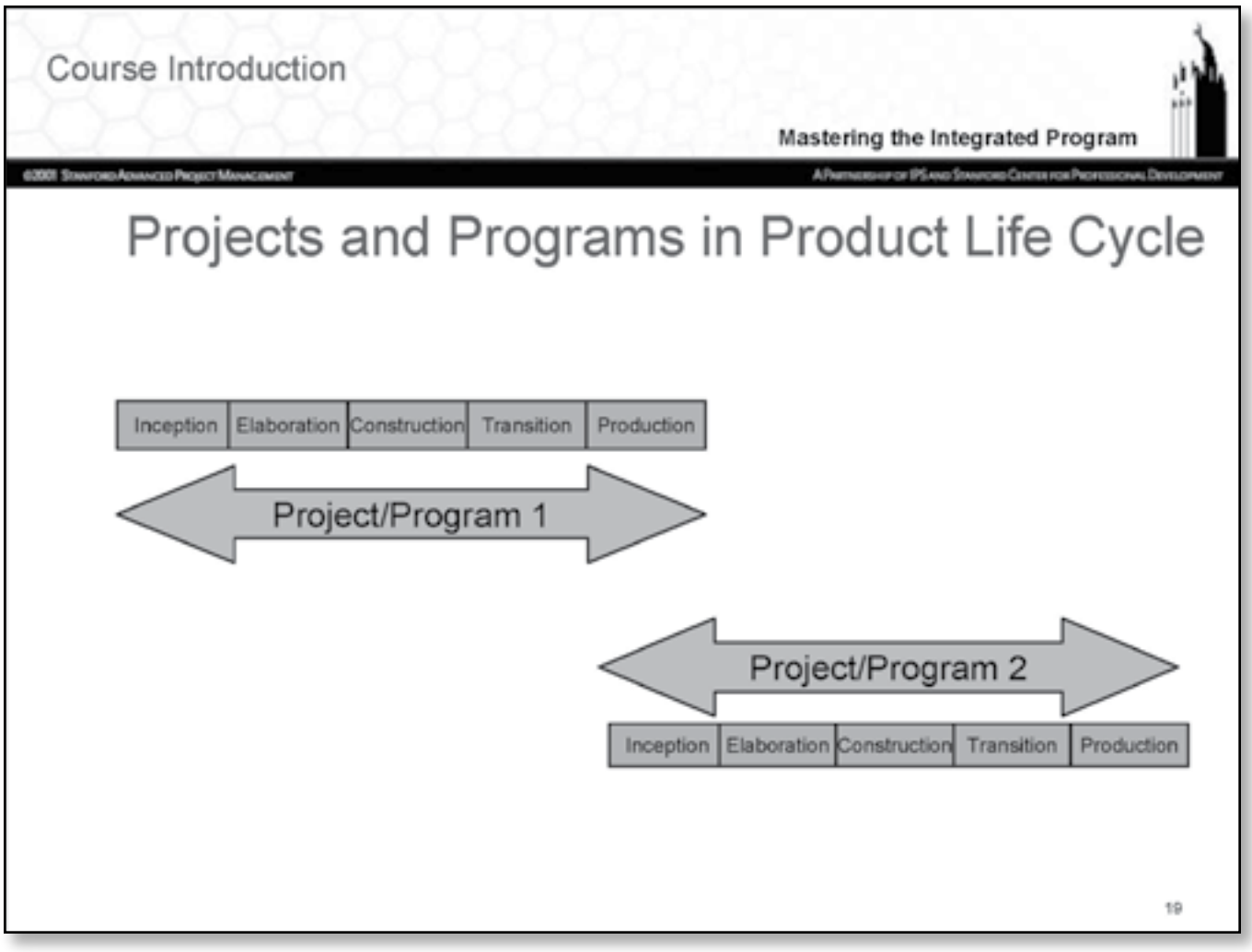

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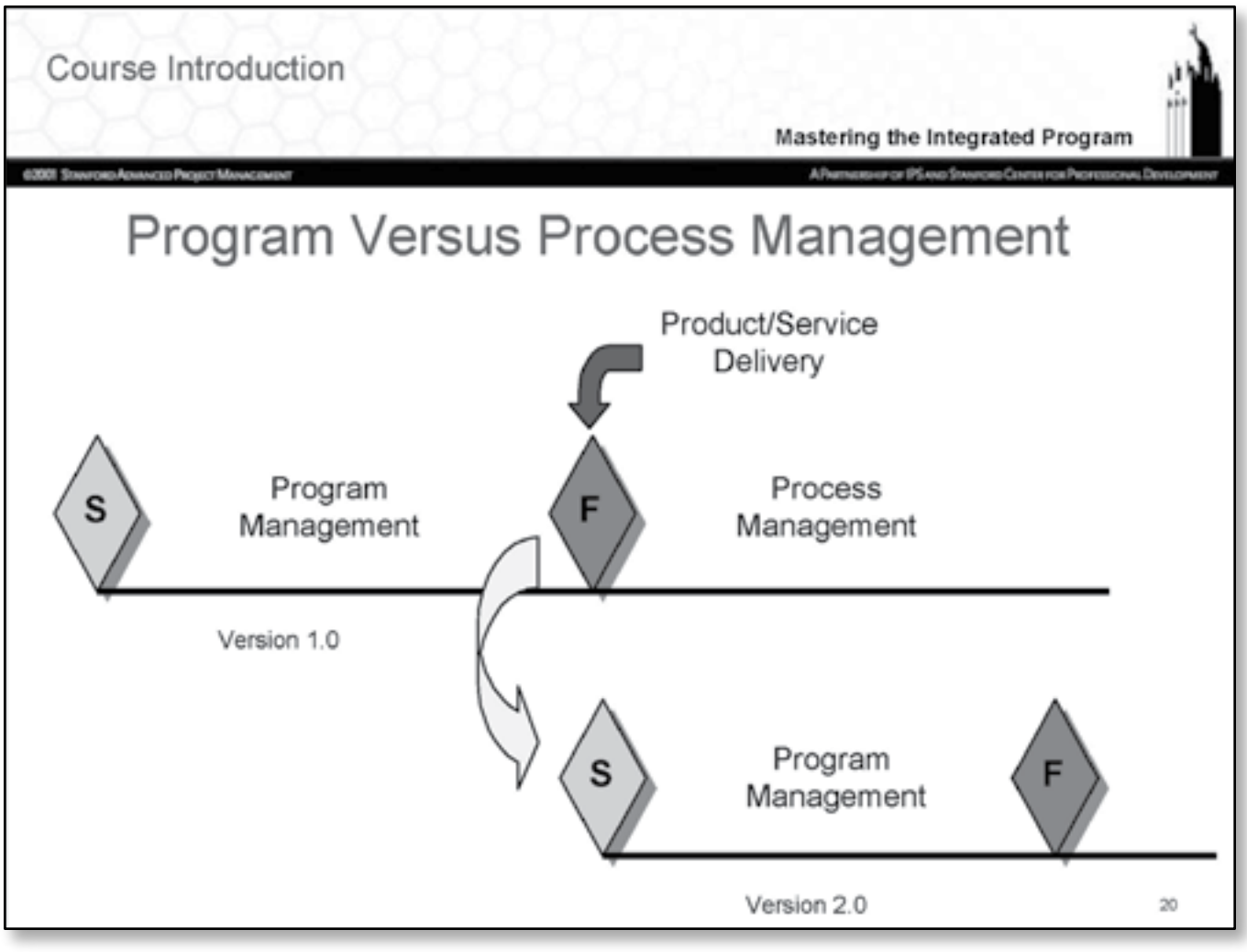

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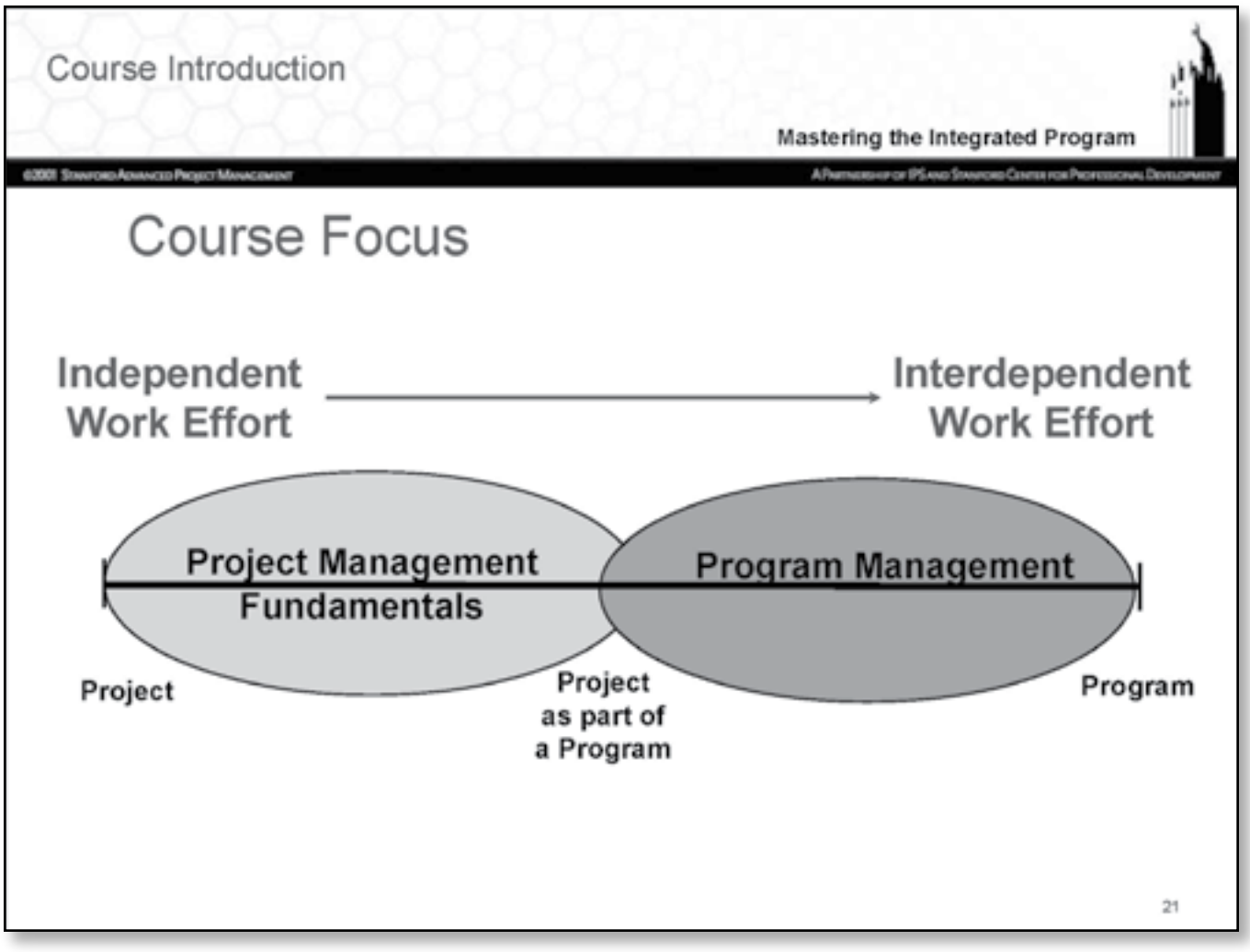

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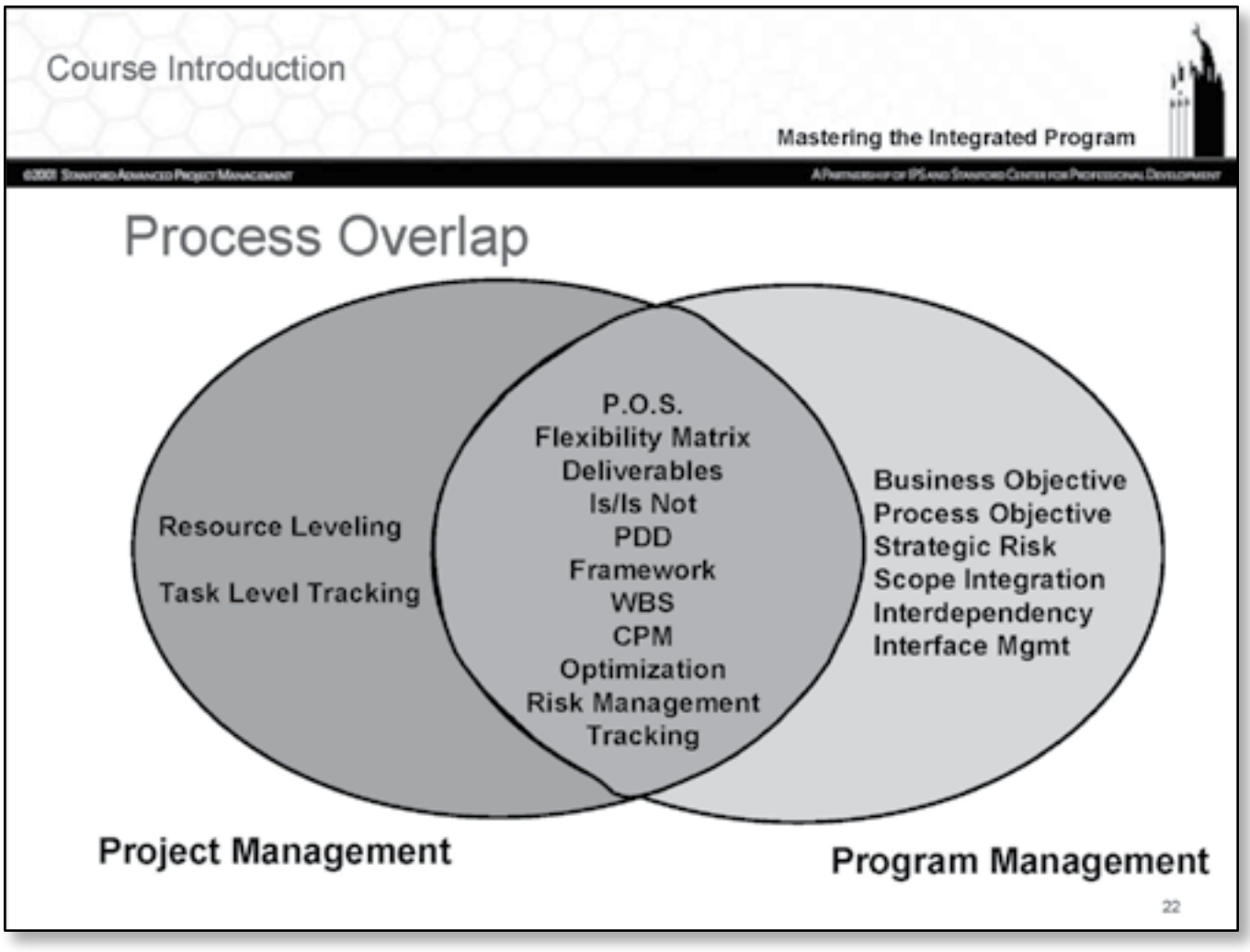

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Course Introduction

Mastering the Integrated Program

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Course Objectives

- Introduce concepts and techniques required to manage integrated programs
- Focus on the differences between project and program management
- Apply key learning to sample integrated program
- Utilize the Process Guide as a resource

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Course Introduction

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Ground Rules

- Honor time commitments
- Turn cell phones/pagers off or silent
- Turn off your laptop
- Listen and expect to be listened to
- Strive for volunteer mode
- Let us know about absences
- Help us by providing feedback

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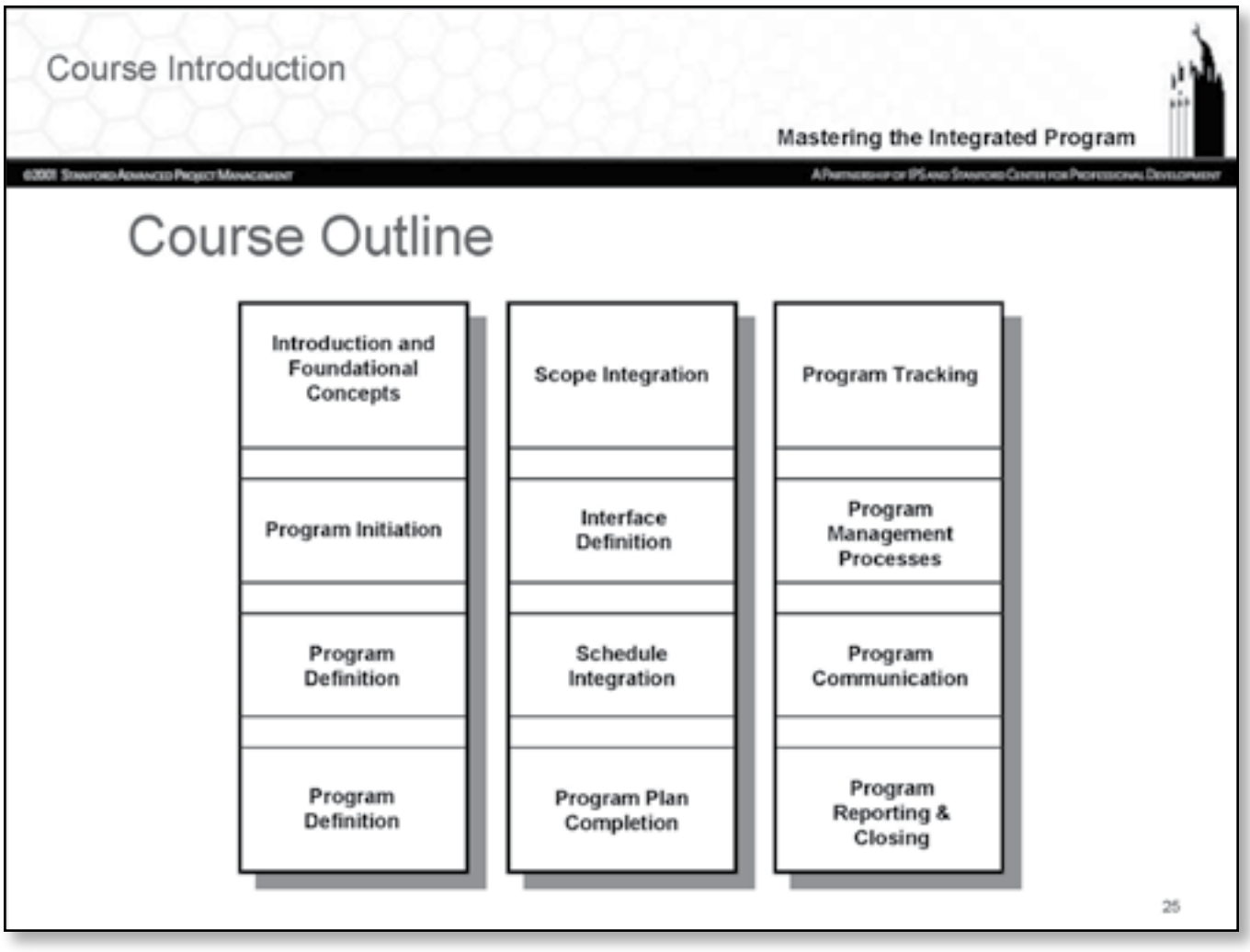

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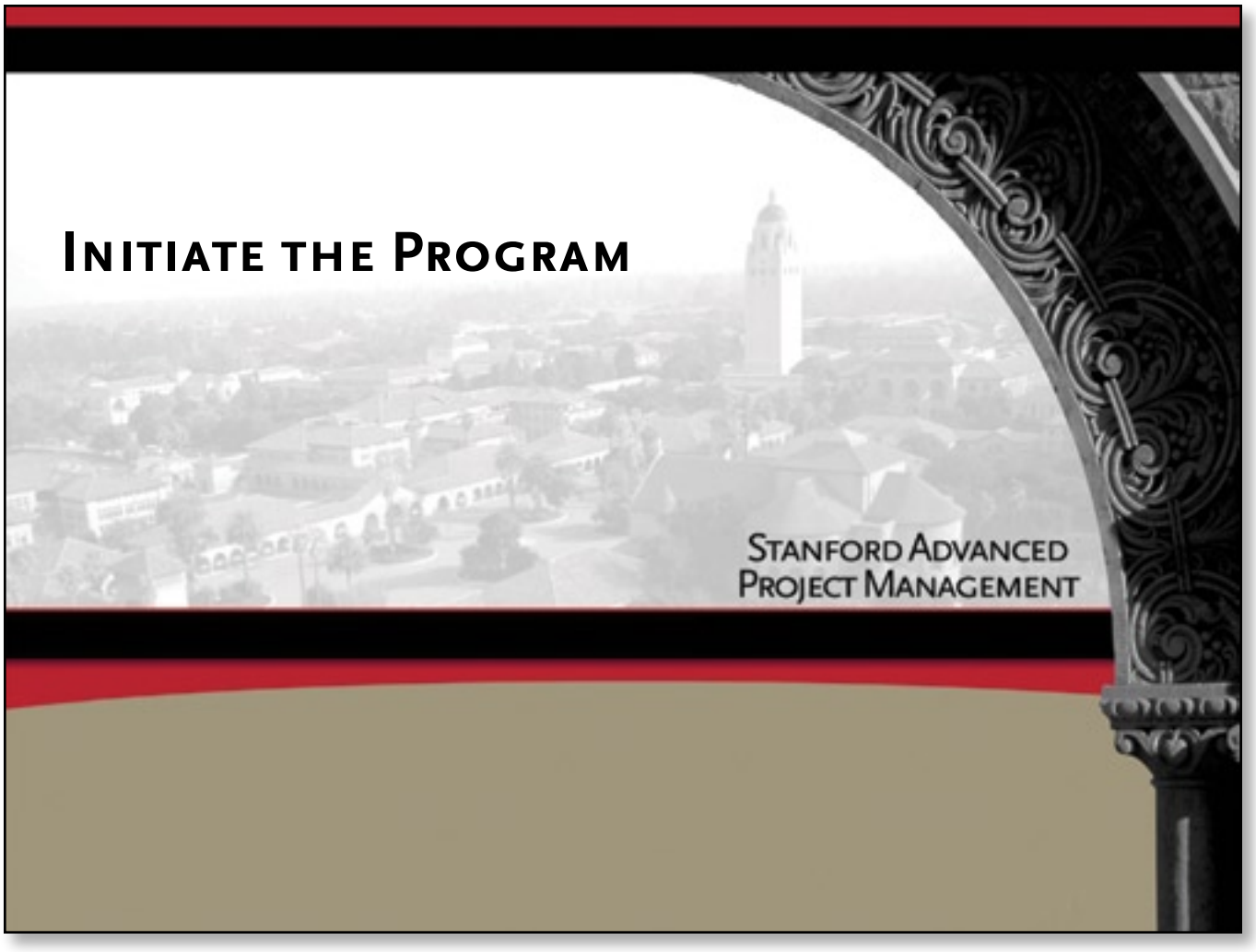

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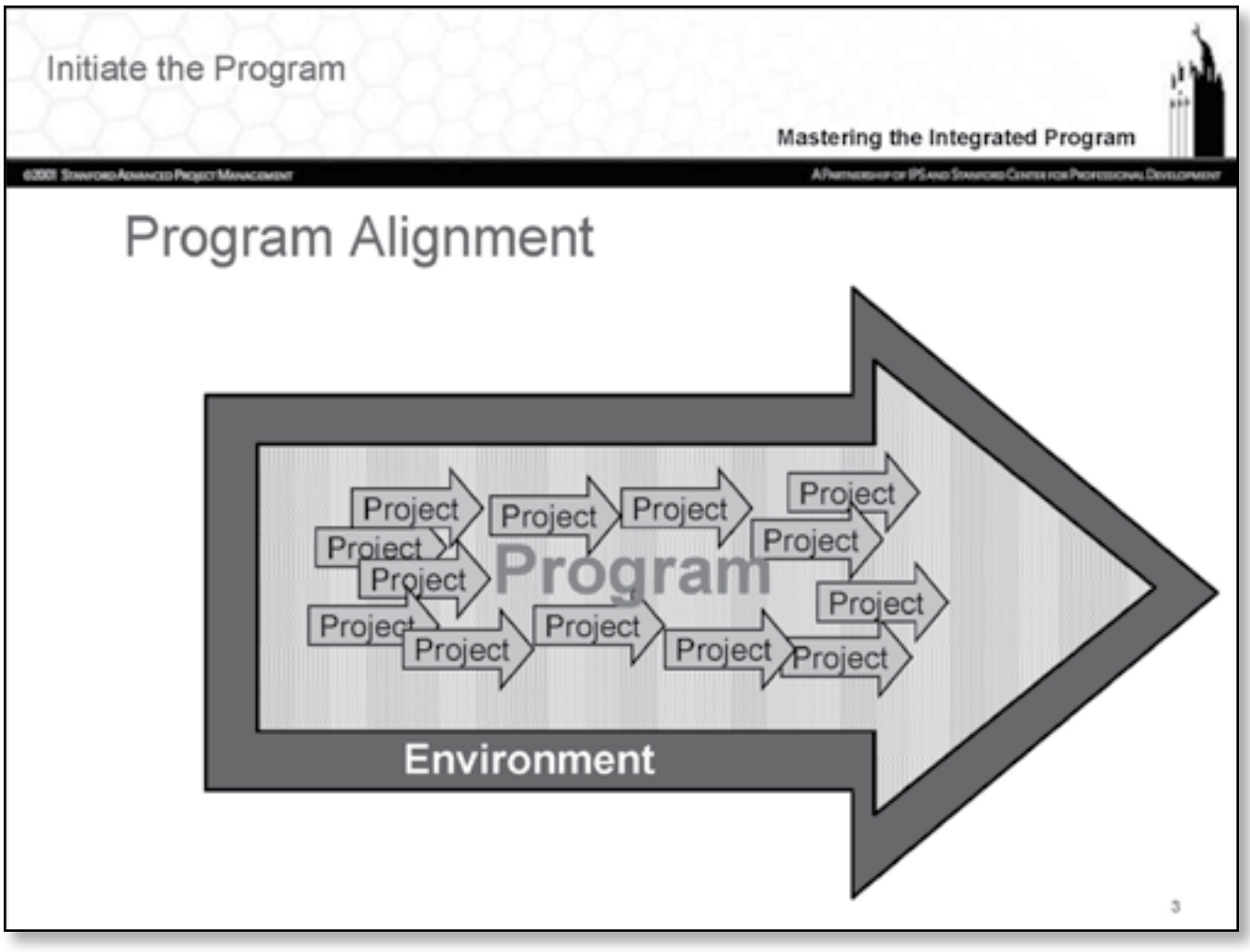

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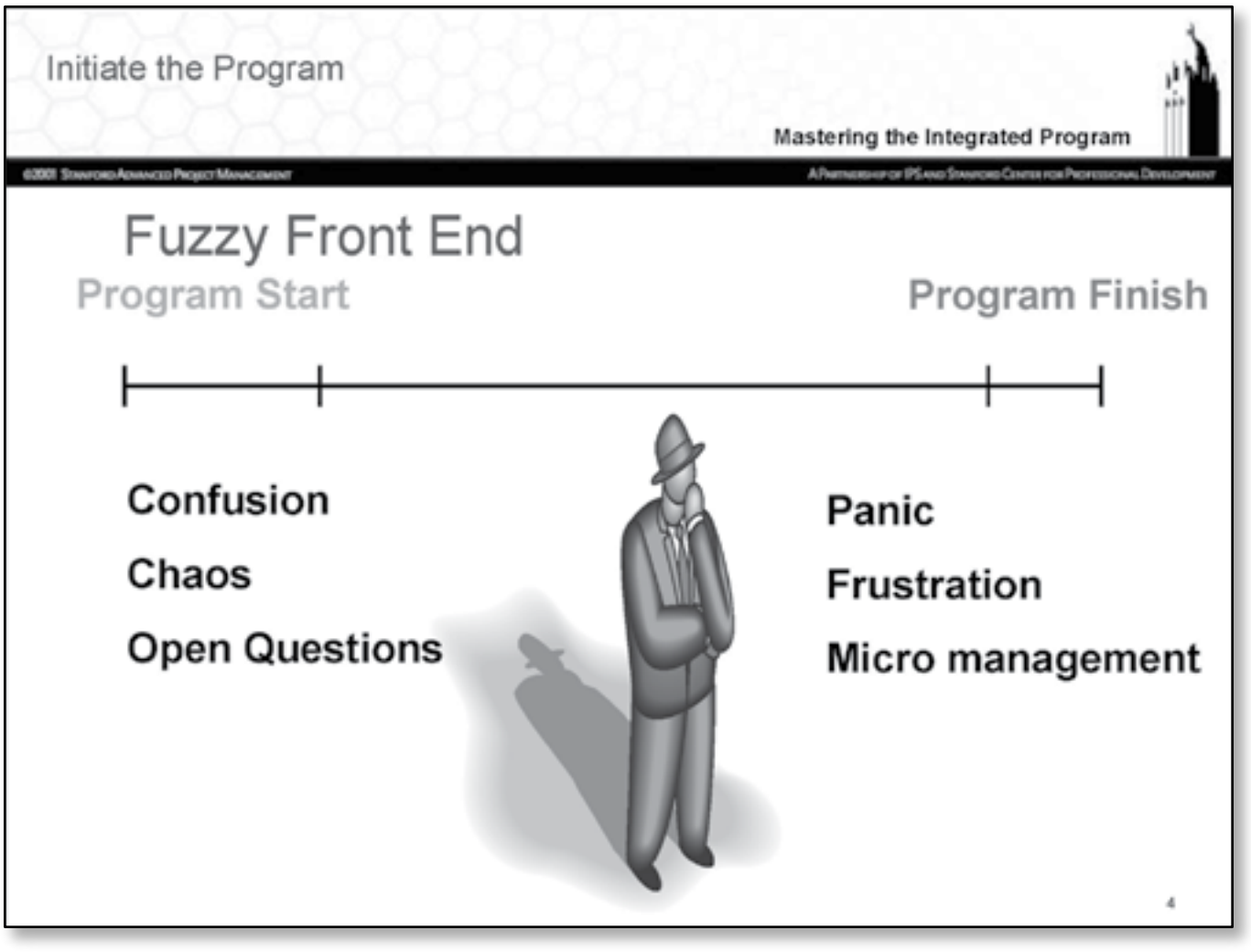

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To Reduce the Fuzzy Front End

- Organize the initial planning team quickly
- Understand the business context of the program proposal
- Identify what success would look like
- Define how success will be measured
- Identify strategies to deal with strategic risks

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Initial Planning Team

- Selection Considerations
  - Representative of key business area
  - Customer advocacy
  - Business/technical expertise
  - Ability to function on a team
  - Availability to work on program planning
  - Future project managers of the program

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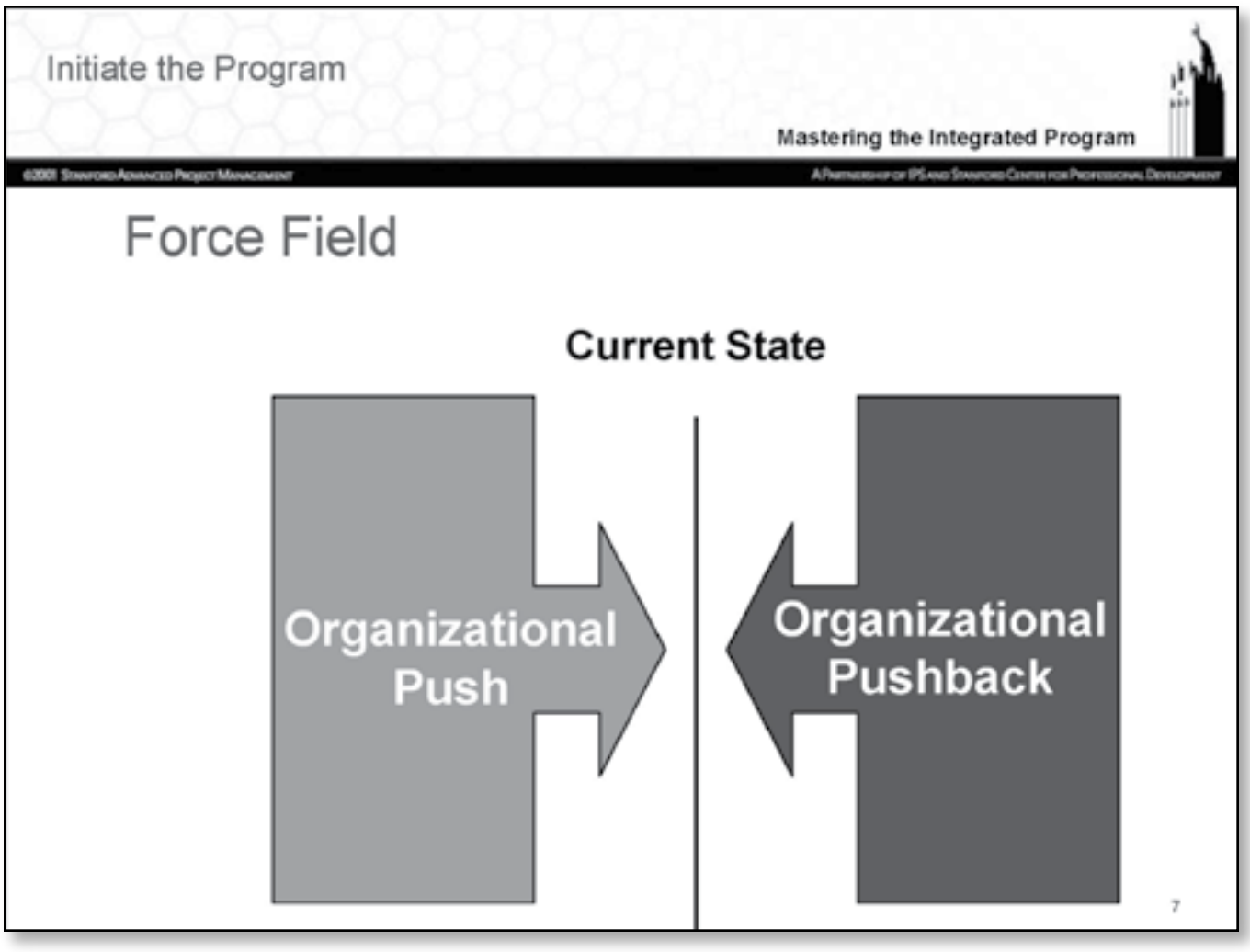

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6 Myths of Organizational Change

- Resistance is avoidable
- Good leaders prevent or eliminate resistance
- Resistance is bad
- People only resist unwanted changes
- People who resist are disloyal and bad
- Resistance has no value

Adapted from Managing Business Change by Evard and Gipple

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Common Errors in Organization Change

- Too much complacency
- Low power guiding coalition
- Under estimating the power of vision
- Undercommunicating the vision
- Allowing obstacles to block vision
- No short term wins
- Declaring victory too soon
- No anchor to corporate culture

From Leading Change by Kotter

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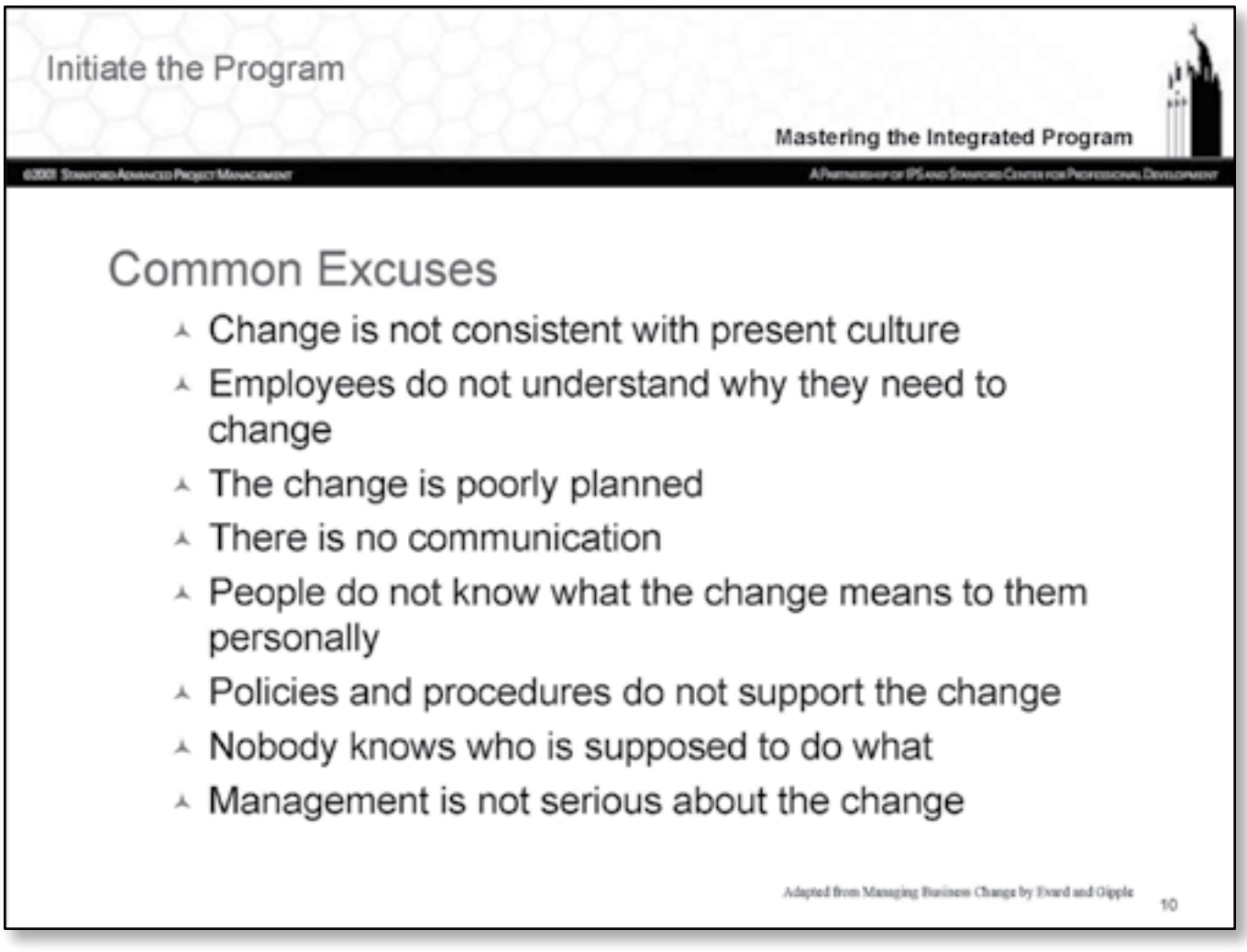

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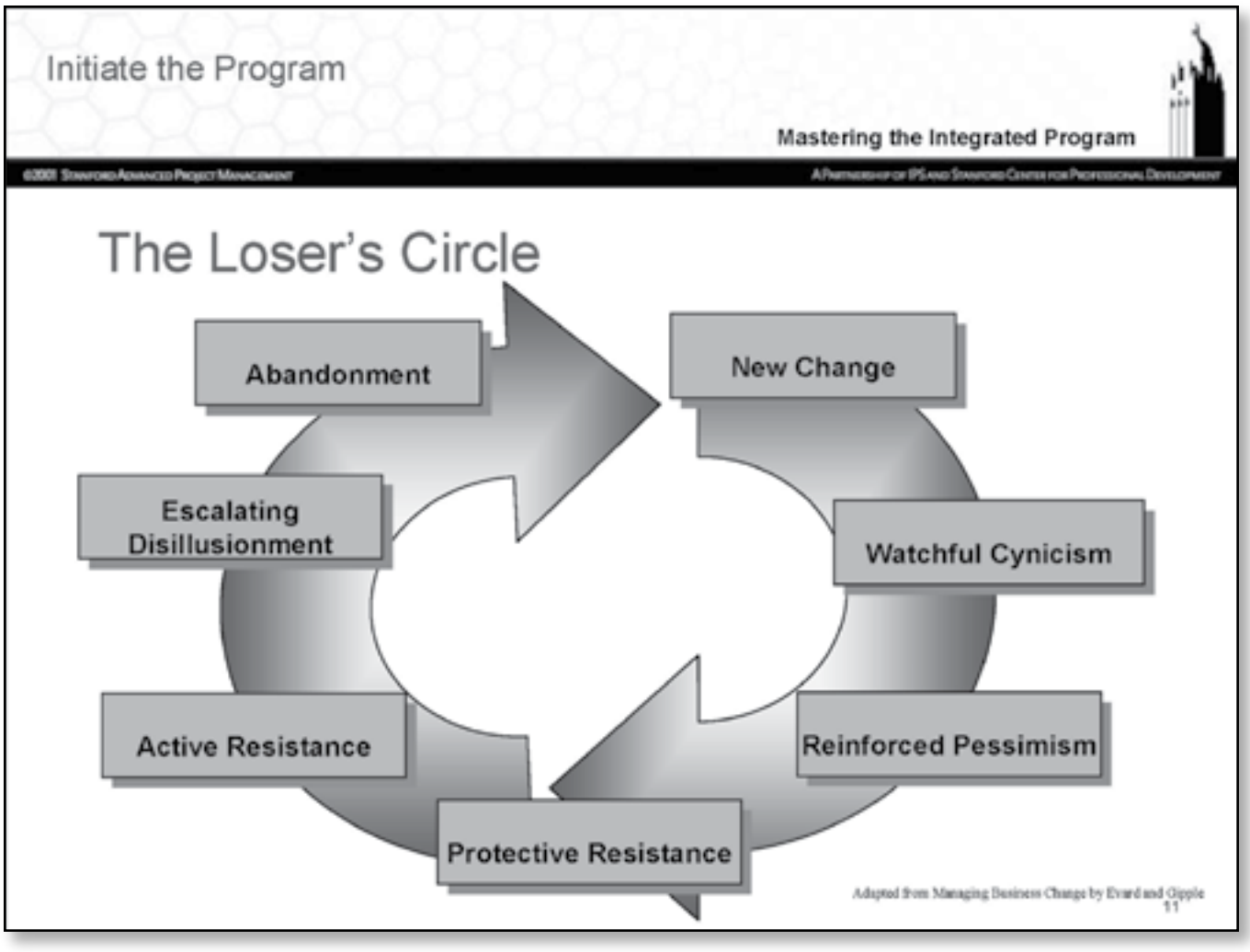

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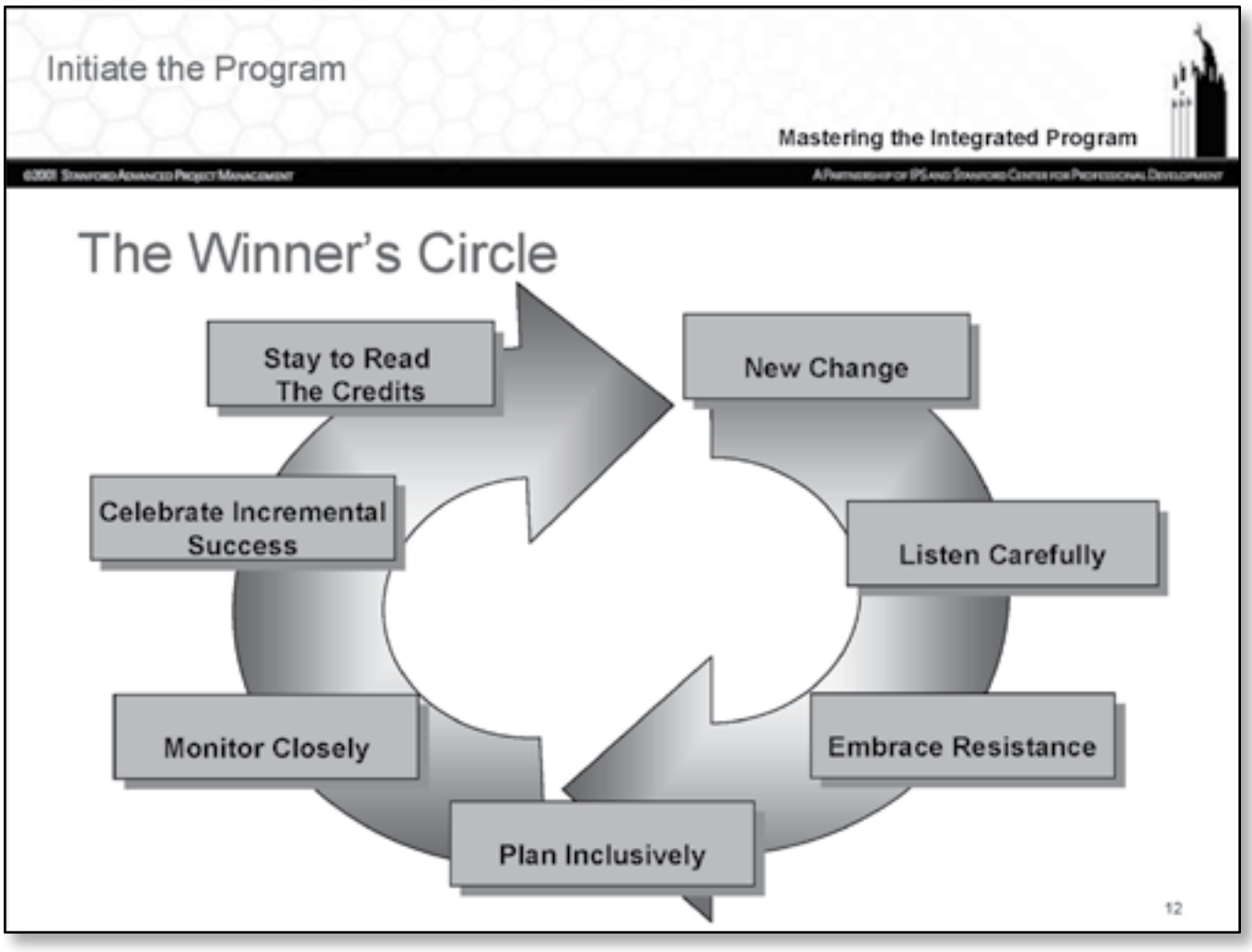

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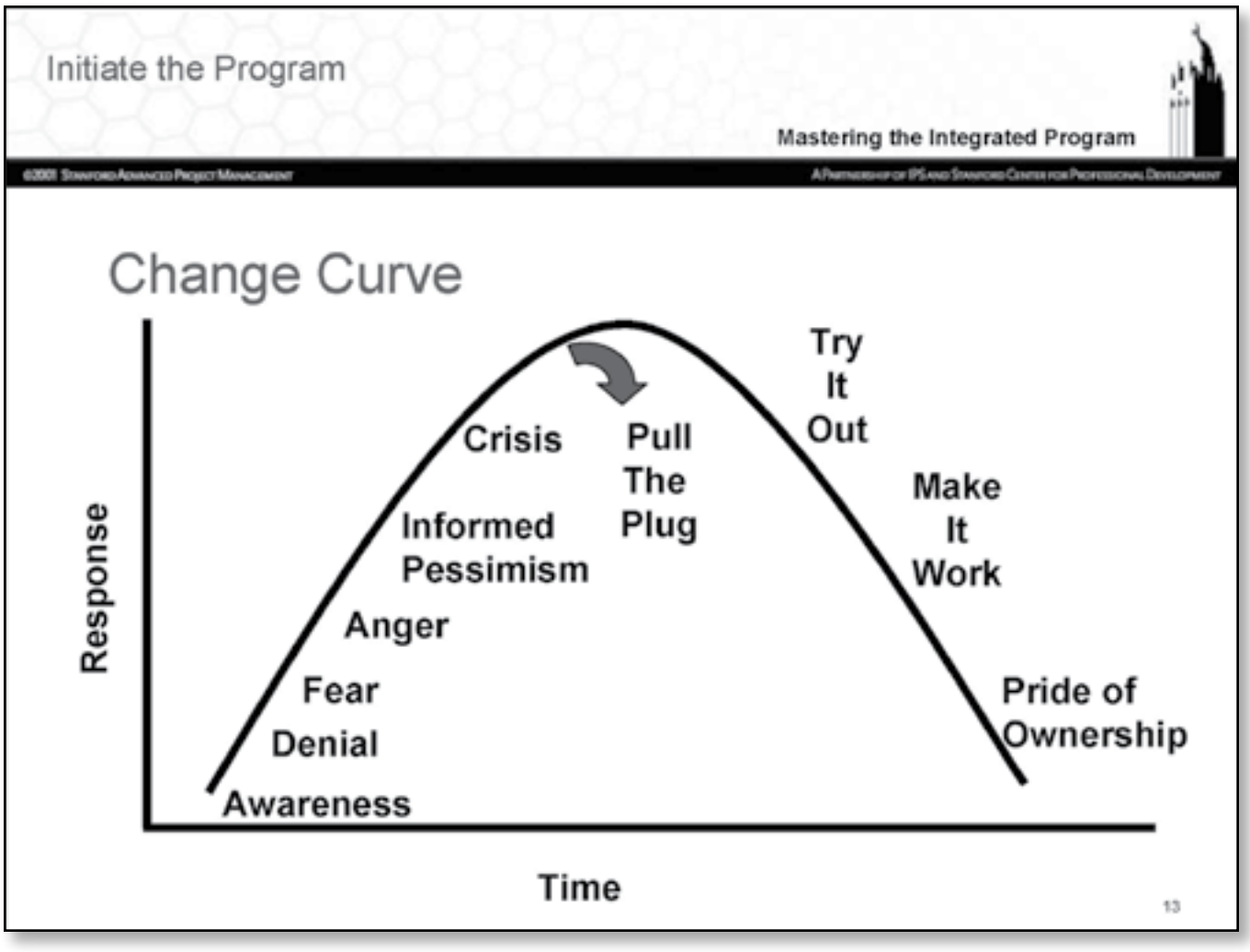

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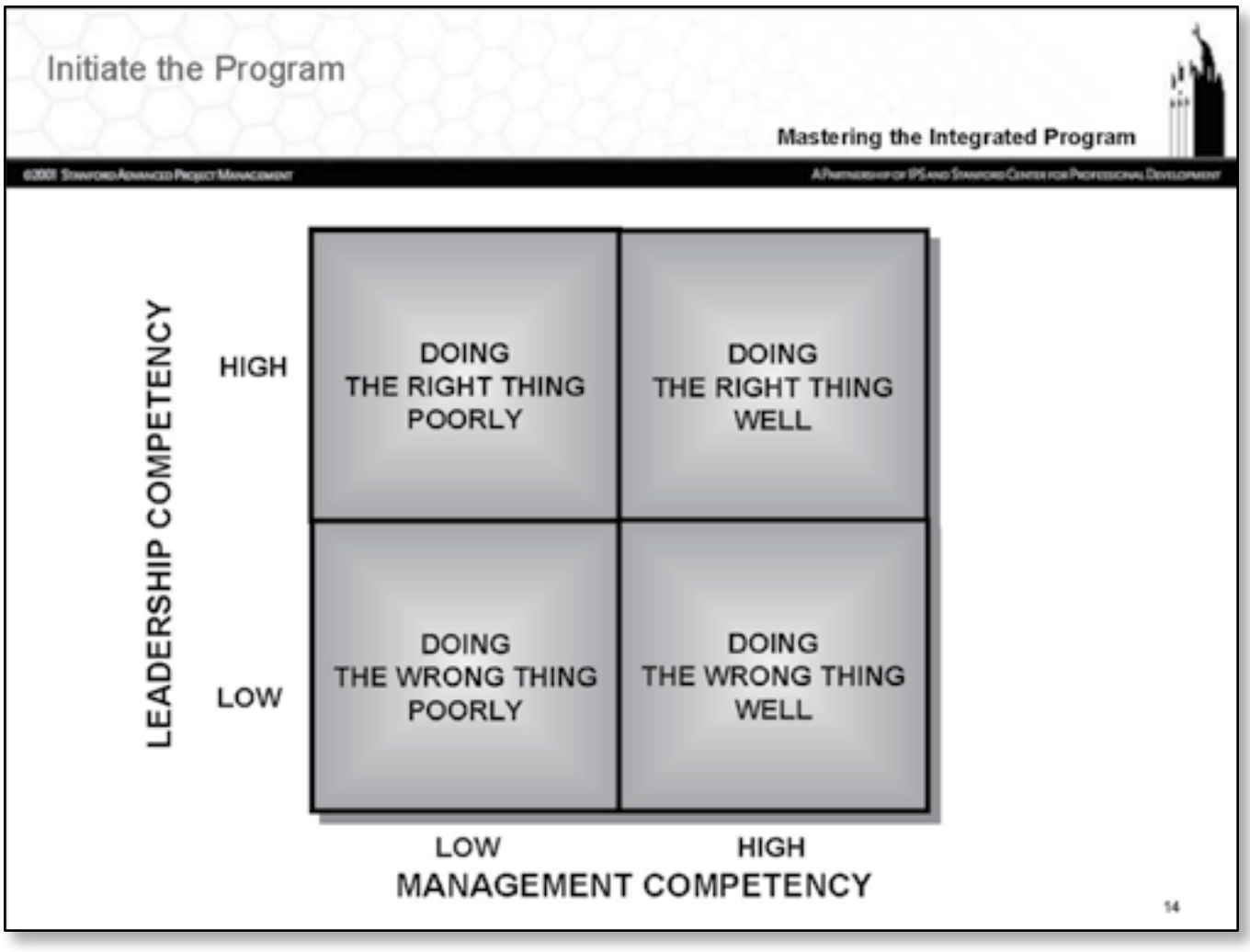

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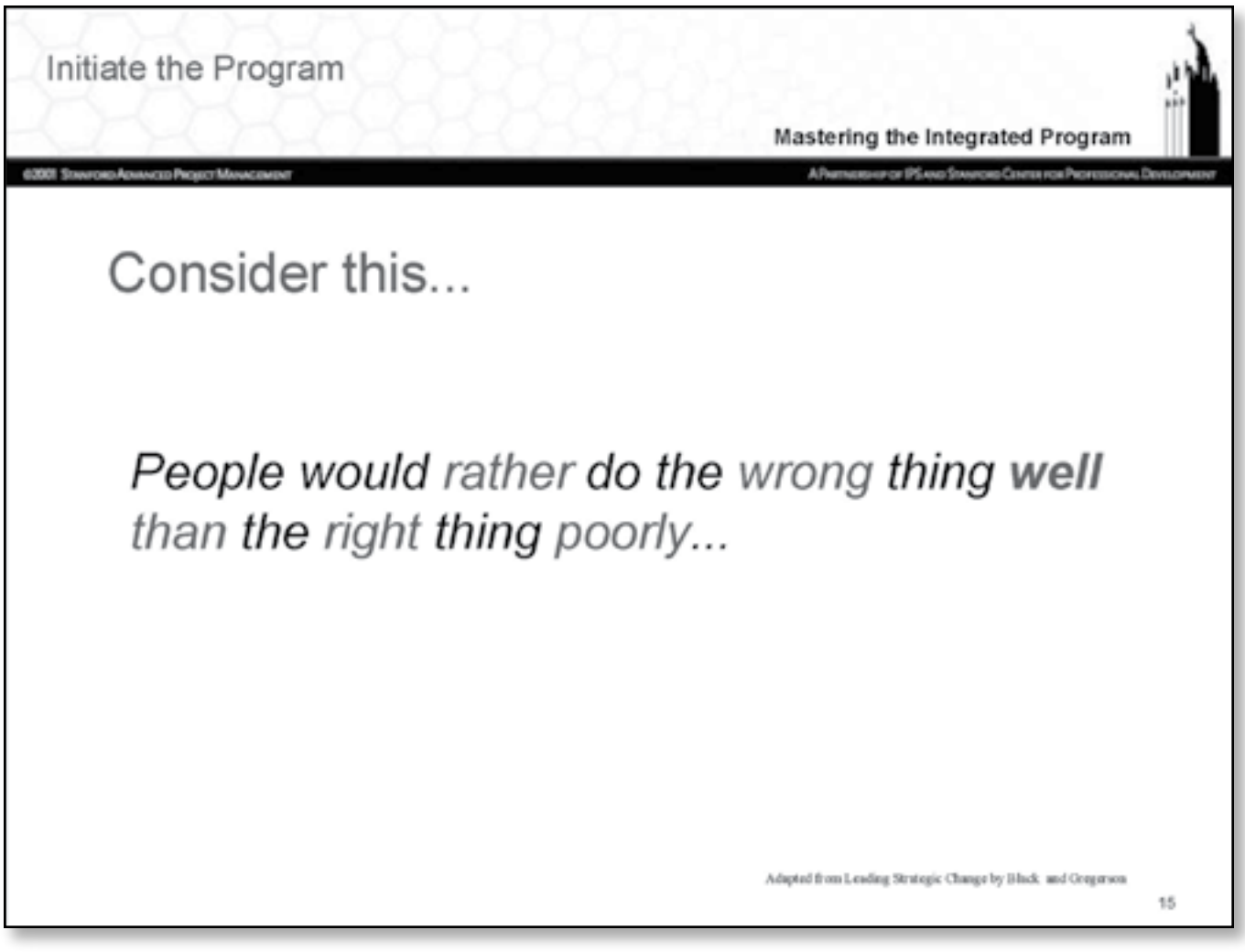

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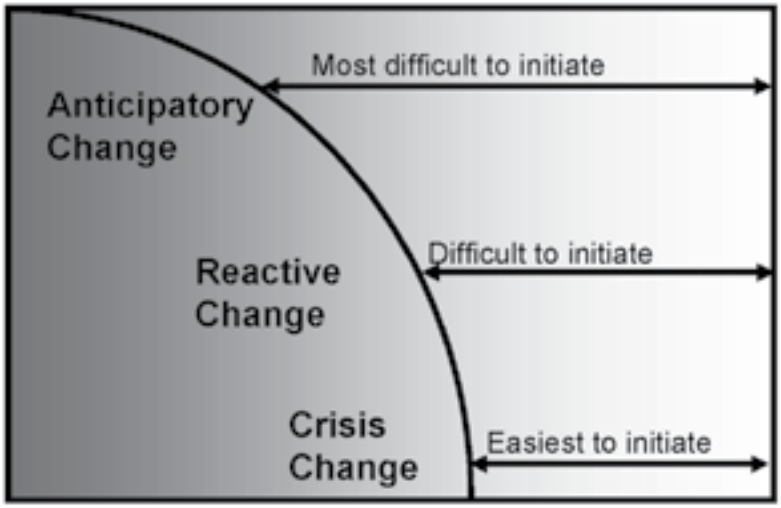
Initiating Change



Adapted from Leading Strategic Change by Black and Gregersen

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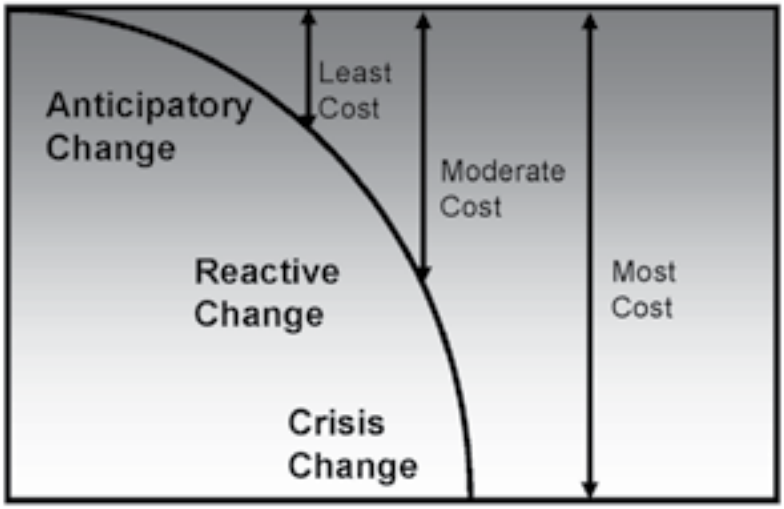
Cost of Change



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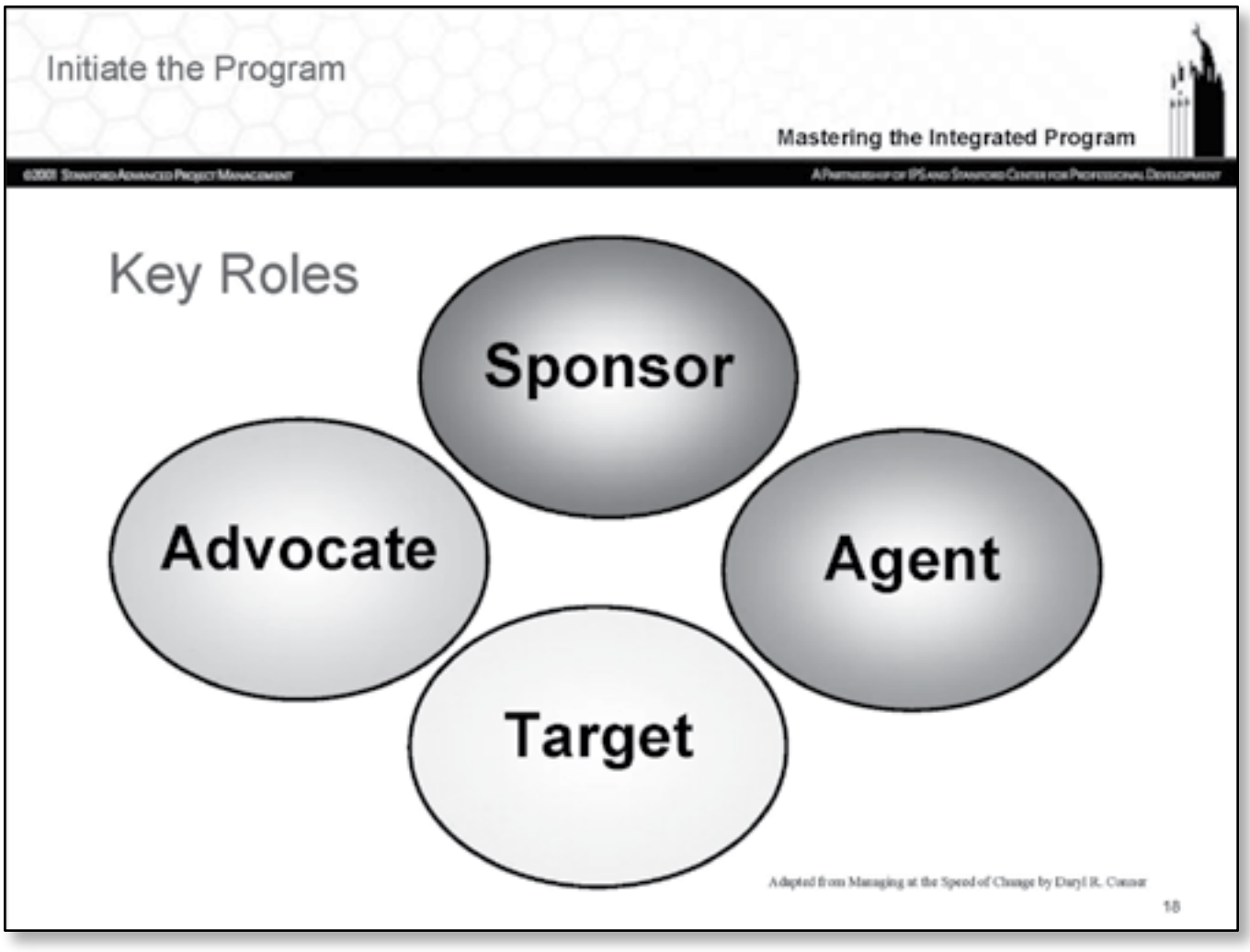

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The Sponsorship Role

- Assesses dangers and opportunities
- Has the power to sanction and legitimize change
- Communicates priorities
- Provides proper reinforcement for success
- Responsible for creating the environment for successful implementation

This is the sponsor of the Organizational Mastery Implementation Plan

Adapted from Managing at the Speed of Change by Daryl R. Conner

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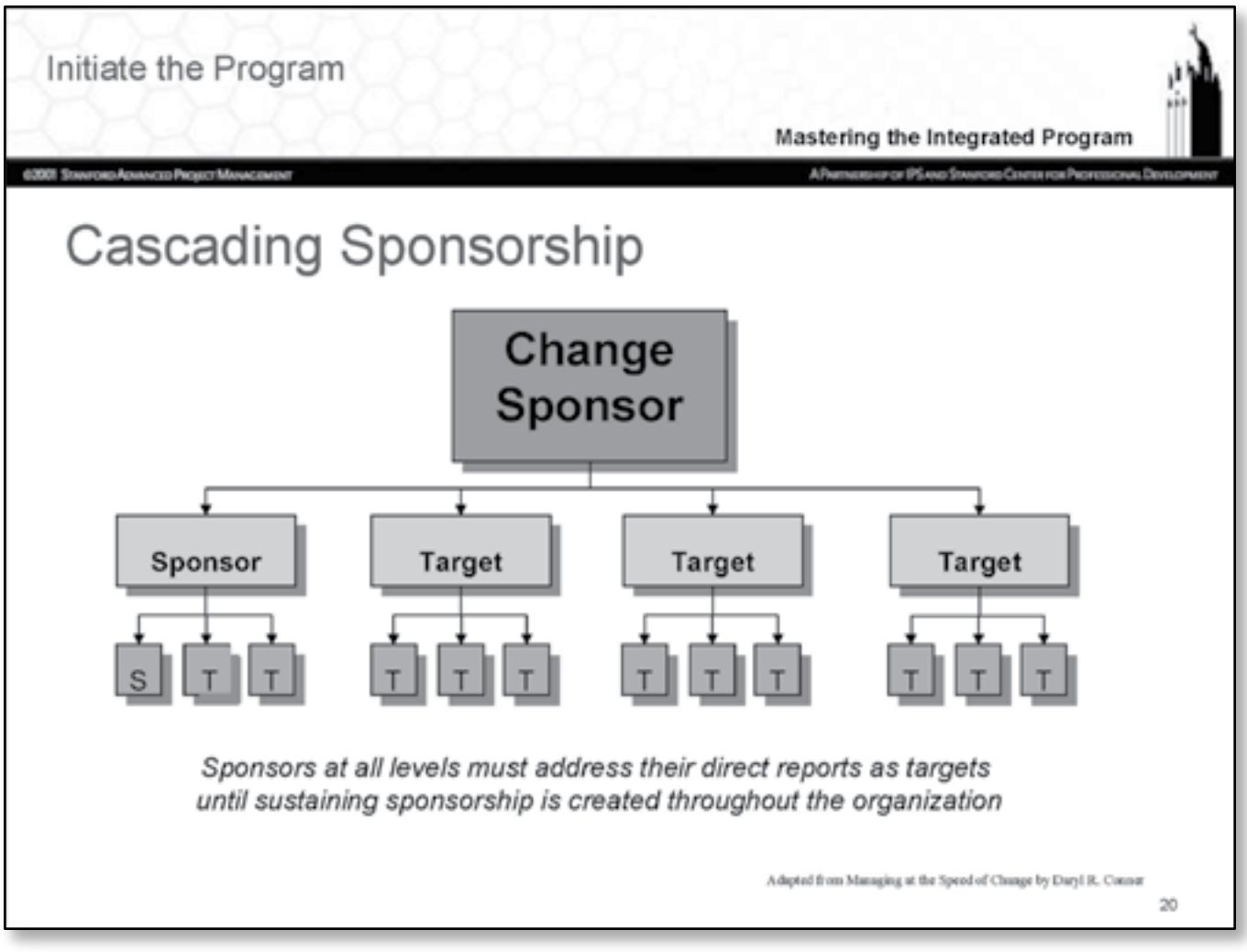

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The Advocate Role

- Source of passion for the change
- "Sells" effectively within the organization
- Lacks sanctioning power
- Seeks and obtains sponsorship
- Works in tandem with the sponsor and agent
- May not be part of the implementation plan

This person is a key player in the core team of OMM implementation

Adapted from Managing at the Speed of Change by Daryl R. Conner

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The Target Role

- Focus of the change
- Determine success or failure
- Need information, education and support
- Live with the change after implementation
- Involved in implementation process
- May influence management decisions
- Have a choice in how they respond

These are individual contributors and stakeholders in OMM

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The Role of Agent

- Plans the implementation
- Manages the change to completion
- Keep sponsors engaged
- Engages targets in the process
- Monitors the commitment level
- Believes the change is a business imperative and acts accordingly

This is the manager of the Organizational Mastery Implementation Plan

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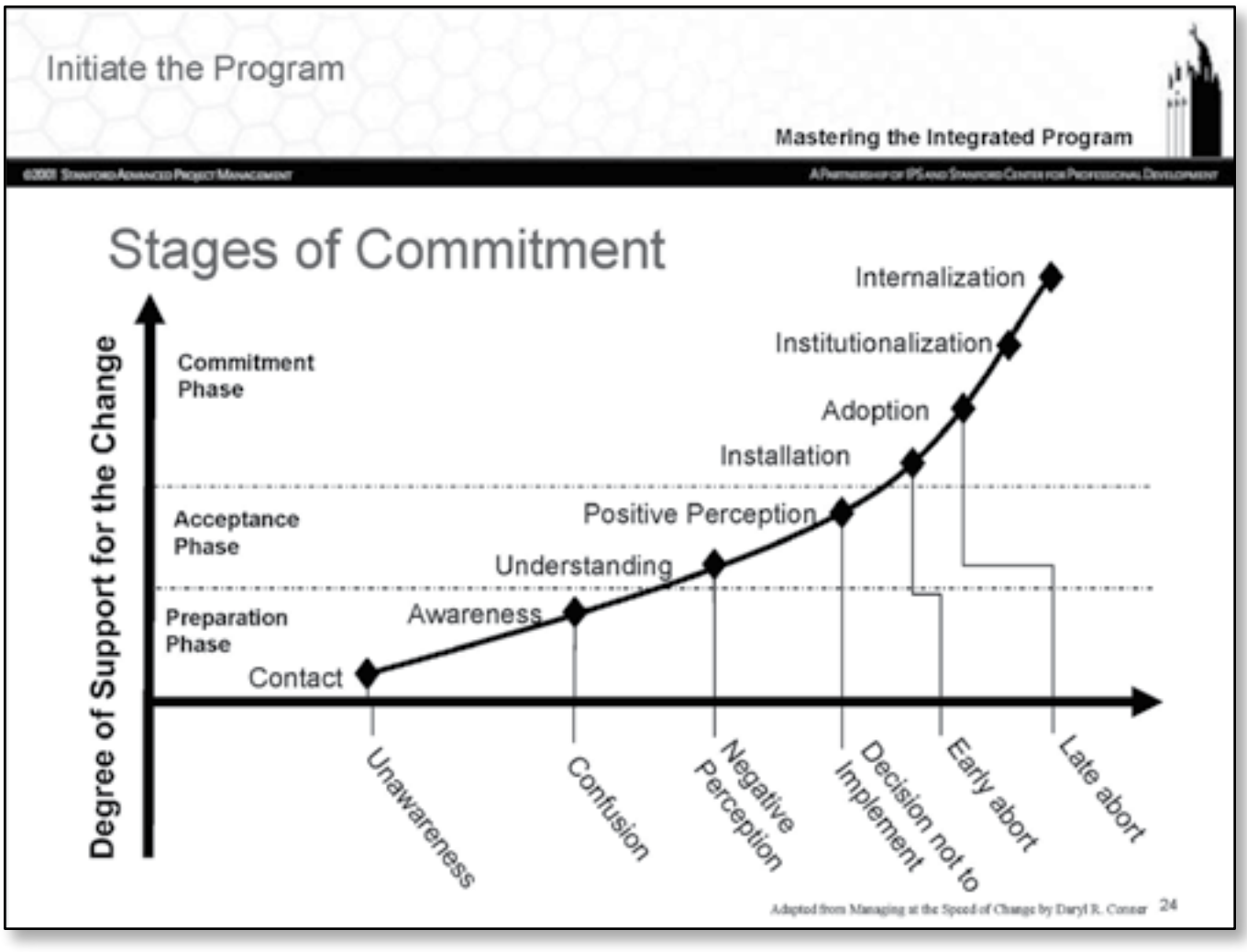

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Review the Proposal

- Proposal parameters to be checked:
  - Program objectives
  - Business objectives
  - Process objectives
  - Success criteria
  - Schedule
  - Costs
  - Risks
  - Alternatives
  - Benefits
  - Recommendation

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Proposal Review Exercise

- Consider the Case Study Proposal
- Place yourself in the position of the new program manager that has been assigned to Case Study project
- As a group, make a list on a flip chart of the questions you would have coming into the assignment

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Success Criteria

What will be measured?...

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Setting Expectations

Includes	Does Not Include
Being first to market Unique functionality Best in class support	Being the low cost leader Serving every market Localization to all languages

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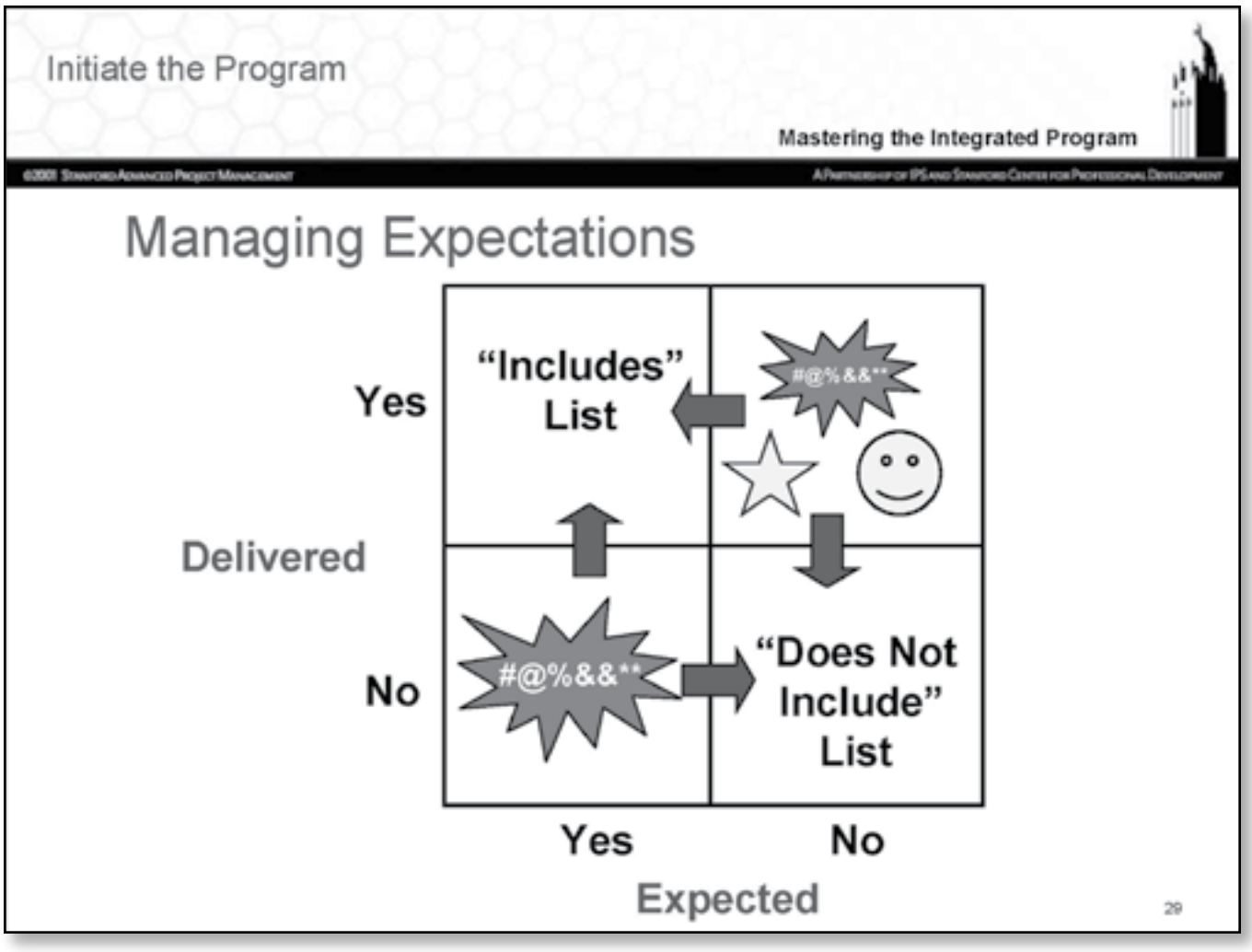

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Categories of Success Criteria

- Business Objective
  - The intent of the program
- Program Objective
  - Scope, Schedule, Resource
- Process Objective
  - How the program must fit the ongoing processes of the business

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Define the Measurement Process

- Identify parameters
  - What will we measure?
- Design data collection process
  - How will we collect the data?
- Establish reporting mechanism
  - What will the report look like?
- Set action limits and frequency of review
  - What action limits will we set and how often will we check?

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Success Criteria Lab Instructions

- Review the Case Study Background
- Review the Case Study Proposal
- Create a list of success criteria
- Develop a method of measurement for at least two success criteria
- Prepare for a short presentation

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Define Approaches to Strategic Risk

Prepare the Program for "what if"

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Example High Level Risks

- **External Risks**
  - Market demand will fade before program delivery
  - Competitor will introduce a lower cost product
  - Technology will obsolete our product
- **Internal Risks**
  - Business will be acquired through a hostile take-over
  - Major reorganization destroys support base

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Developing Approaches to Risk

- Identify Internal and External Risks
- Identify potential show stoppers
- Identify planning strategies for mitigation
- Weigh benefits and tradeoffs of alternative strategies
- Generate recommended approach
- Validate with sponsor
- Develop plans based on strategies

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Define Approach to Strategic Risk

Risk	Mitigation Strategy
Competitor will introduce lower priced product Implication: market share will be lost to lower priced producer	Create a two level design Alternatives?

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Strategic Risk Management Lab

- Brainstorm a list of 5 strategic risks to the Case Study program
- Create multiple options and a recommended strategy to deal with one high risk
- Prepare a short presentation of your risk management options and recommendation

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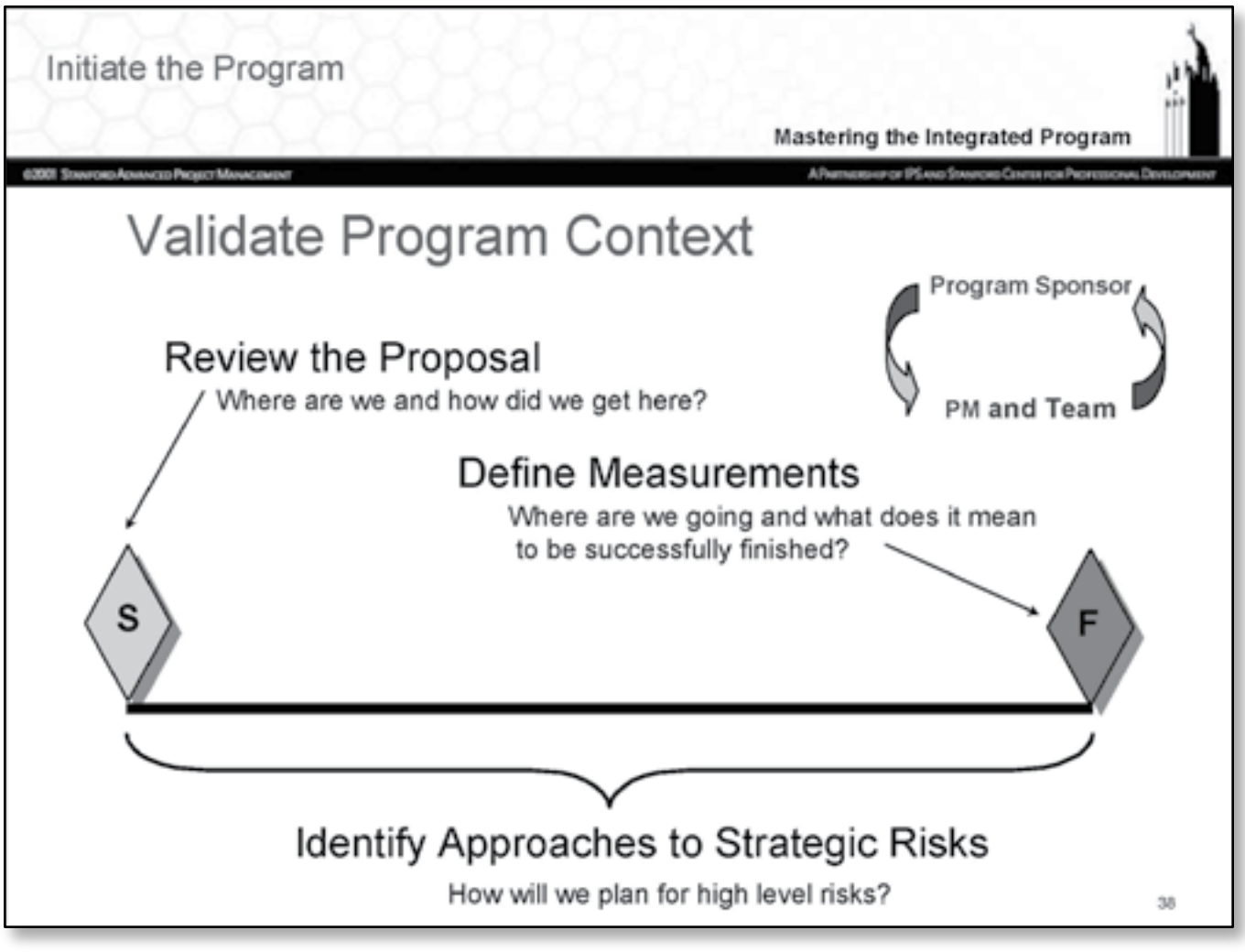

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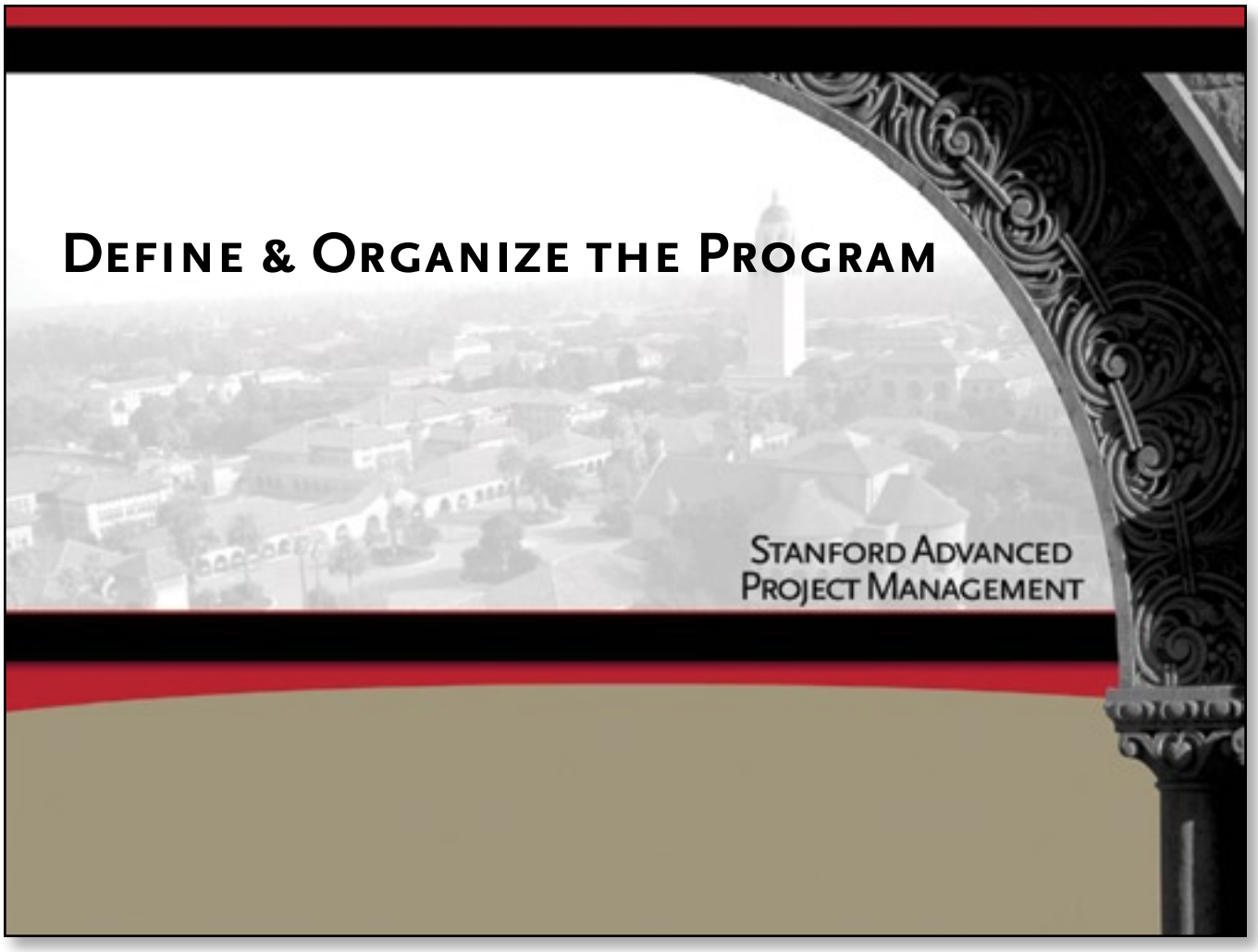

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Define & Organize the Program

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Establish the Program Organization

Initial program planning team transitions to program planning and management team

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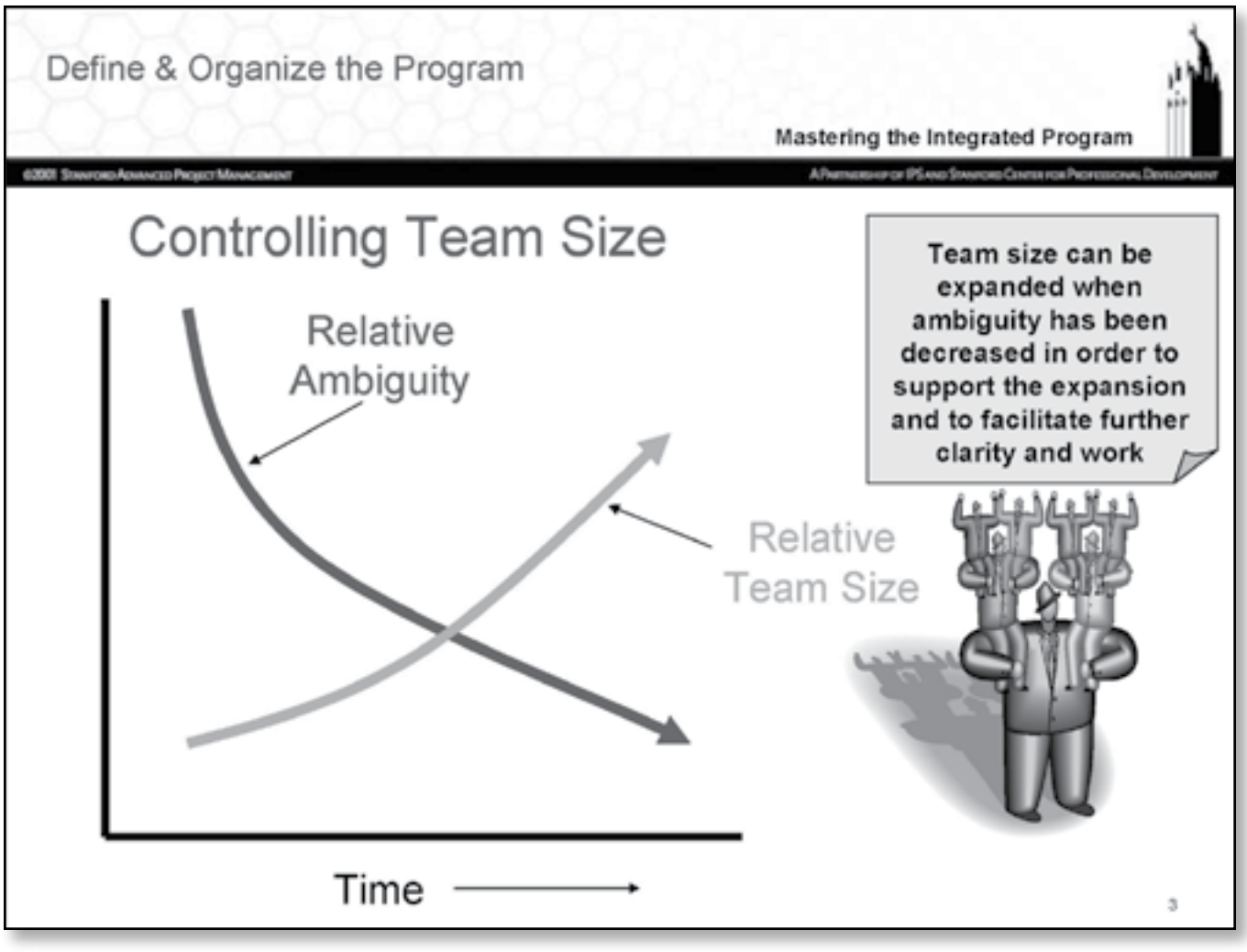

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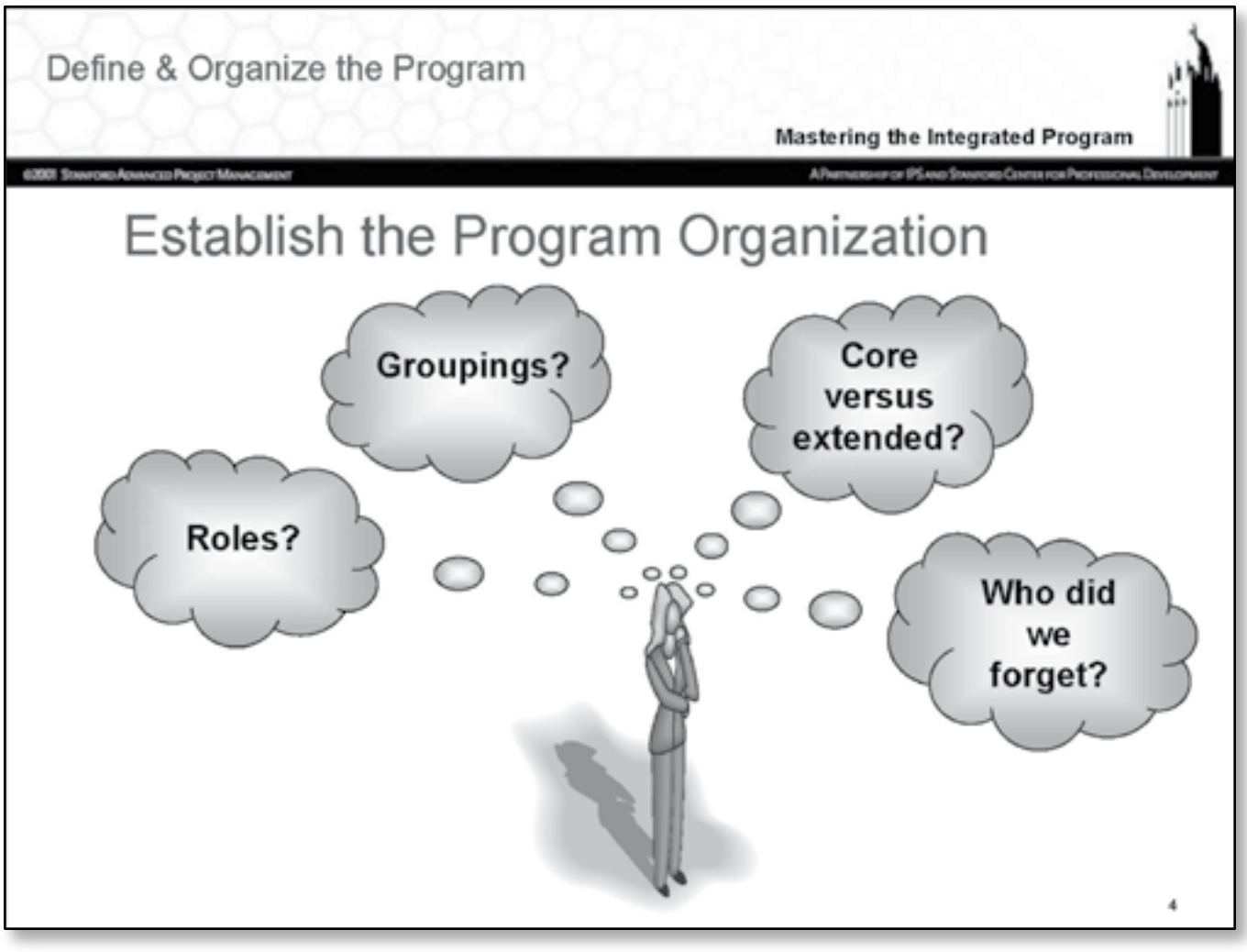

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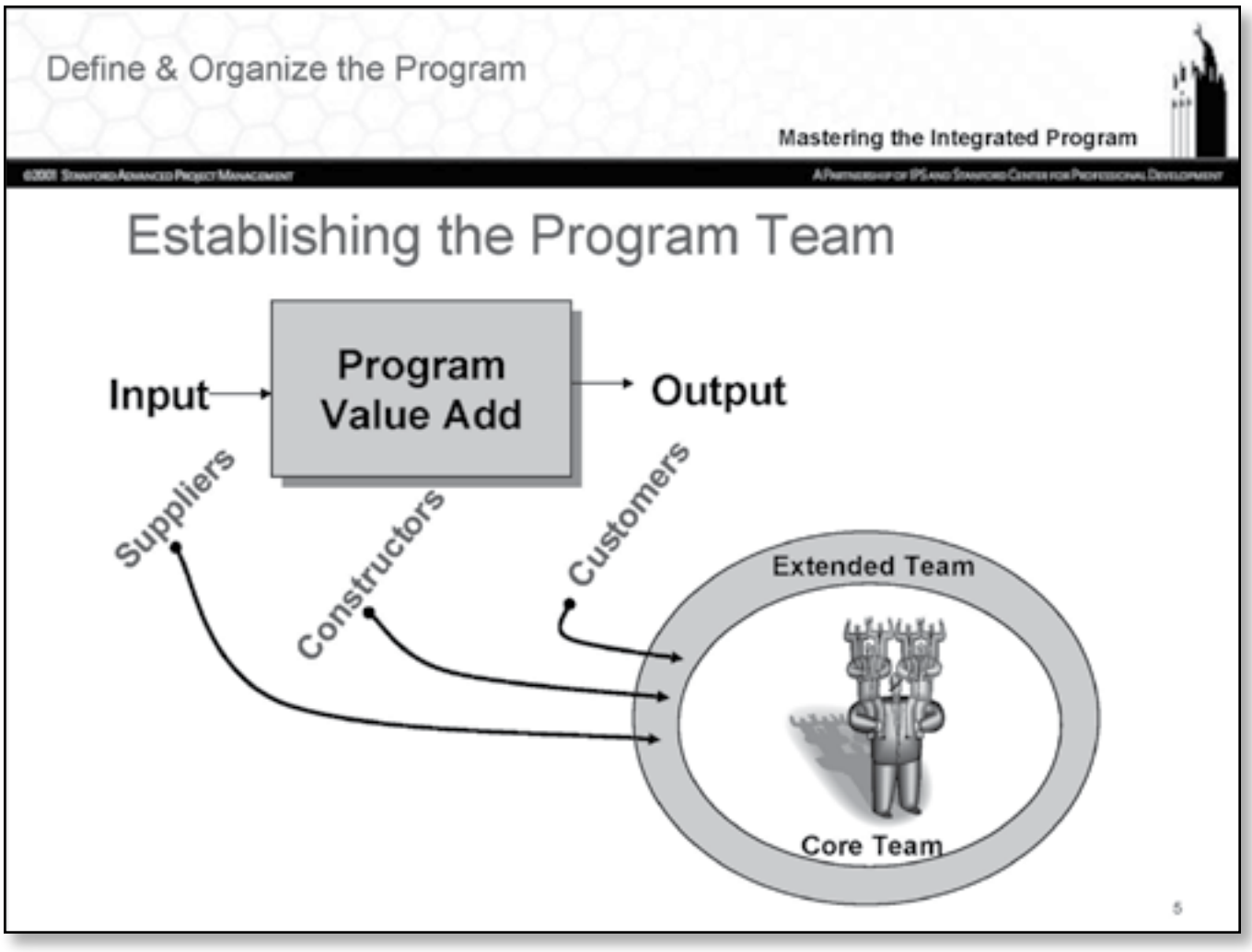

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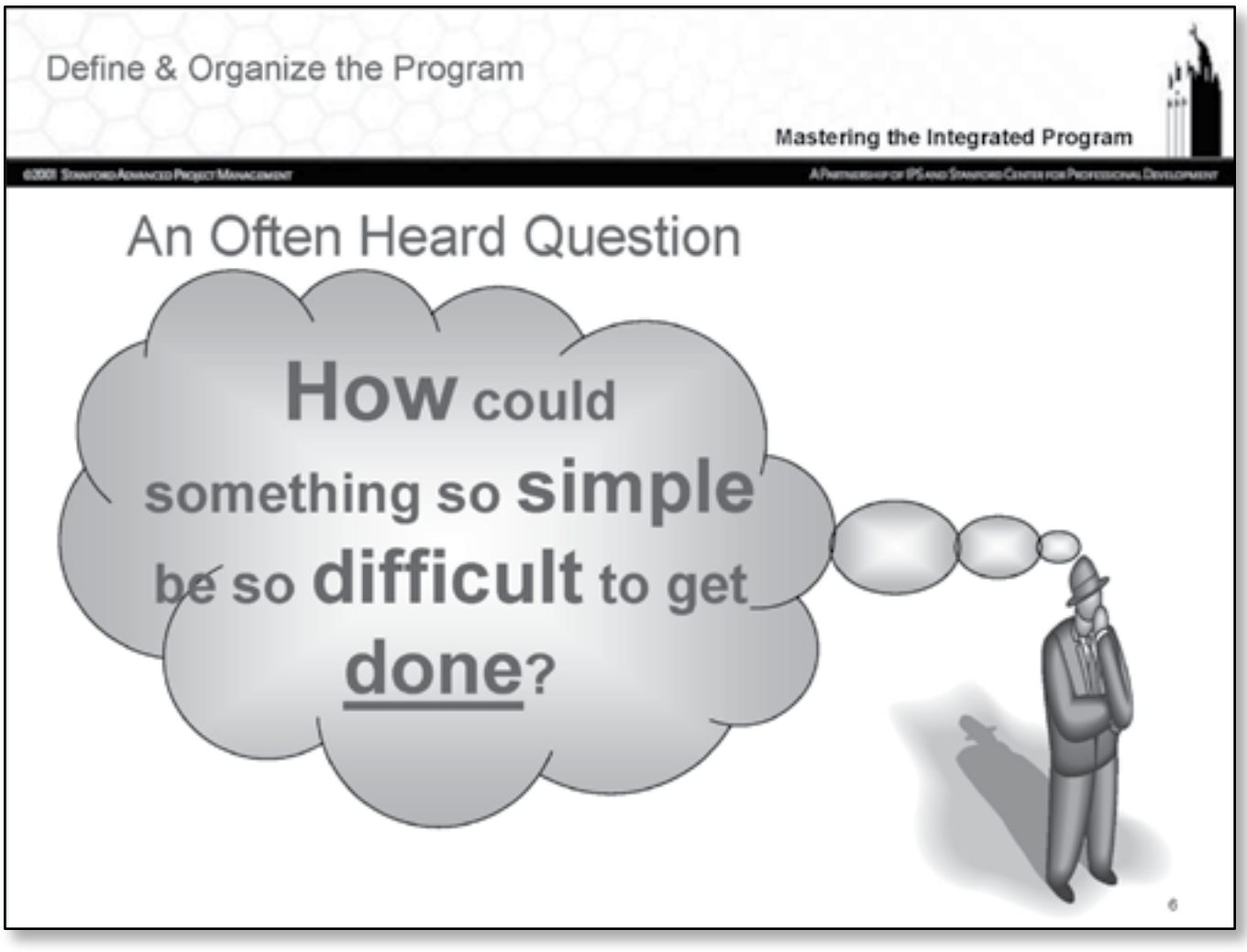

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The Nature of Work In Organizations

- Productivity is effected by many things including:
  - The nature of work we are doing
  - How we organize ourselves to accomplish the work

- Optimum program organization is possible when we consider both the nature of the work and the structure of organizations doing the work

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Not All Work Is Created Equal

- There are 3 types of work in organizations
  - Pooled work (Independent)
    - Workers accomplish their tasks independently of other workers
  - Sequential work (Dependent)
    - Workers accomplish their tasks when others have completed other tasks on which they depend
  - Reciprocal work (Interdependent)
    - Workers accomplish their tasks in cooperation or collaboration with other workers by a series of adjustments or iterations

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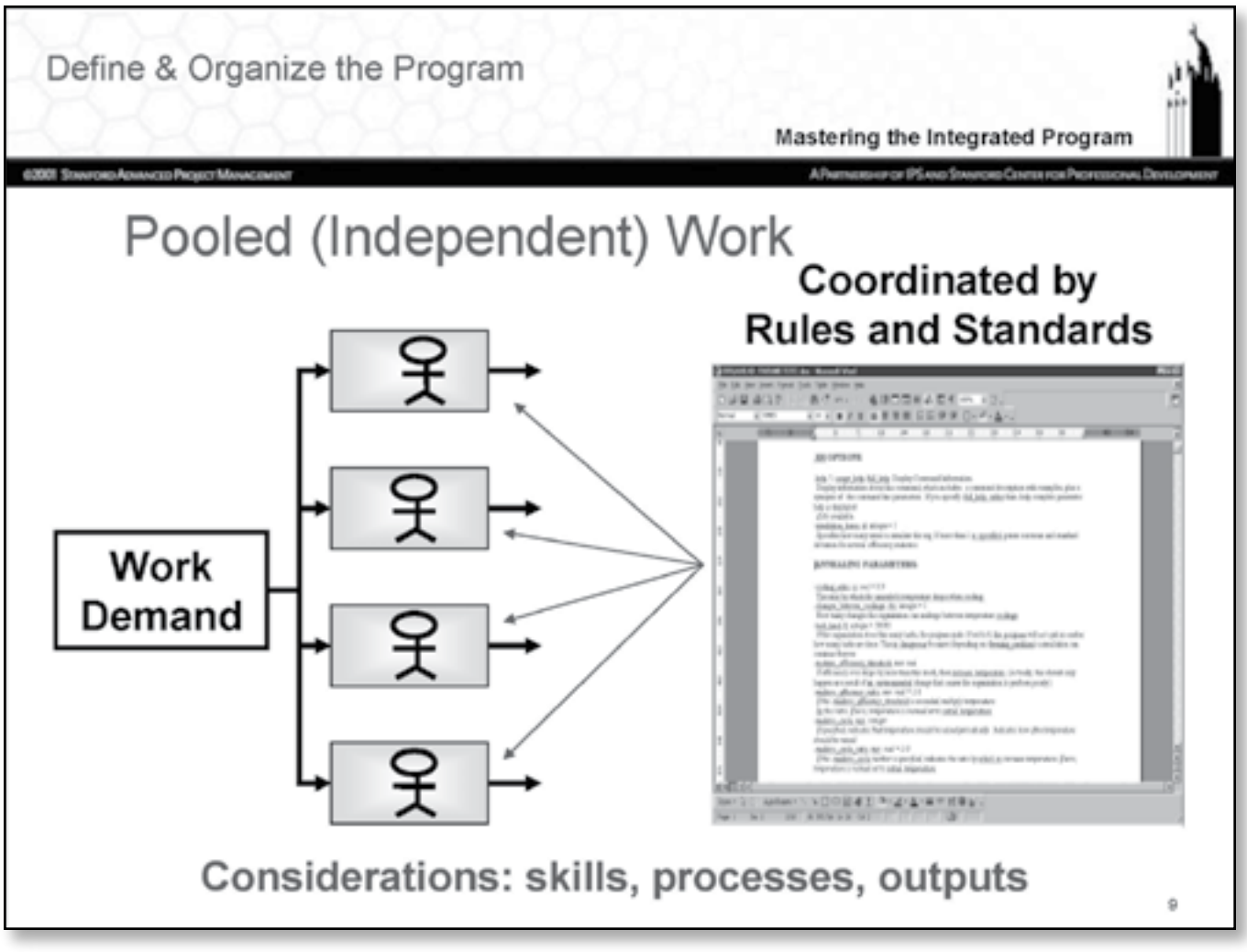

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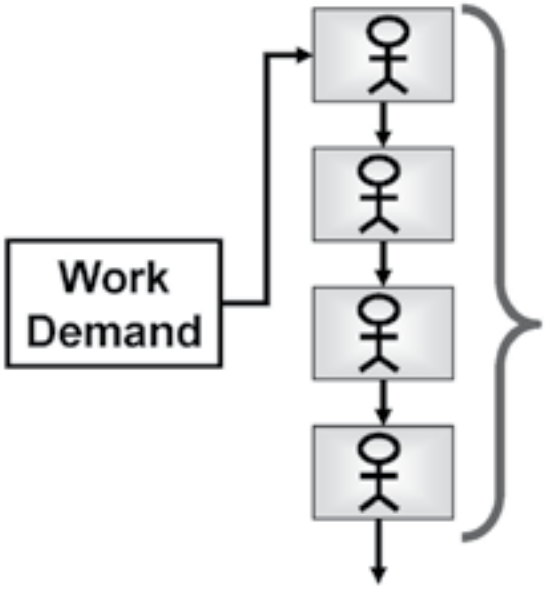
Sequential (Dependent) Work



Coordinated by Hierarchical Planning

Added Considerations: sequence, completion criteria

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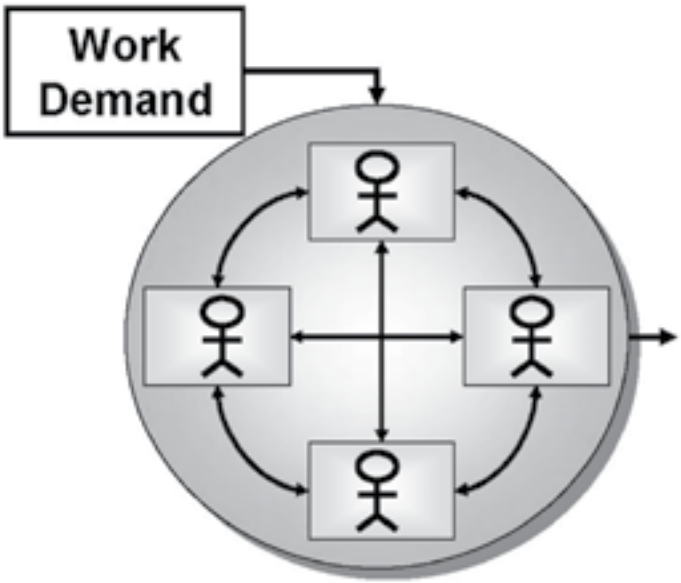
Reciprocal (Interdependent) Work



Coordinated by Mutual Adjustment

Added Considerations: interface agreement, organization structure

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Program Organization Design Strategy

- Organize based on the nature of the work
  - Pooled work can be easily organized globally or locally
  - Sequential work can be coordinated globally or locally using standard CPM tools and planning processes
  - Reciprocal work must be managed by either
    - Co-location of the team members or
    - Interface management or
    - Both
- Create program infrastructure to fill the gaps
  - Meetings, workshops, design reviews, phase reviews, program management office, detailed interface tracking, etc.

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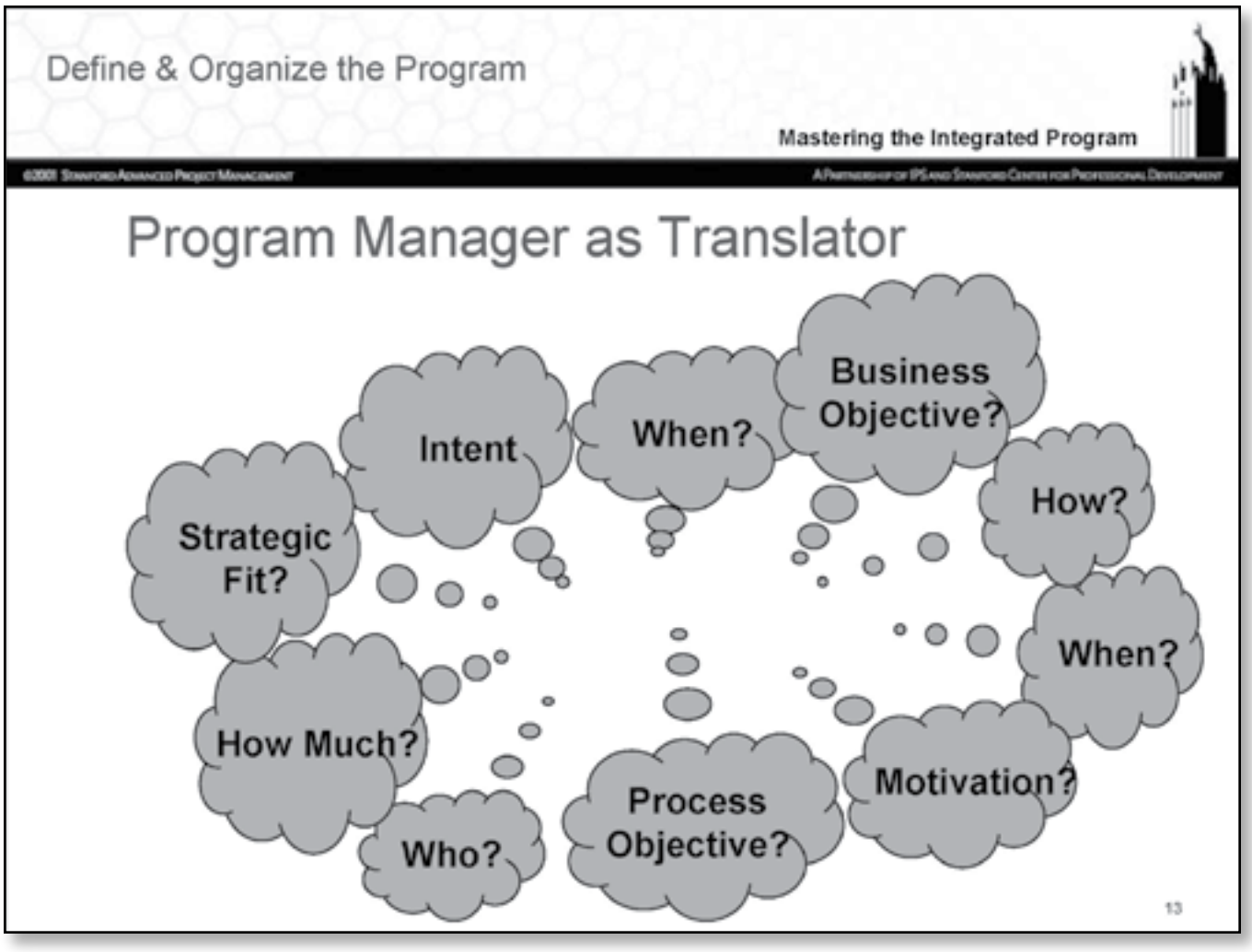

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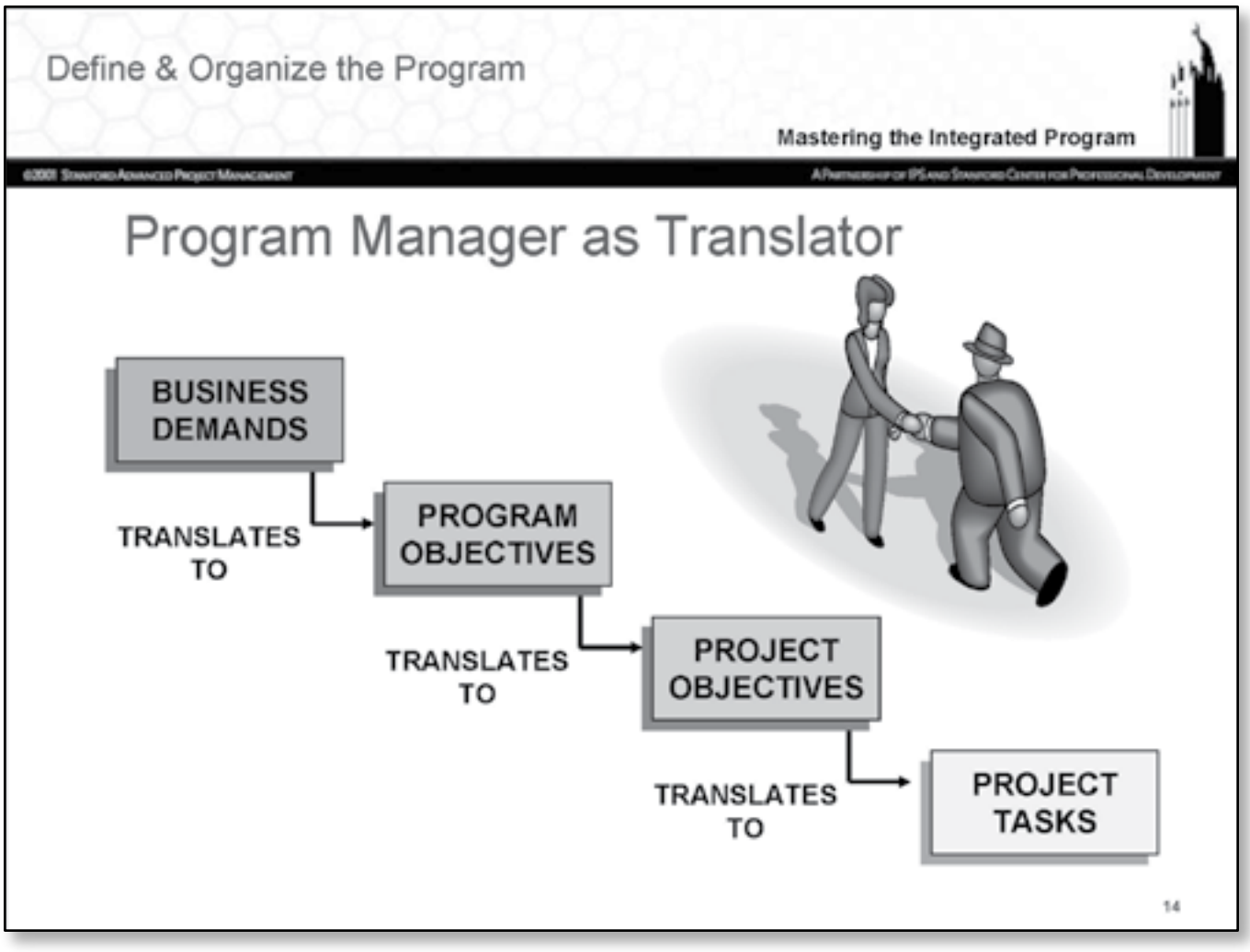

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Program Definition Exercise

- Review the diagram given to you
- Communicate to your team how to replicate the diagram on their paper
- You have 10 minutes to
- complete the exercise

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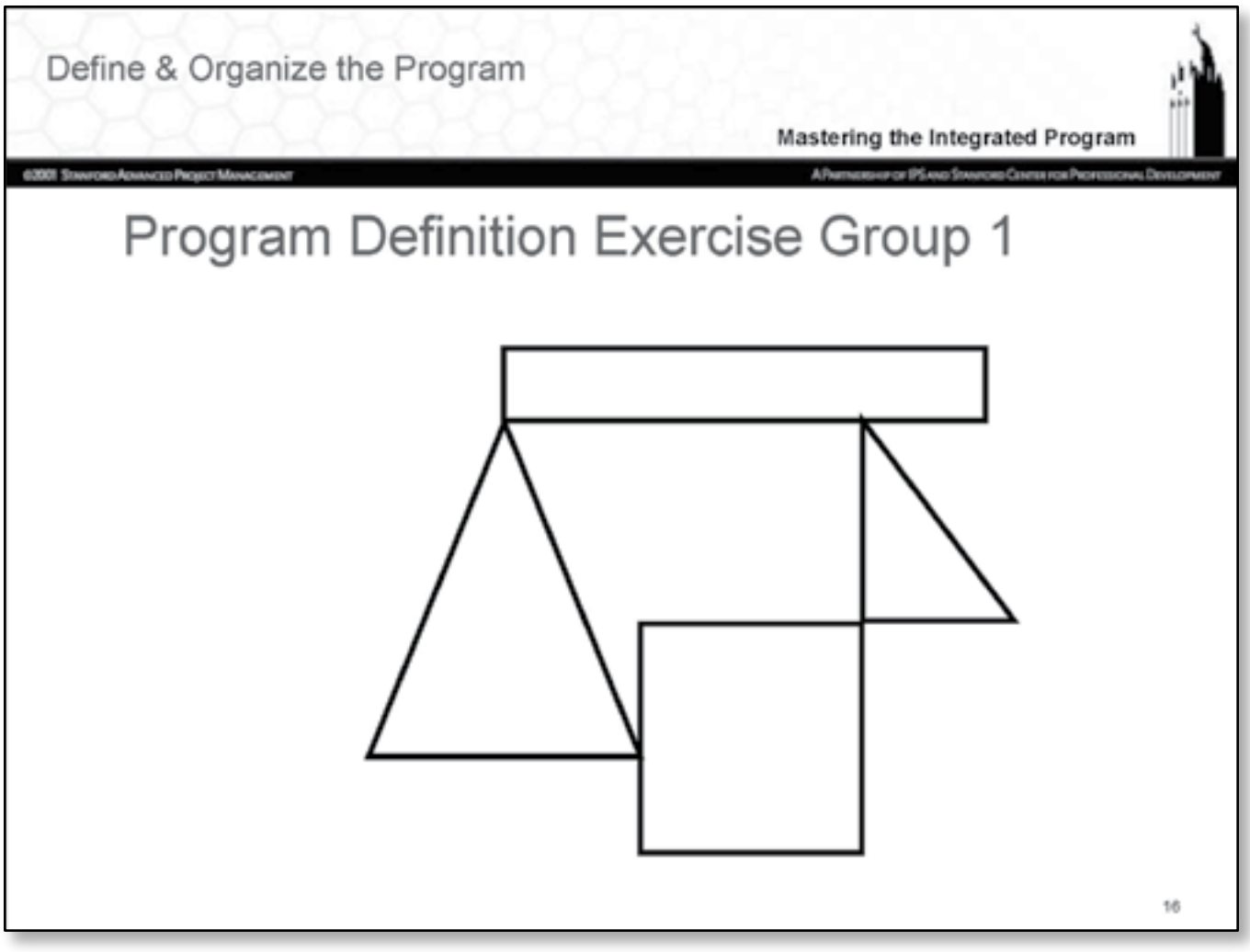

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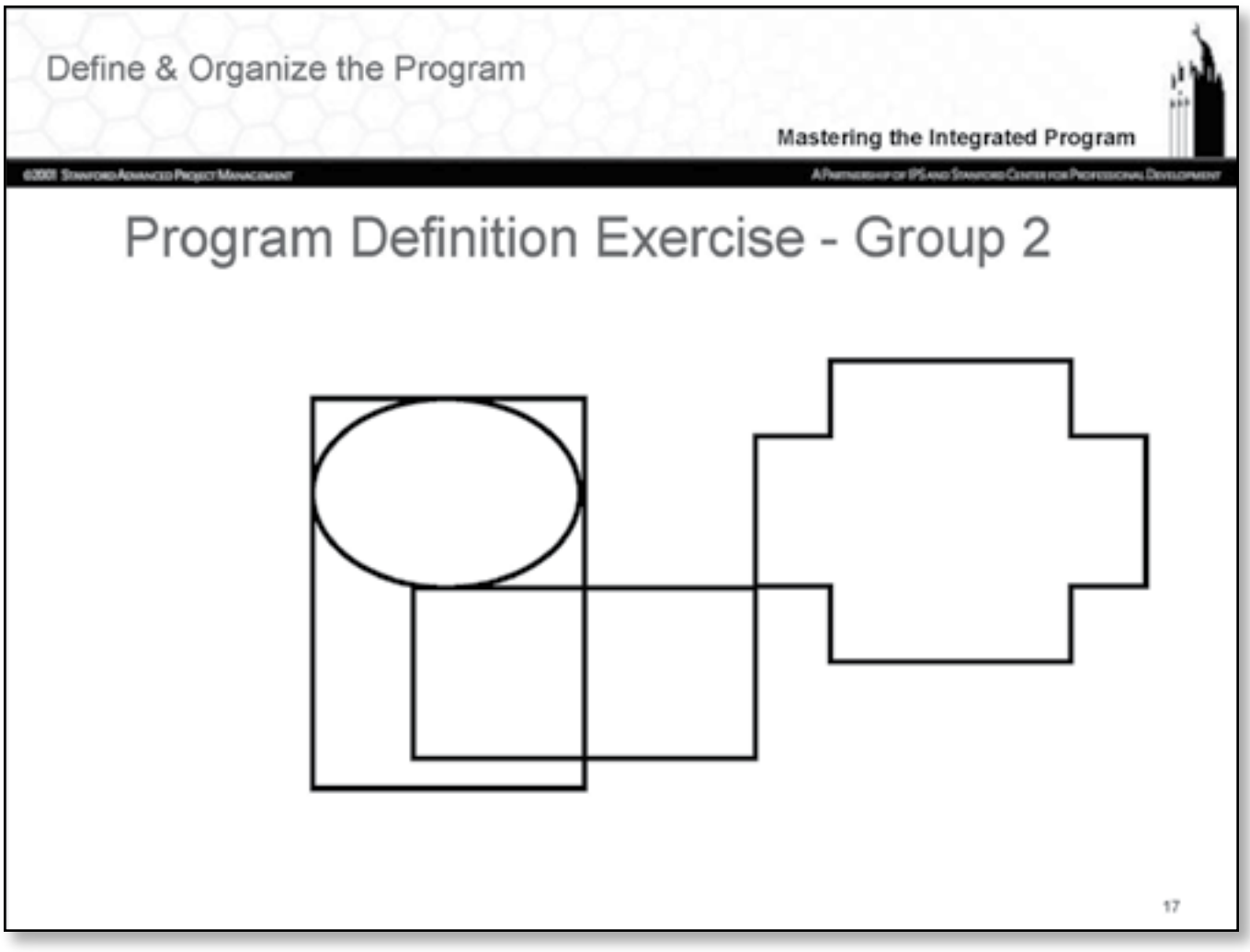

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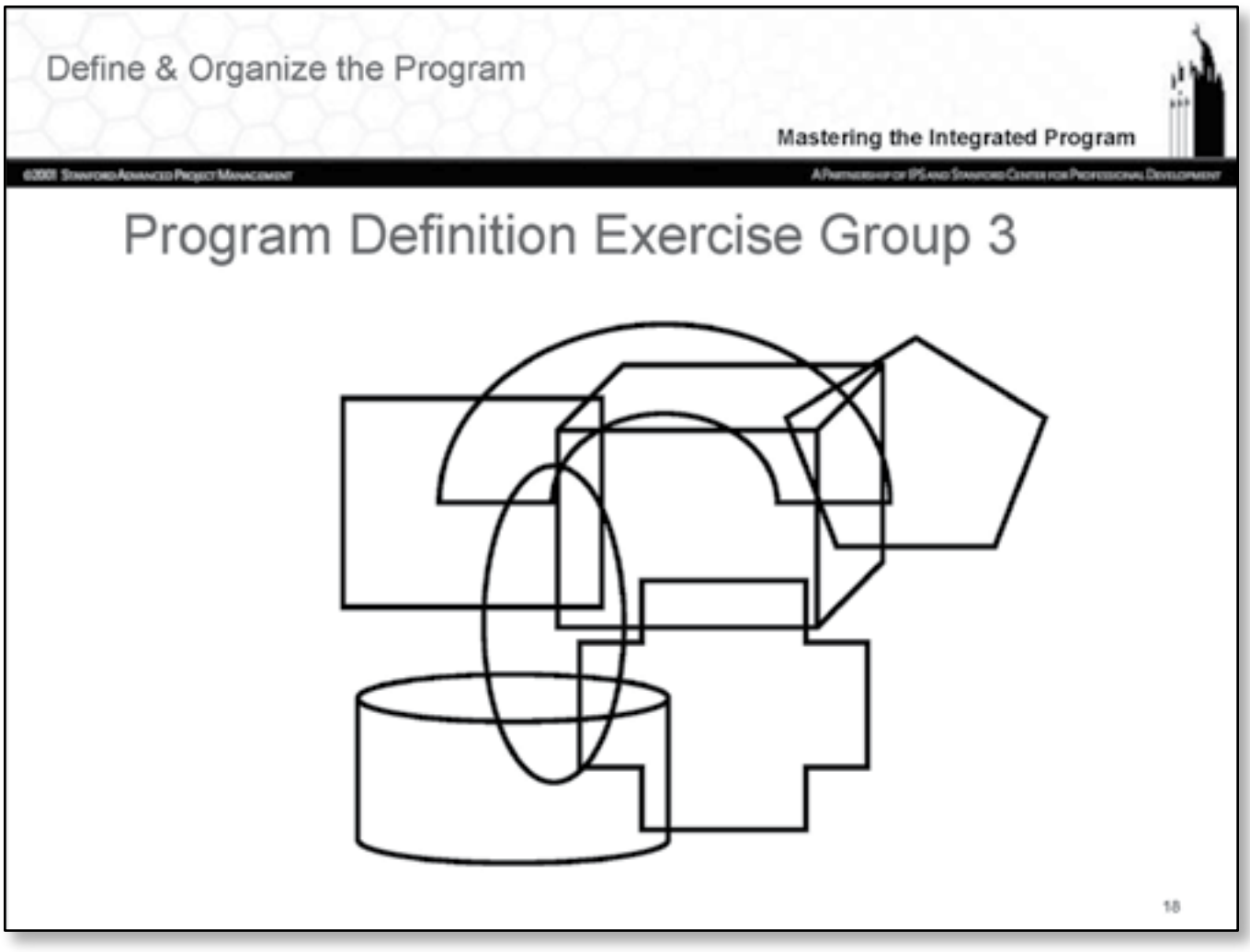

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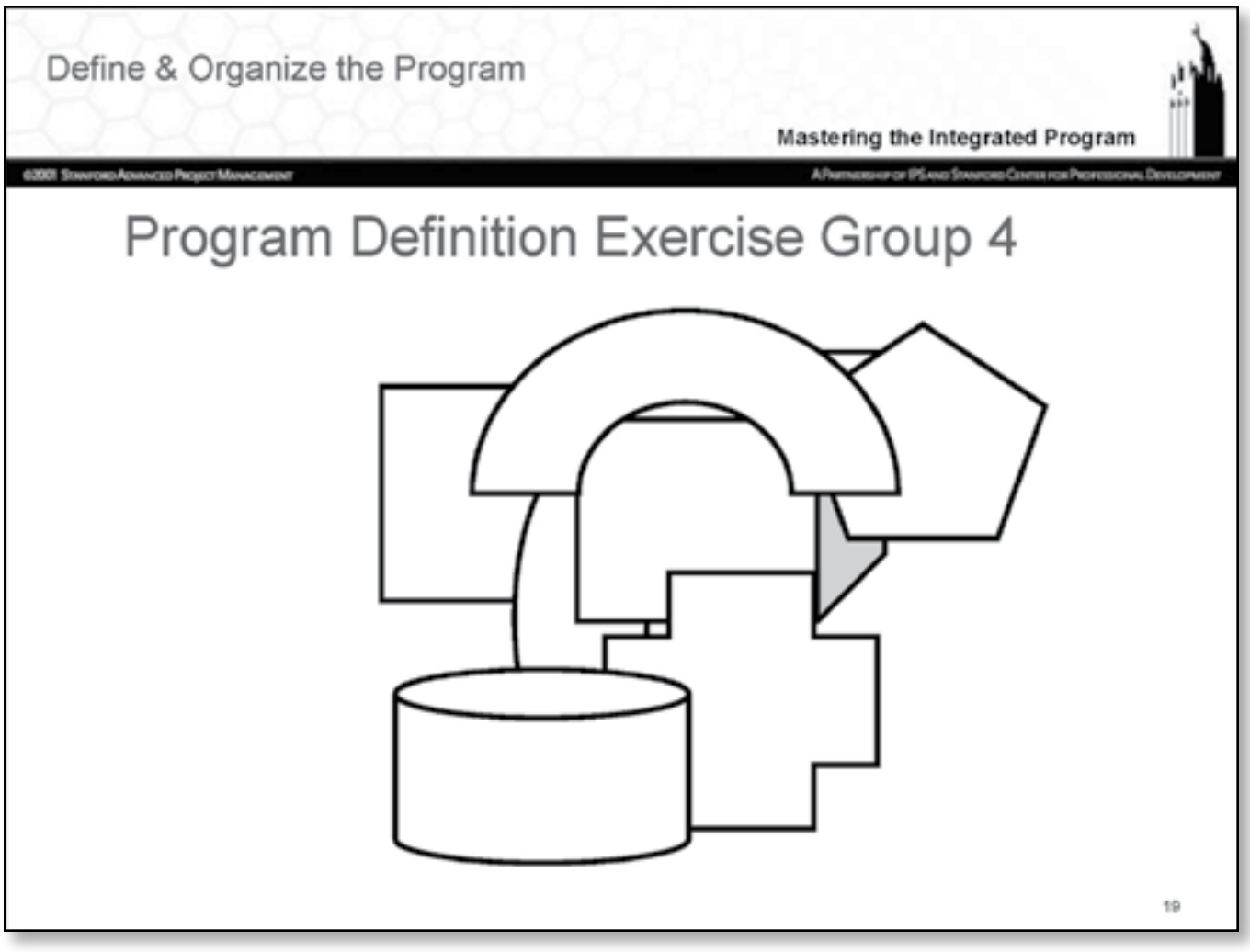

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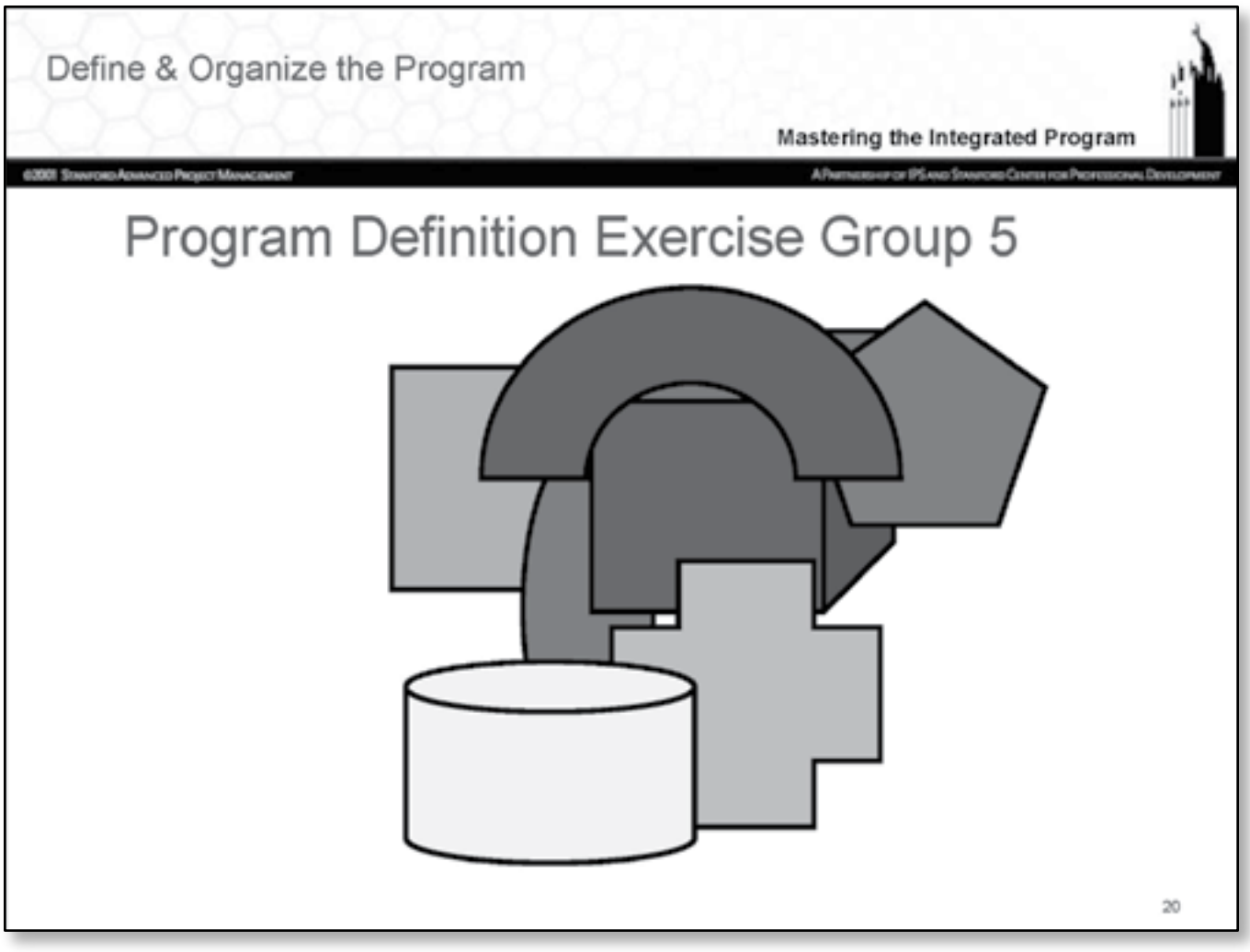

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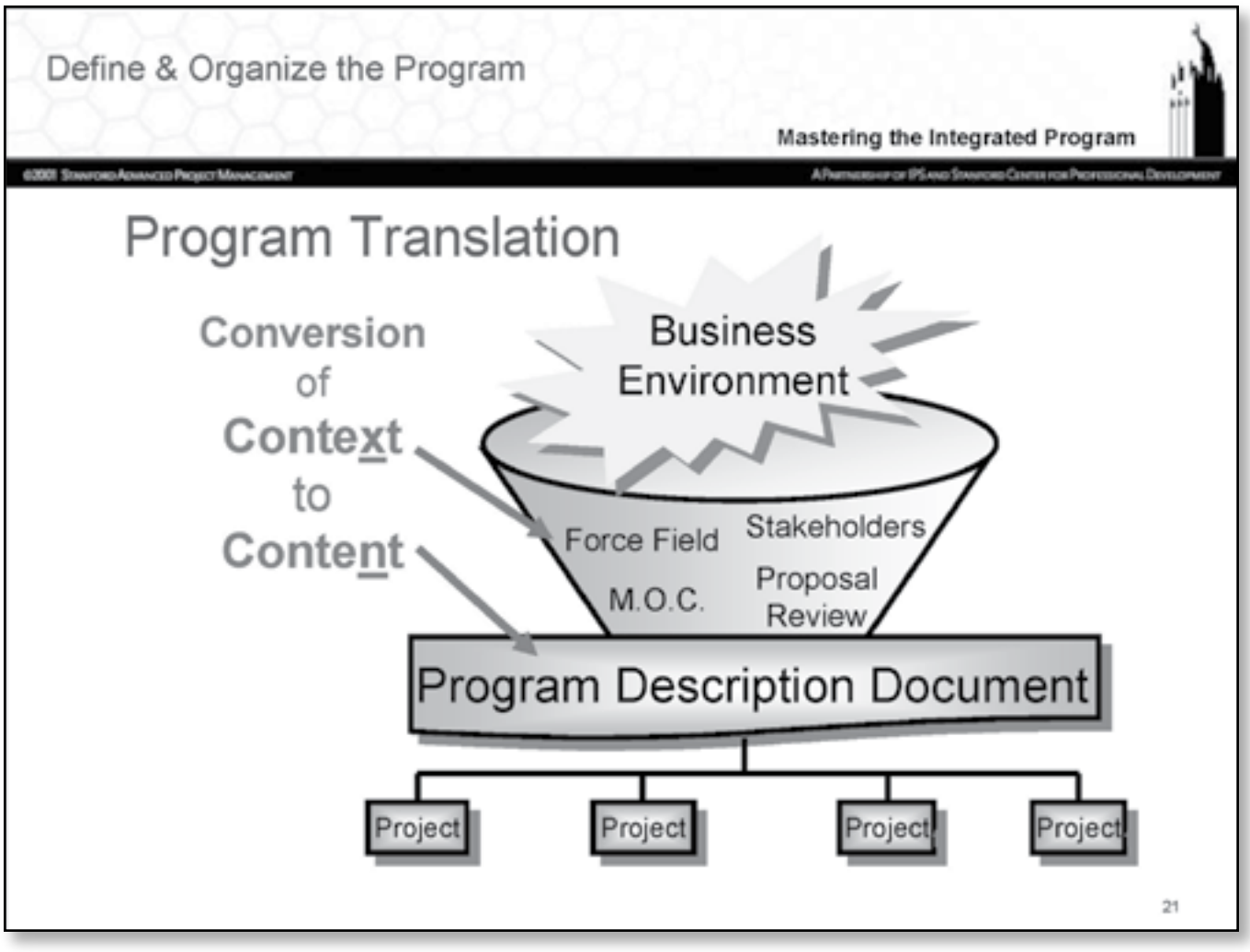

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Create the Program Definition

- Program objective statement
- Flexibility matrix
- Priority scale
- Program deliverables
- High level integrated schedule
- High level budget
- Program Risk Management Plans

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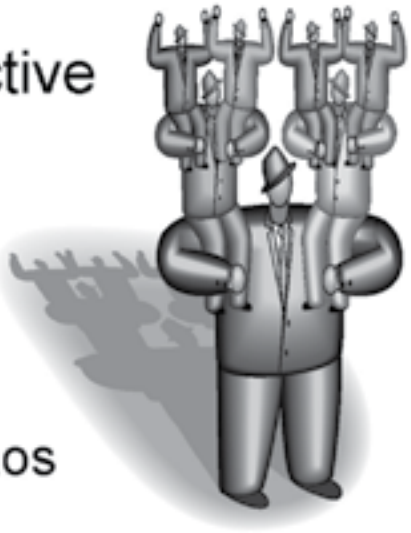
Program Definition Workshops

- A workshop is very effective
  - Reduces fuzzy front end
  - Generates momentum
  - Establishes involvement
  - Expands ownership
  - Creates clarity out of chaos



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Program Definition Workshop – Typical Deliverables

- Program roles and responsibilities
- Program objective statement
- Program deliverables
- Flexibility Matrix
- Framework checklist
- Target milestone schedule
- Major risks
- Program issues log

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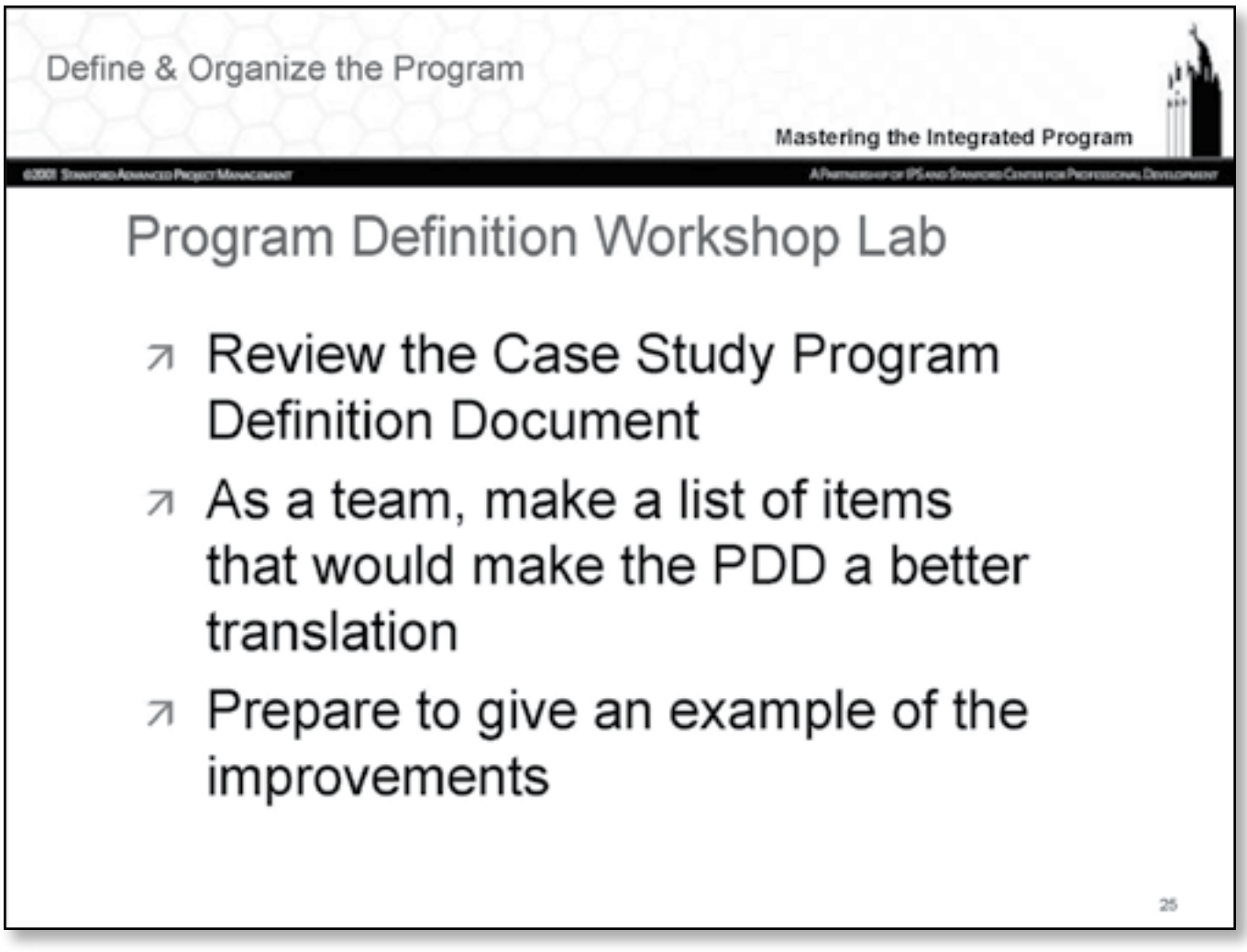

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Create the Program Infrastructure

- Process considerations
  - Planning Strategy
  - Program Processes
  - Program Office
  - PMO Resource Requirements
    - Tools, equipment, facilities

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Planning Strategy

- Sequential planning
  - Wait until all planning is complete before starting work
- Concurrent planning
  - Plan while working
- Phase planning
  - Break program into phases
- Rolling wave
  - Plan to a time horizon

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Program Management Processes

- Program/Cross-project Planning
- Performance Management and Reporting
- Dependency Management
- Communications Planning
- Issue and Escalation Management
- Risk Management
- Change Control
- Cost/Benefit Tracking
- Quality Management
- Stakeholder Management
- Organizational Change Management
- Document and Knowledge Management
- Resource Management
- Internal Training
- Project Prioritization and Selection*
- Supplier Management*

*These processes may not apply to all programs

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Program Office

- Established as the control center for the program
- Develops key program infrastructure
  - Processes and Procedures
  - Plans and Controls
- Creates program support structures
  - Tracking and Reporting
  - Tools and Training

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Keys to a Successful Program Office

- Scale the size, services and service levels to
  - Strategic intent, business objectives and performance expectations
- Scale the processes to support the program to
  - Program depth, breadth, and complexity
- Determine roles and staffing
  - Sponsor, program manager, subject matter experts, tool specialists, and project/program coordinators
- Provide Facilities and Tools

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Tips on Developing a Program Office

- Focus on ease of use
  - Reduce bureaucracy
  - Streamline the processes
- Leverage processes which are applicable to all types of programs
- Seek out best practices from experienced project and program managers
- Use networking

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Program Management Office Lab

- The Case Study Program Manager has hired you as a Program Office consultant
- Consider the Program Management processes
- Which should be managed most formally?
- Which of these processes be highest priority?
- Which processes should the Program Office handle as centralized processes?

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Create the Program Launch Plan

- This is a critical communication point
  - Present a clear and compelling reason for the program
  - Answer all the who, what, why, when, where, how, and for how much questions
- Plan the exact communication forum
  - Meetings
  - Off-site events
  - Parade

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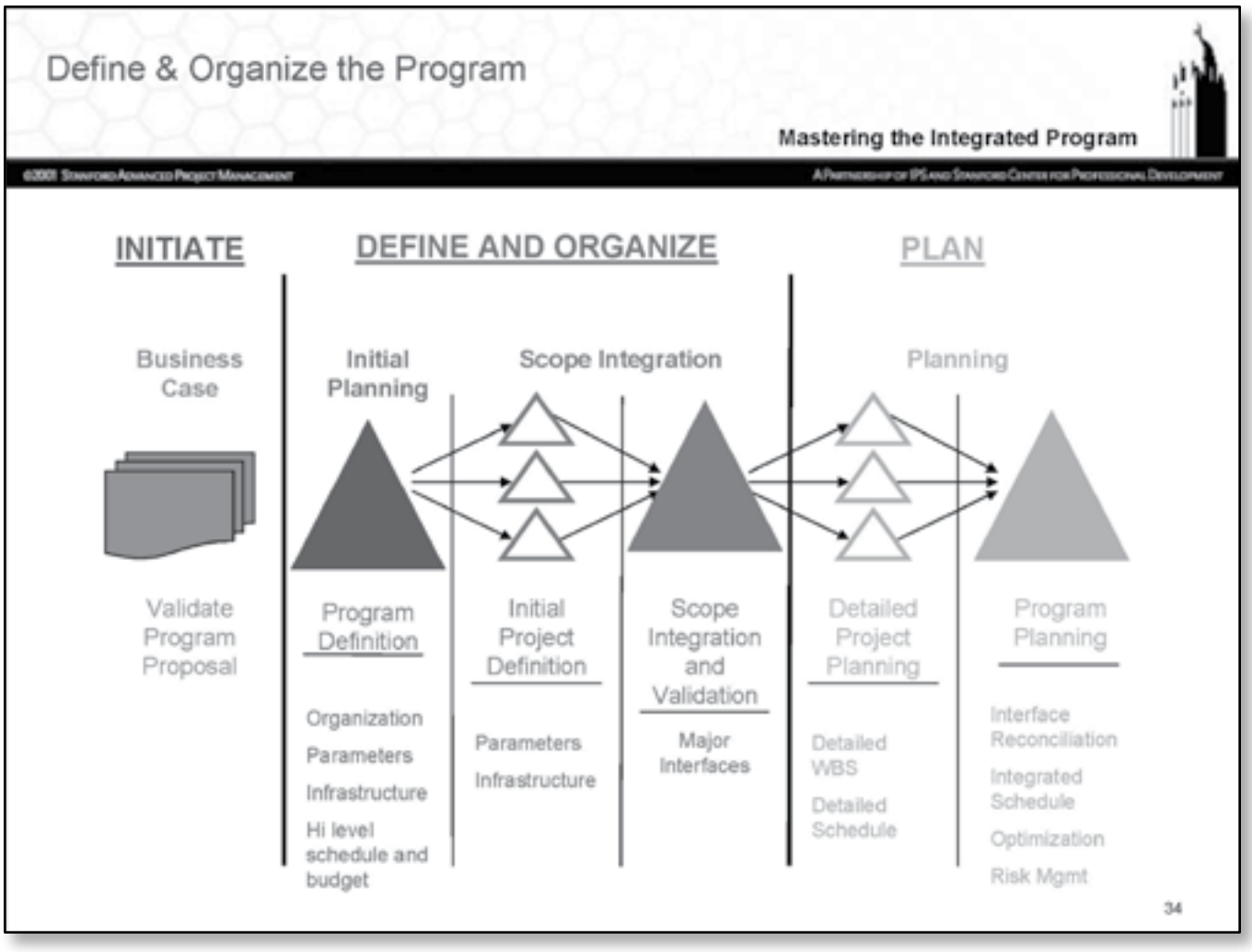

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Scope Integration Goals

- Project objectives fit program objectives
- Project deliverables aggregate to program scope
- No gaps
- No overlap
- Issues are identified for action

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Scope Integration Process

- Verify project objectives
- Verify project deliverables
  - Check all is/is not lists for completeness, gaps and overlaps
- Resolve discrepancies
- List unresolved discrepancies as issues

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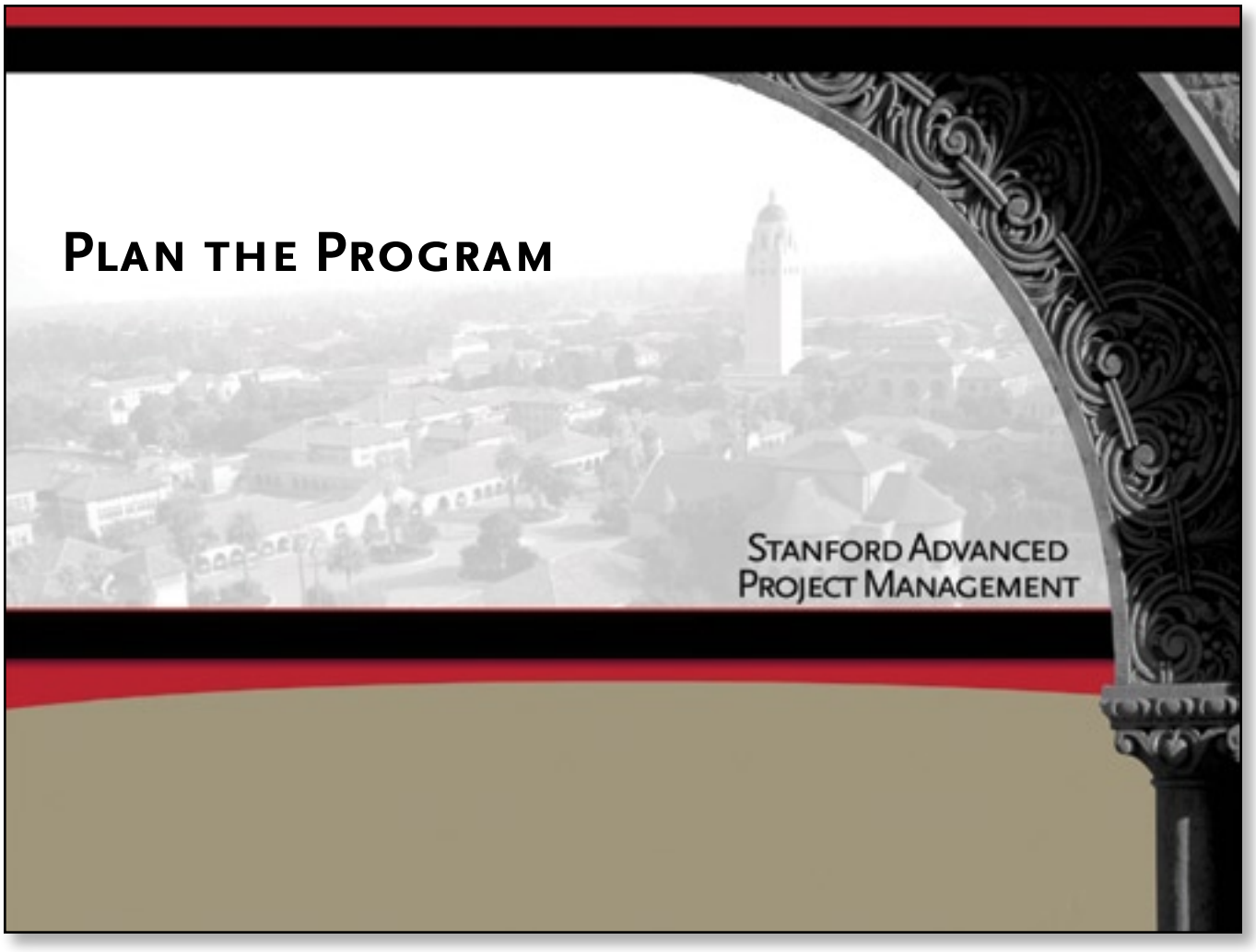

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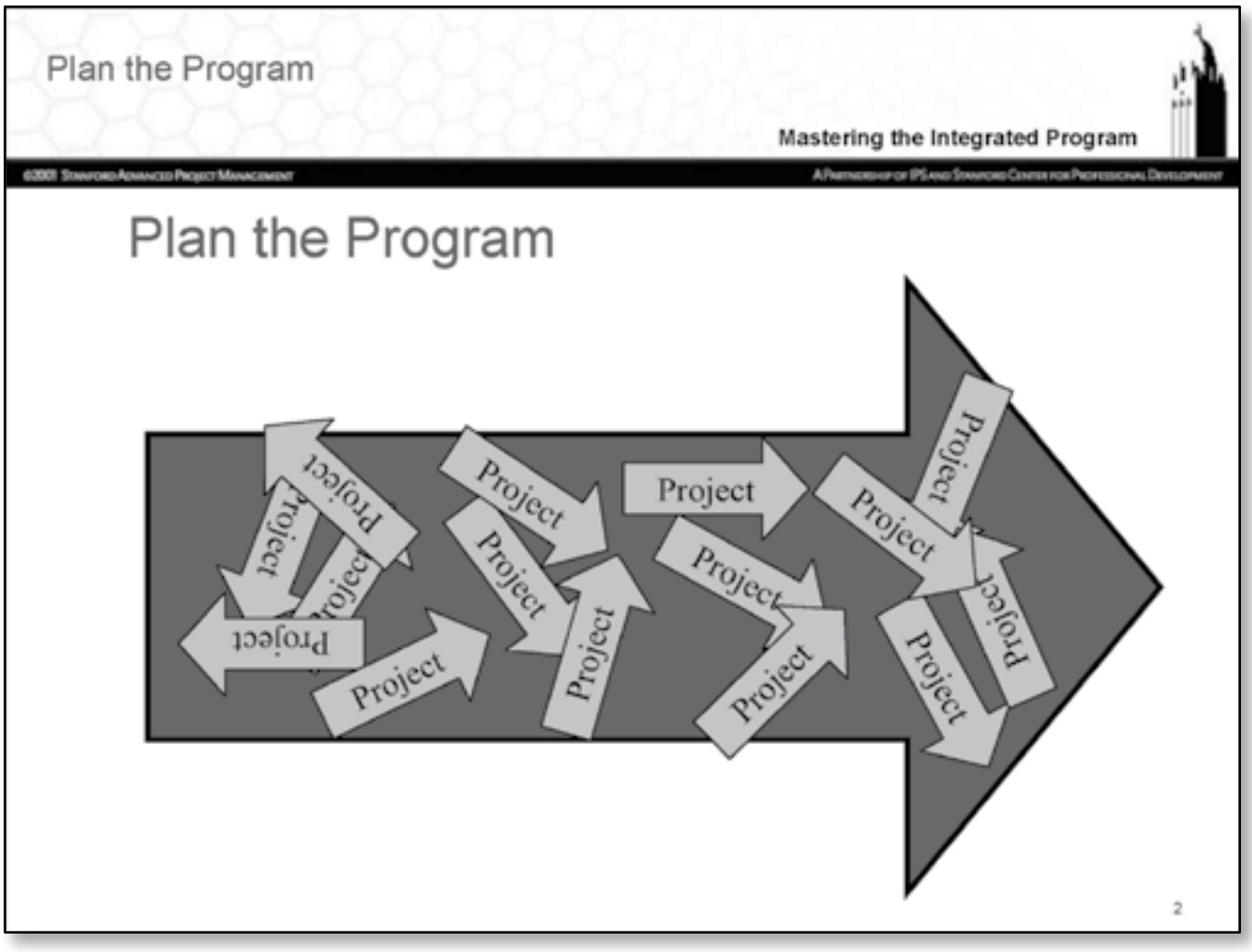

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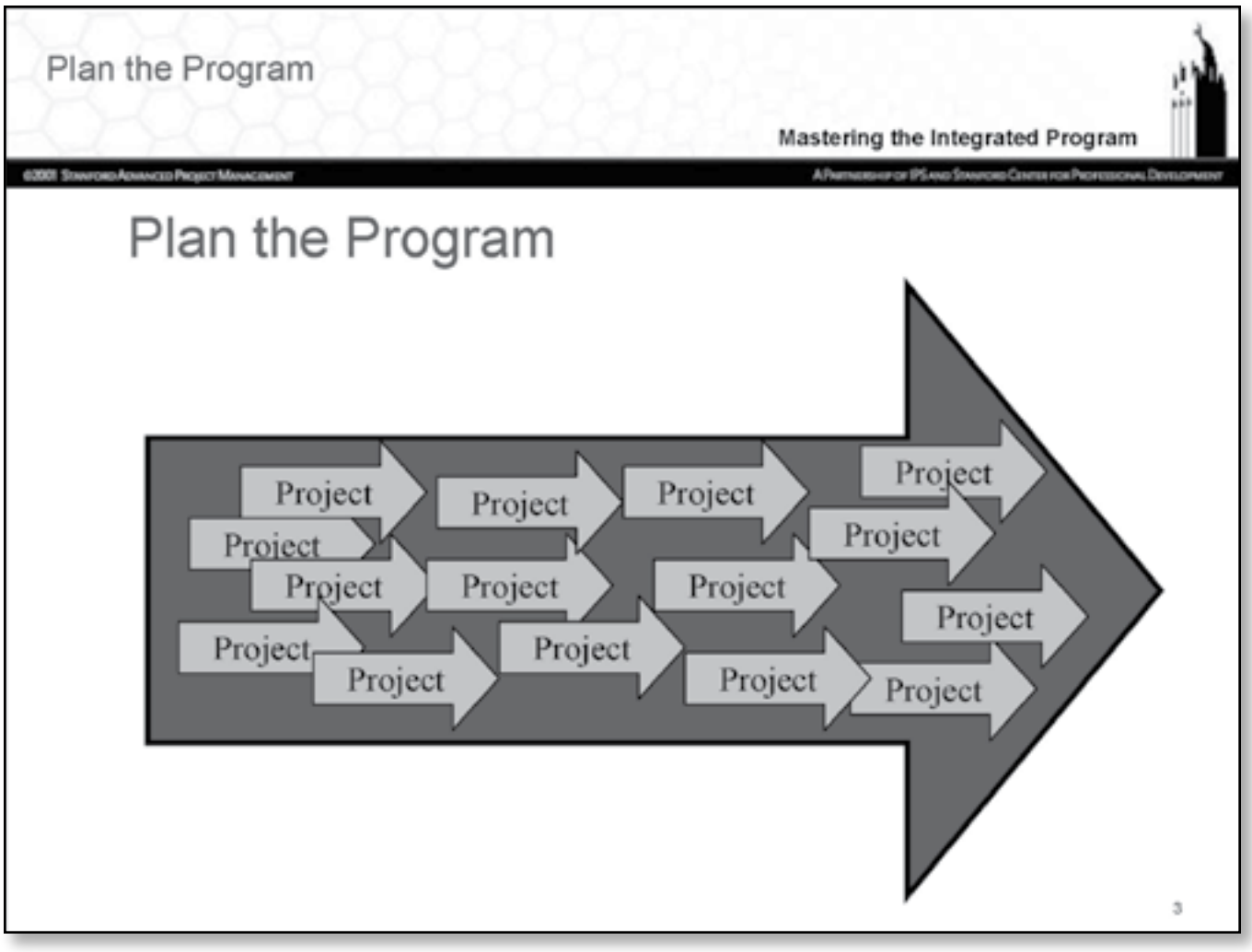

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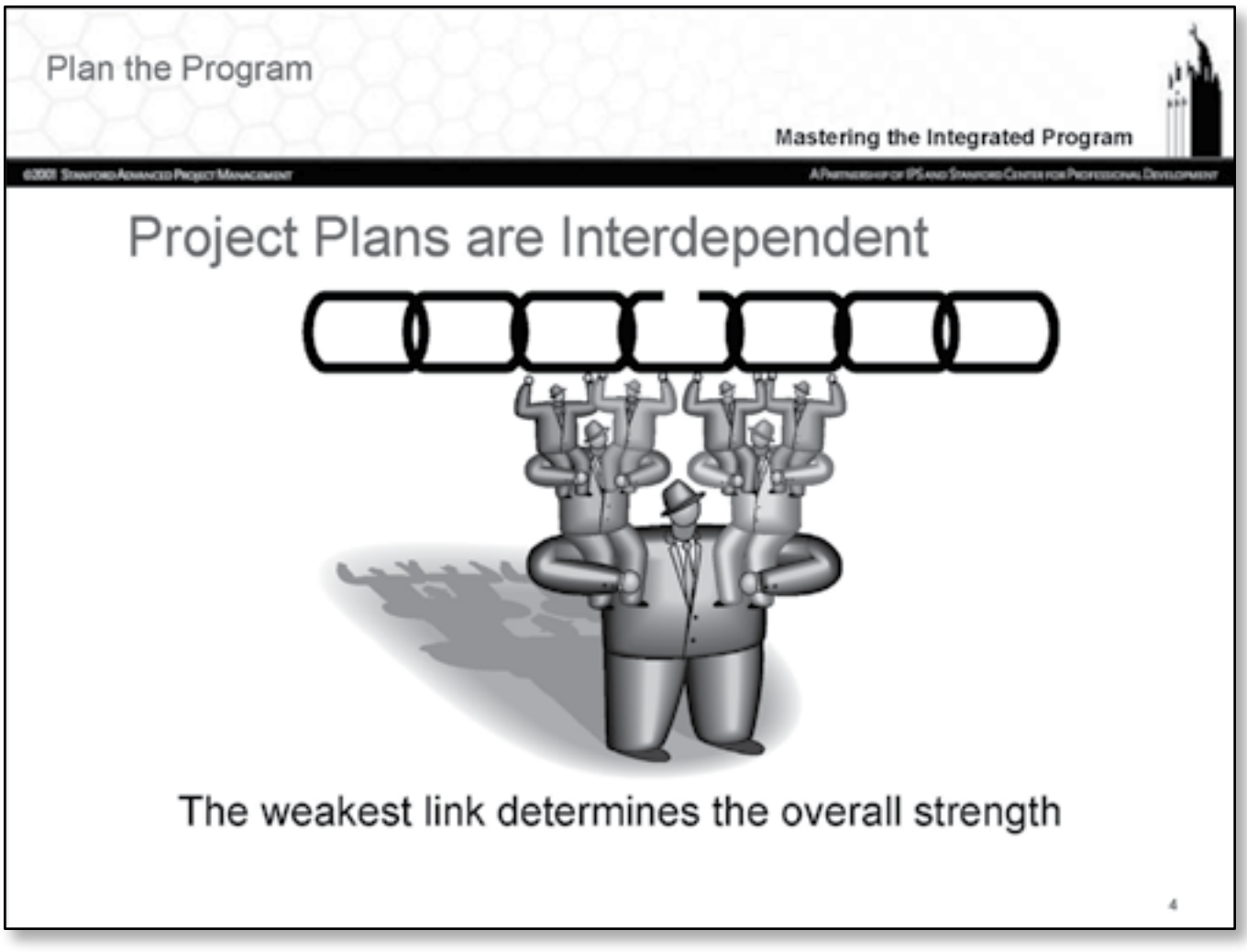

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Plan Quality Review

- Conduct a plan quality check prior to integration processes
  - Check for optimization to high-level milestones
  - Assure preliminary resource loads are complete
  - Assure deliverables support the program

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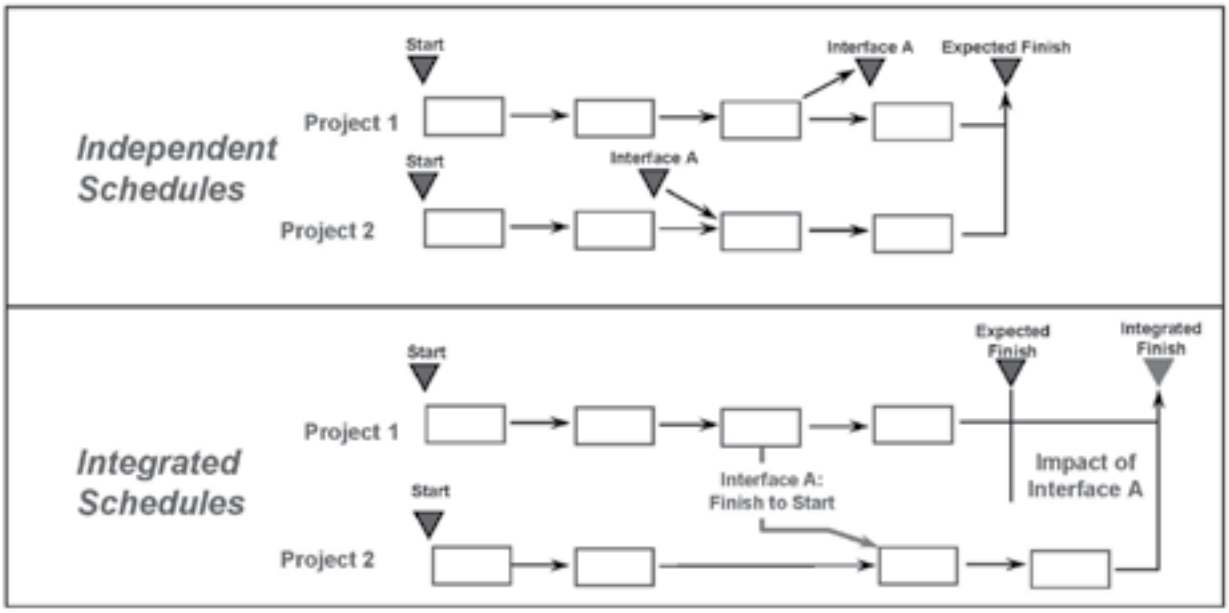
Interfaces and the Integrated Schedule



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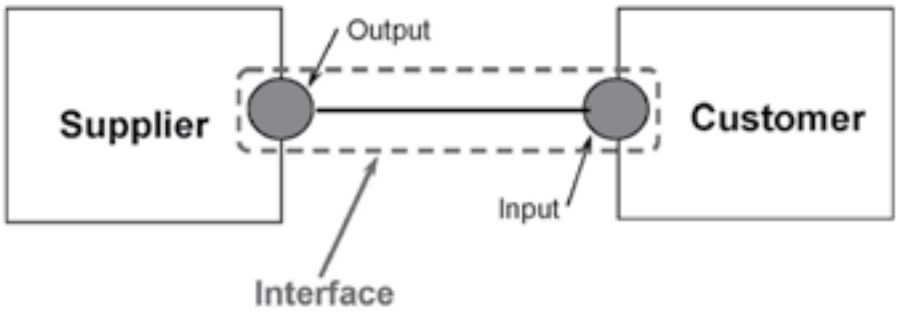
Integration Through Interface Management



- Establish clear connections
- Focus on process, not individuals (reduces conflict)
- Interface management allows functional autonomy while creating program integrity

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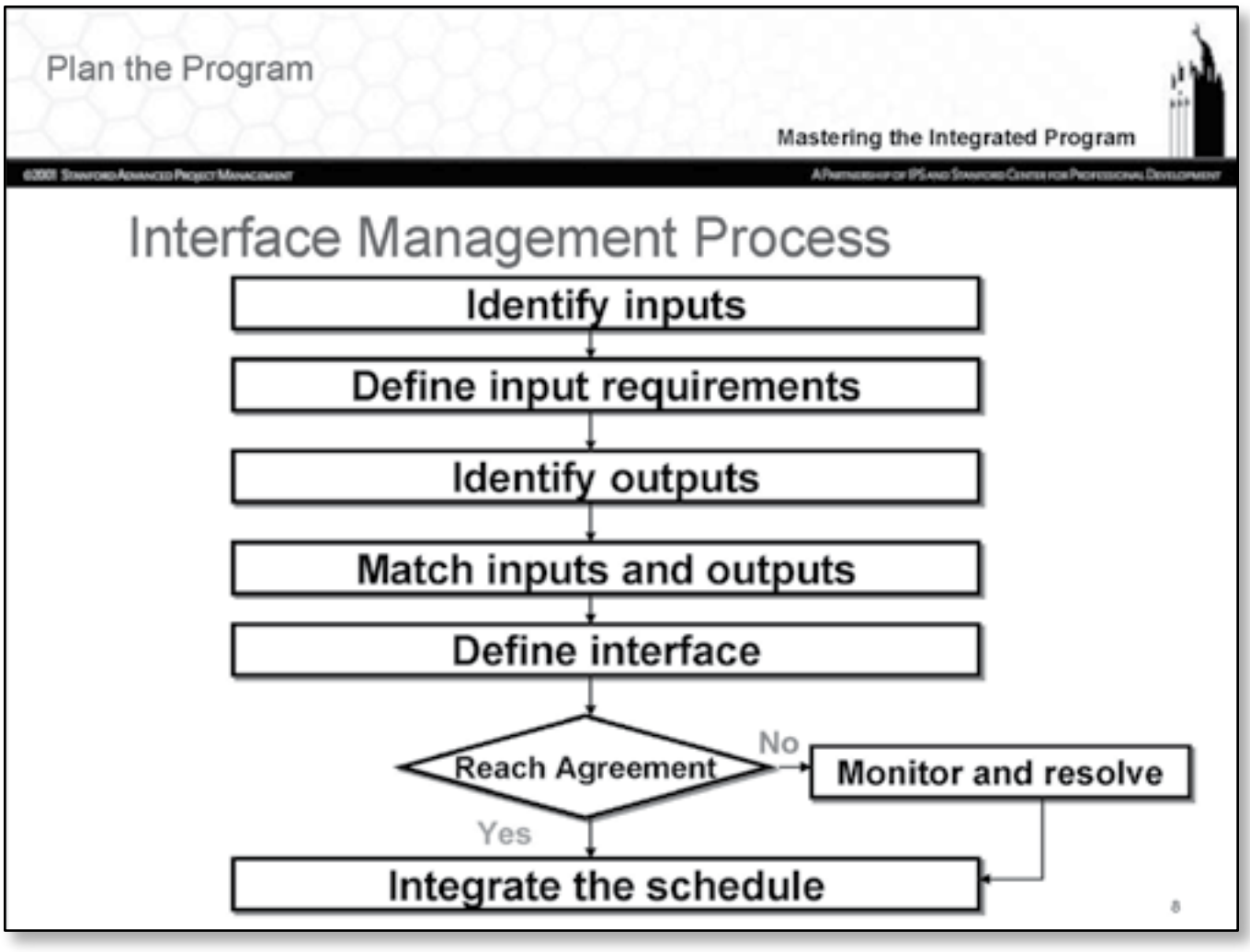

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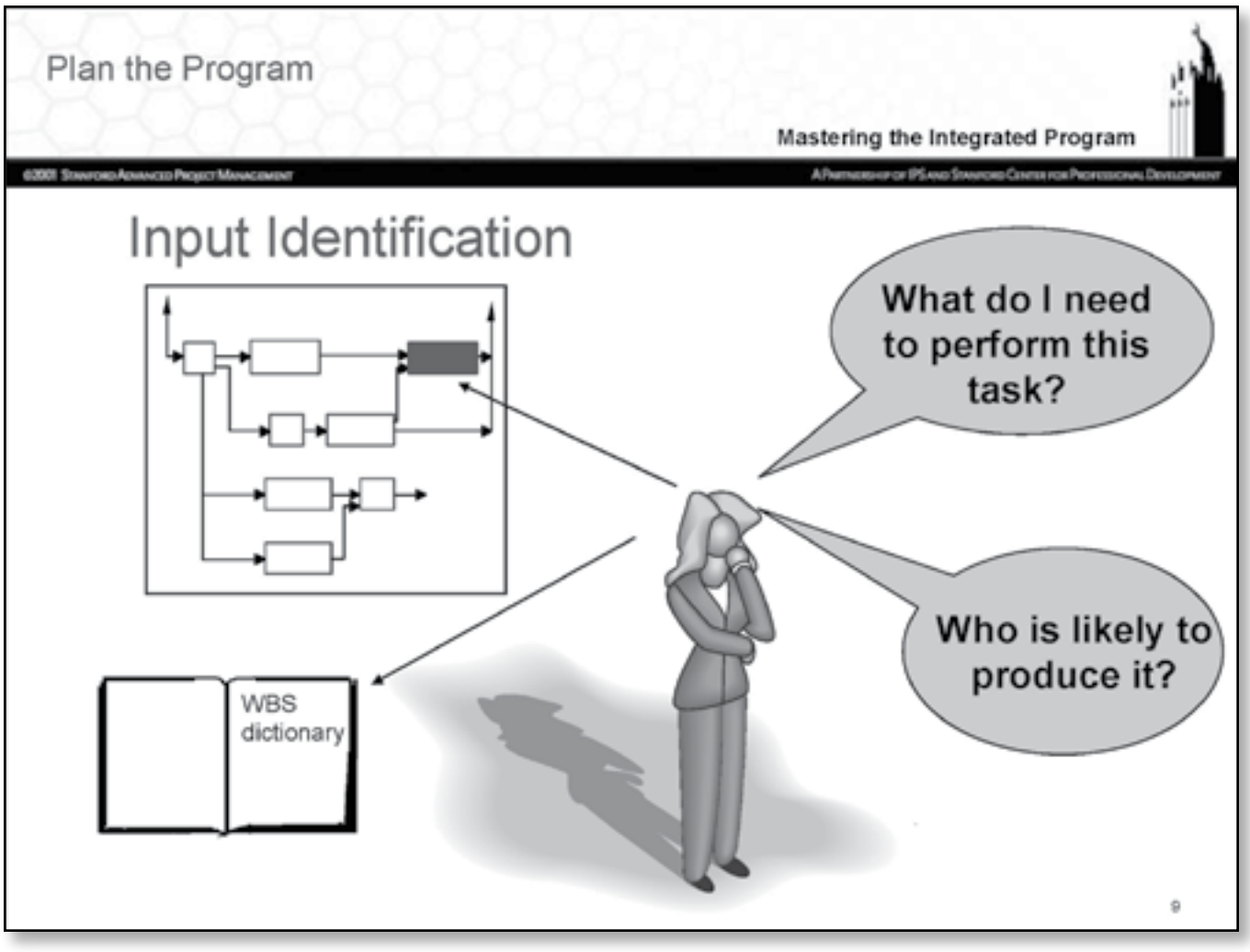

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Input Definition

- Names the input
- Defines the parameters
  - Size, shape, color, form, format
- Sets the values
  - Quantitative and qualitative
- Includes customer, task name and presumed supplier
- Defines usage

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Interface Definition Form

Customer Organization	Customer Contact
Documentation	Ann Gela Landsberry
Supplier Organization	**Supplier Contact**
Software Development	Mike Rosoft

Input Description

Soft copy of functional specification

Usage Information

Used to create Alpha Test documentation for QA

Key Parameters

File Type, Media Type, Template Used

Parameter Values and Completion Criteria

Must be a Phrase 6.0 document, on a zip disk, uncompressed, in Release Level 4.2 template format, delivered to Ann in person.

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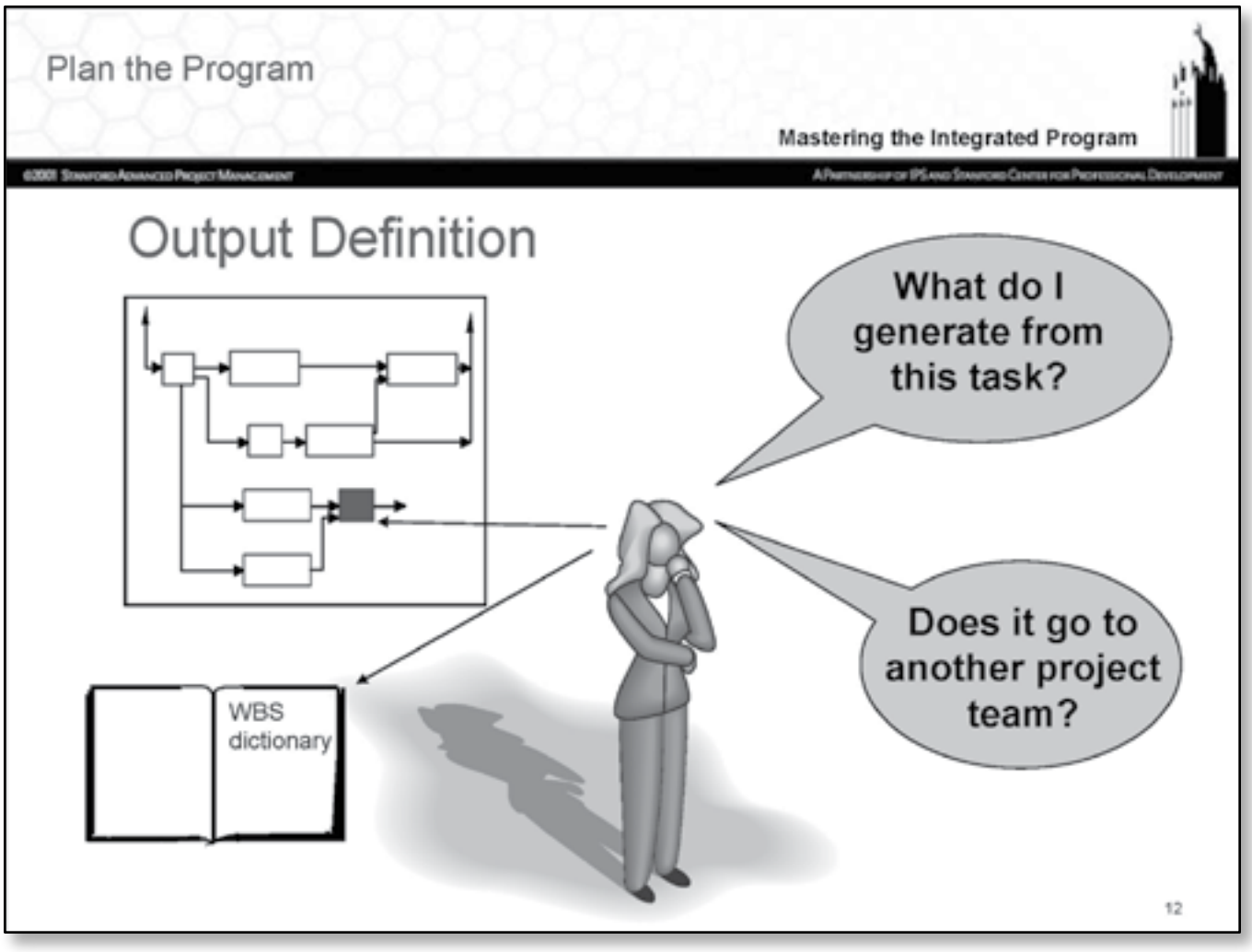

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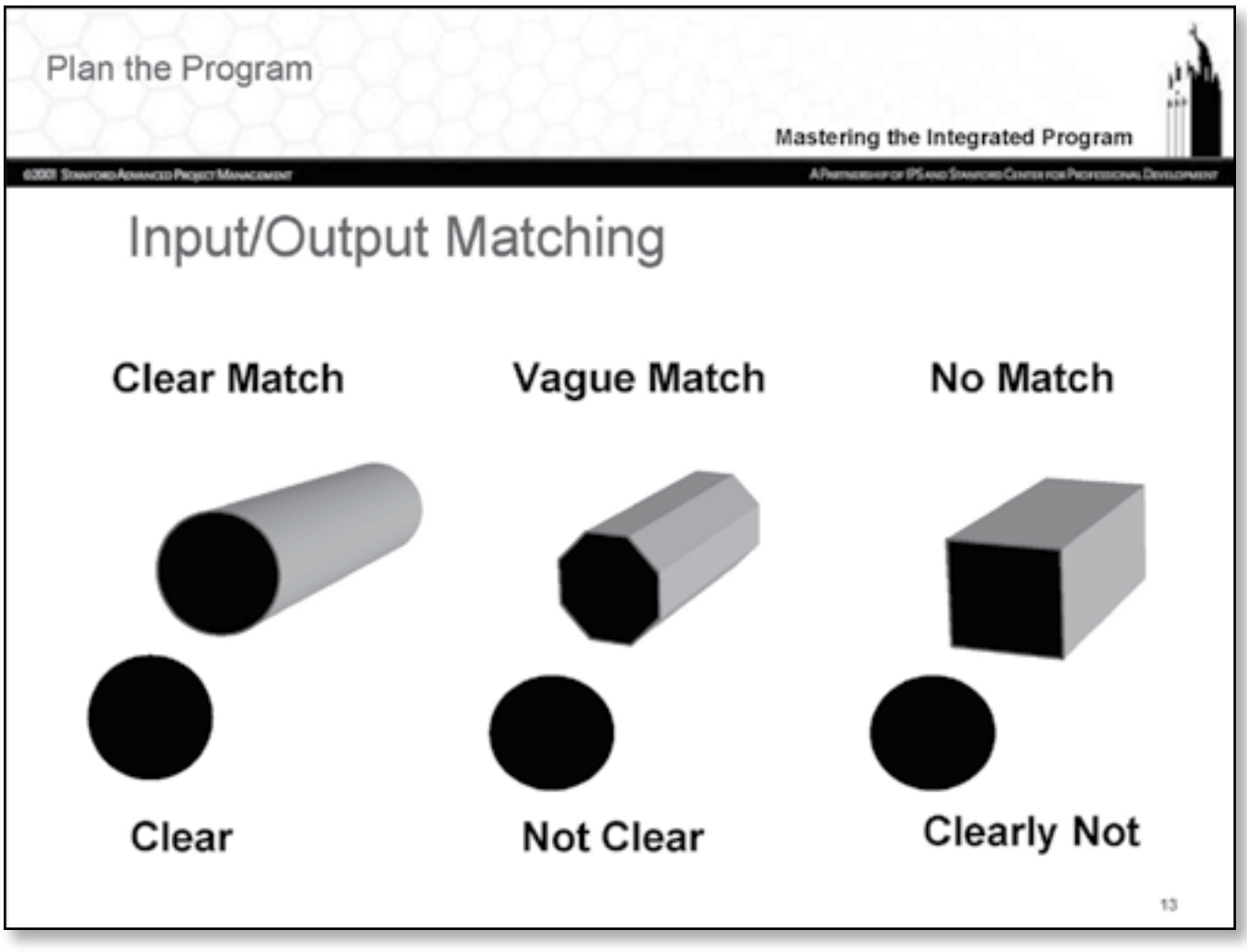

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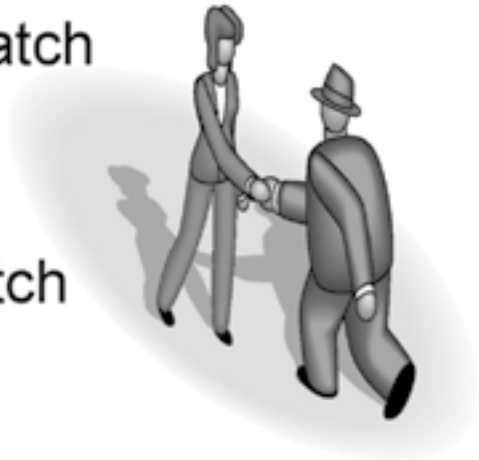
Clear Interface Match

- Parameters match
- Parameter values match
  - Quantitative
  - Qualitative
- Form and format match
- There is a sign-off



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Common Interface Problems

- Naming conventions
- Assumptions
  - "Everyone knows what that is…"
- Informal agreements based on relationship

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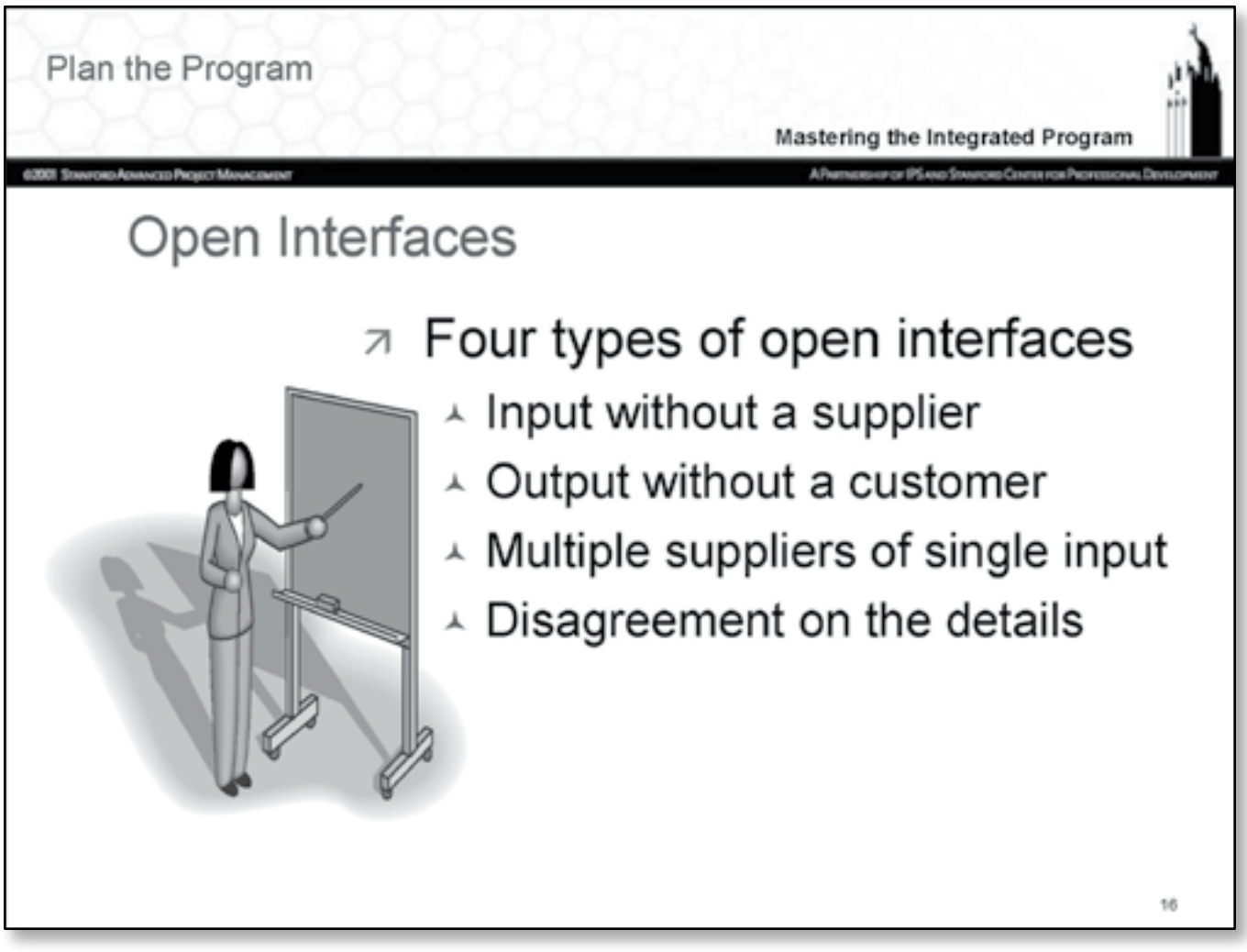

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Interface Log

Interface Name	ID	Supplier	Customer	Status	Comments
Draft 1 Requirements	A	V. Eg	I. Coad I. Rite	Closed	
Draft 2 Requirements	B	V. Eg	I. Coad I. Rite U. Print	**Open**	Current open issue is content in user interface definition

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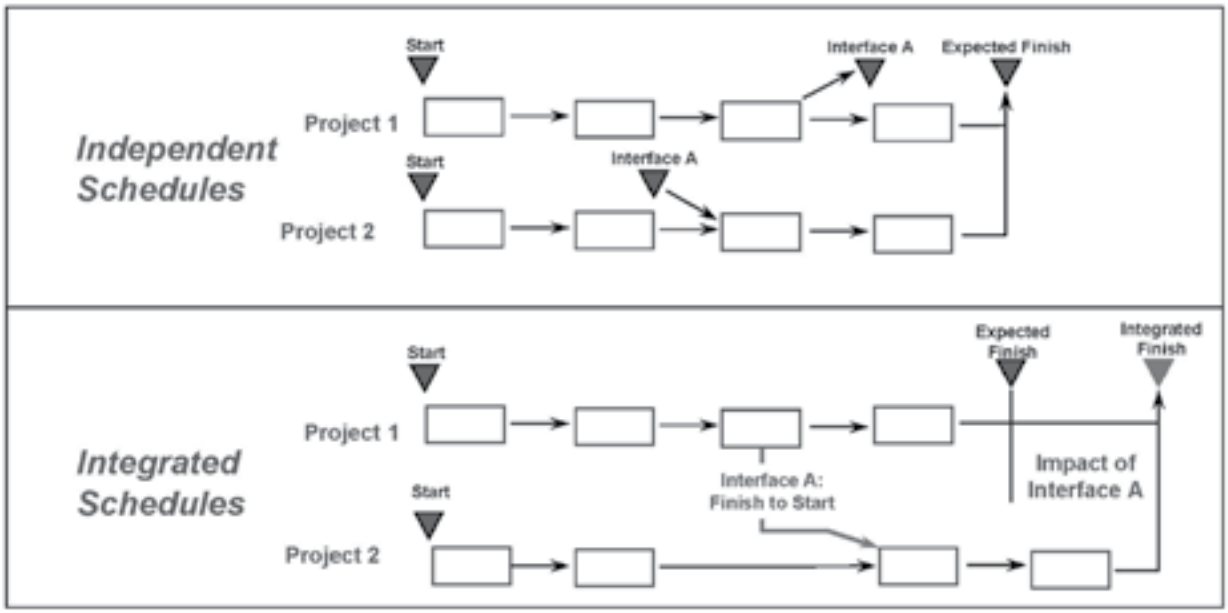

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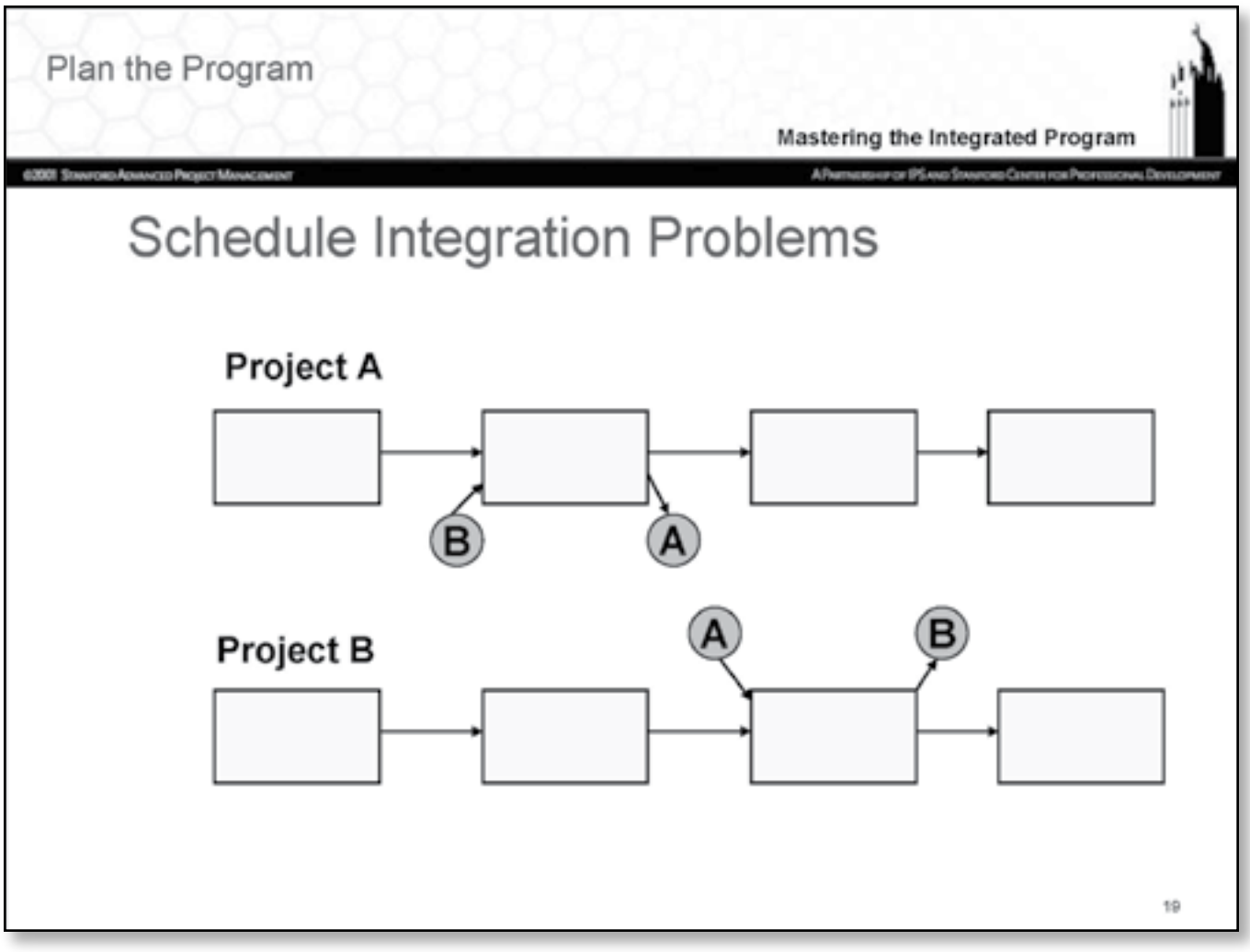

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Goals of Optimizing

	Least	Mod	Most
Schedule			
Scope			
Resources			

- Meet PDD
- Consider impact on team
- Good business sense
- Tradeoff among 3 parameters with guidance from flexibility matrix

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Optimization Process

- Program Manager as coach
  - Explore strategies and tactics
  - Set expectations and boundaries
  - Opportunity for cooperative inventiveness

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Optimization Lab

- Review the section of the program plan your group has been assigned
- Focus on the program critical path
- Develop several options for how your portion of the critical path duration can be shortened
- Prepare to present your options and recommendations with quantified duration benefits as well as tradeoffs

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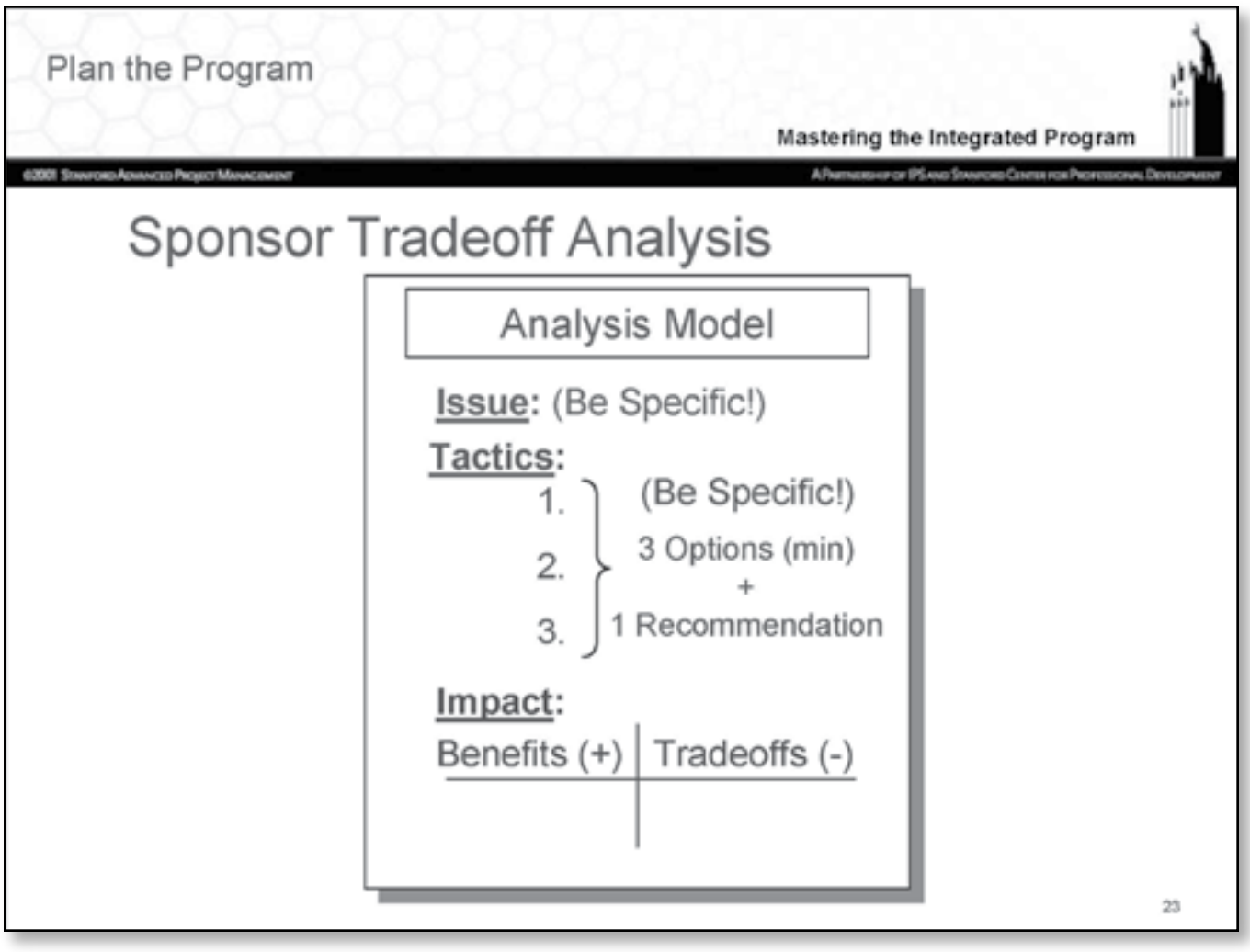

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Exceeding the PDD

- "What if" fact-based alternatives
- Multiple (3) options and a recommendation
- Present recommendation for management decision-making

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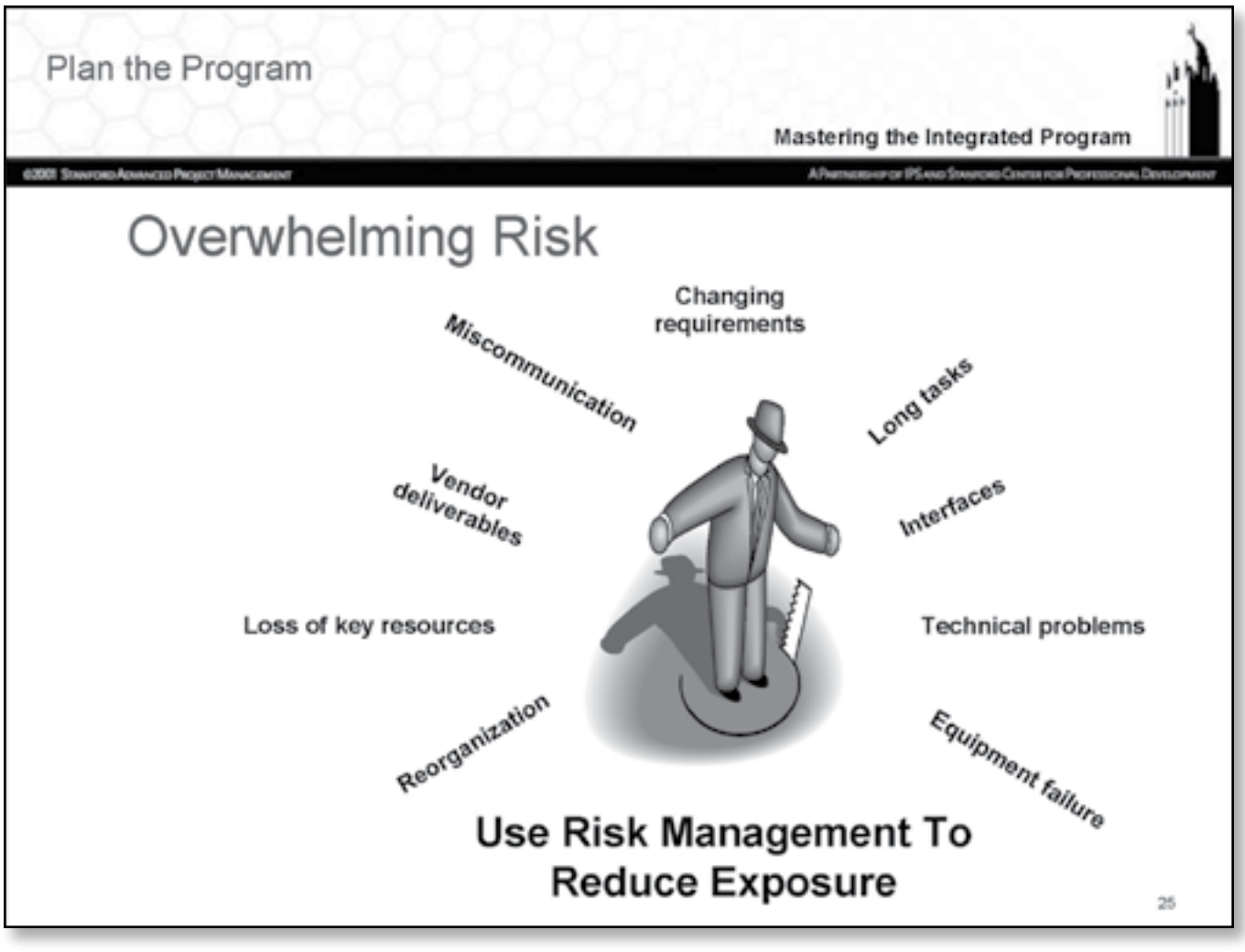

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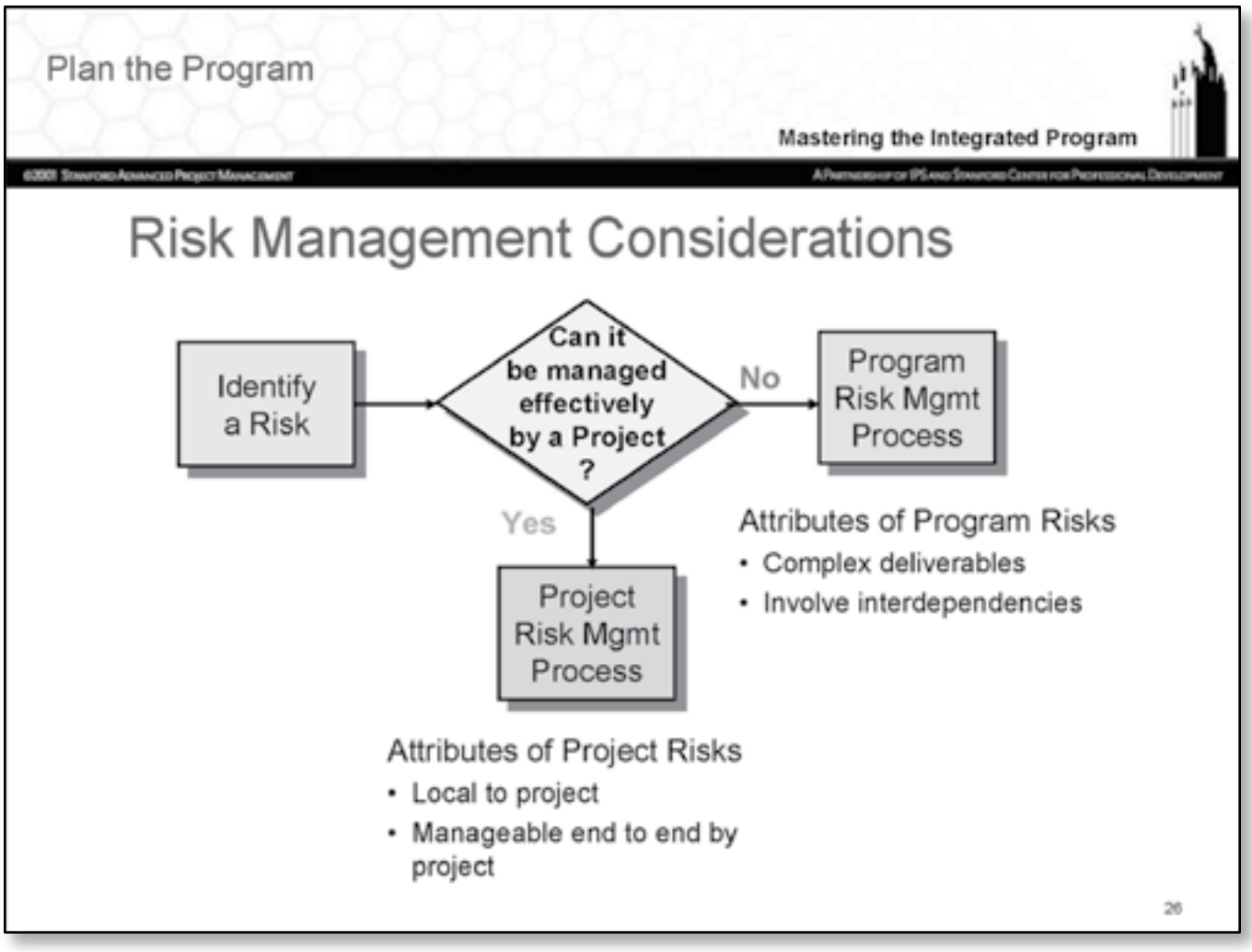

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Risk Assessment Matrix

Risk Area	Potential Impact	Likelihood of Occurrence	Difficulty of Timely Detection	Overall Threat
1				
2				
3				

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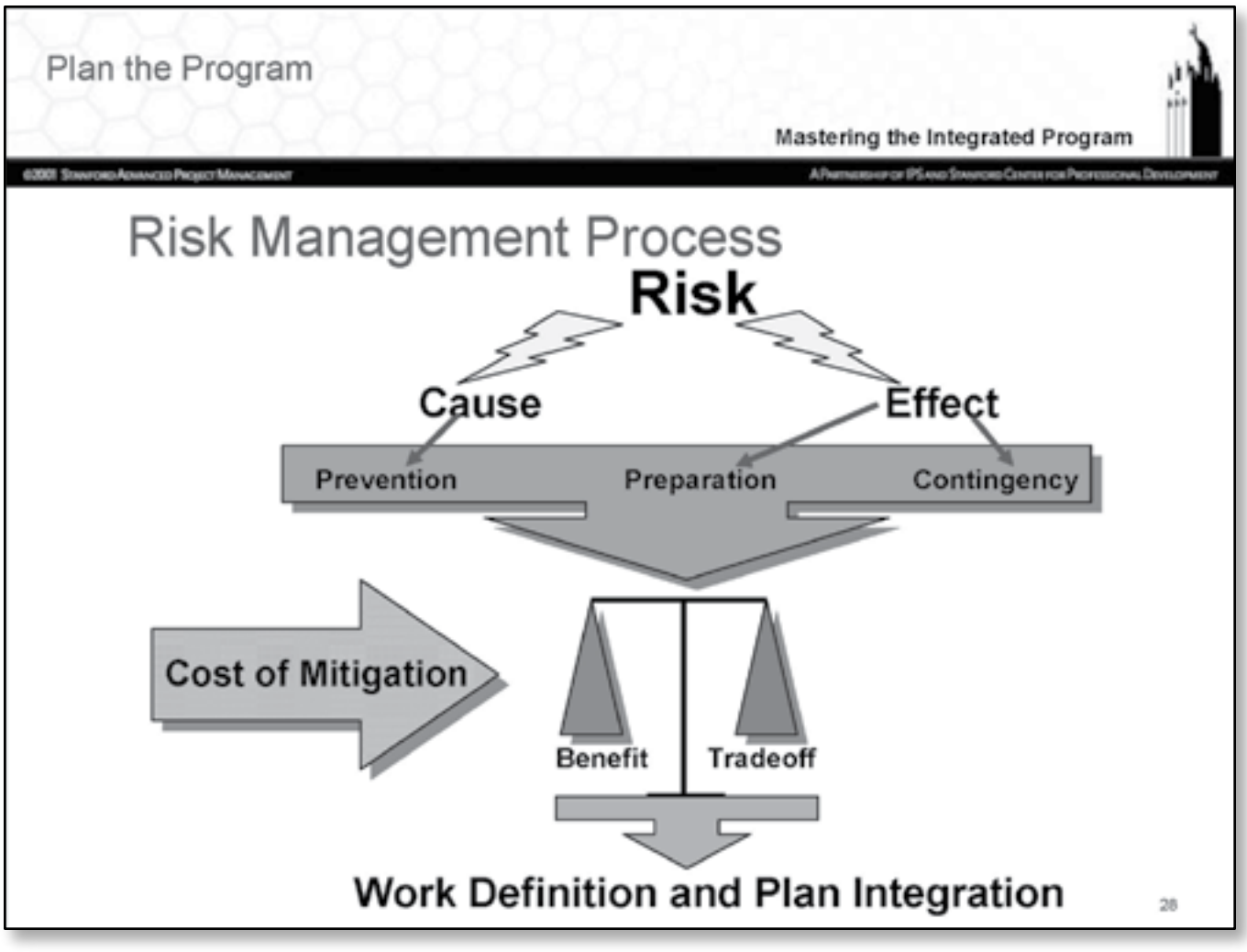

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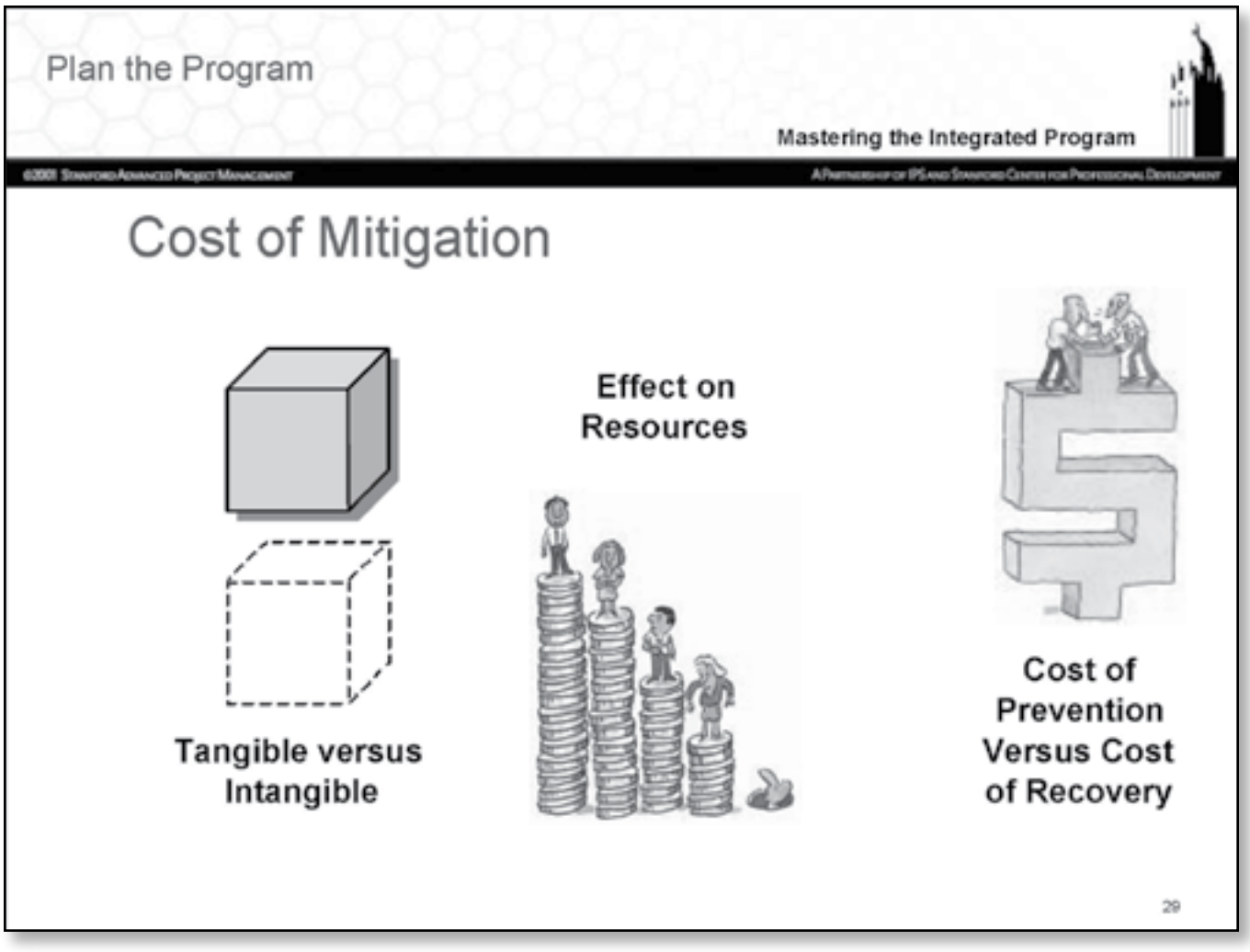

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Risk Management Lab #1

- Brainstorm a list of 5 risks to Case Study Program
- Determine which are project level and which are program level
- Create an assessment matrix for the program level risks

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Risk Management Lab #2

- Select a risk that is program level
- Determine how to segment the management plan into project pieces
- Develop a recommendation as to whether it is "worth it" to implement risk management actions from a "cost of mitigation" point of view

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Conduct Business Review

- Evaluate alignment of plan to business case
- Confirm assumptions
- Align expectations

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Program Baseline

- Schedule Baseline
  - Program and Projects simultaneously
- Scope Baseline
  - Is/Is Not Lists
- Resource Baseline
  - Program and Project budgets
- Other program plan components
  - Assumptions, Success Criteria, etc.

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Program Kick-off

- An event
  - Communicate key program information
    - Program Purpose
    - Program Team
    - Program Dates
  - Acknowledge Performance
    - Proposal Team
    - Planning Team

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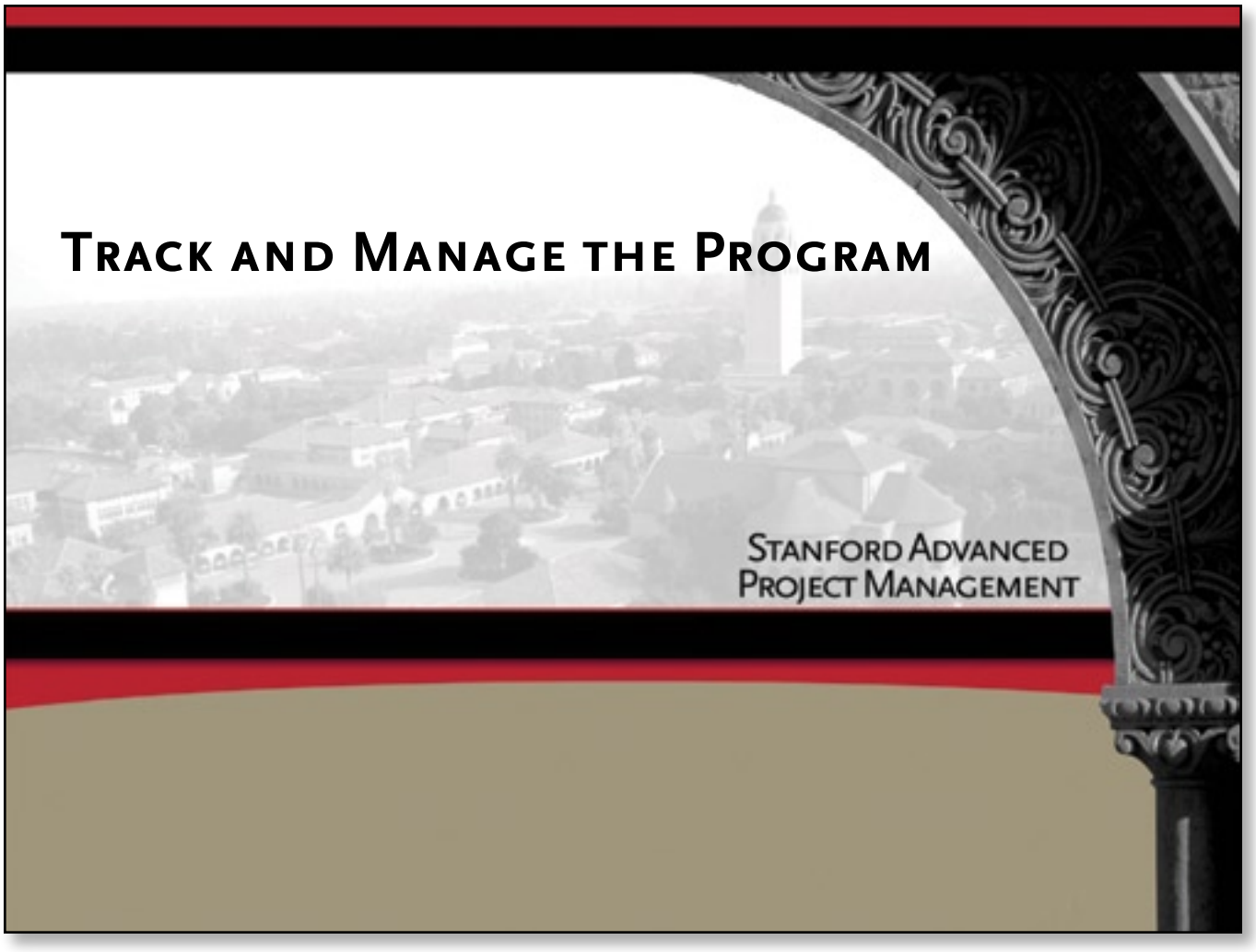
Chapter 6:



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Application Exercise

- Review the "Challenges List"
- Review Day 2 processes
  - Infrastructure, PMO, Scope Integration, Project Plan Review, Schedule Integration, Interfaces, Optimization, Risk Management, Validation and Baseline
- Create a short presentation relating how the processes help to address the challenges

2

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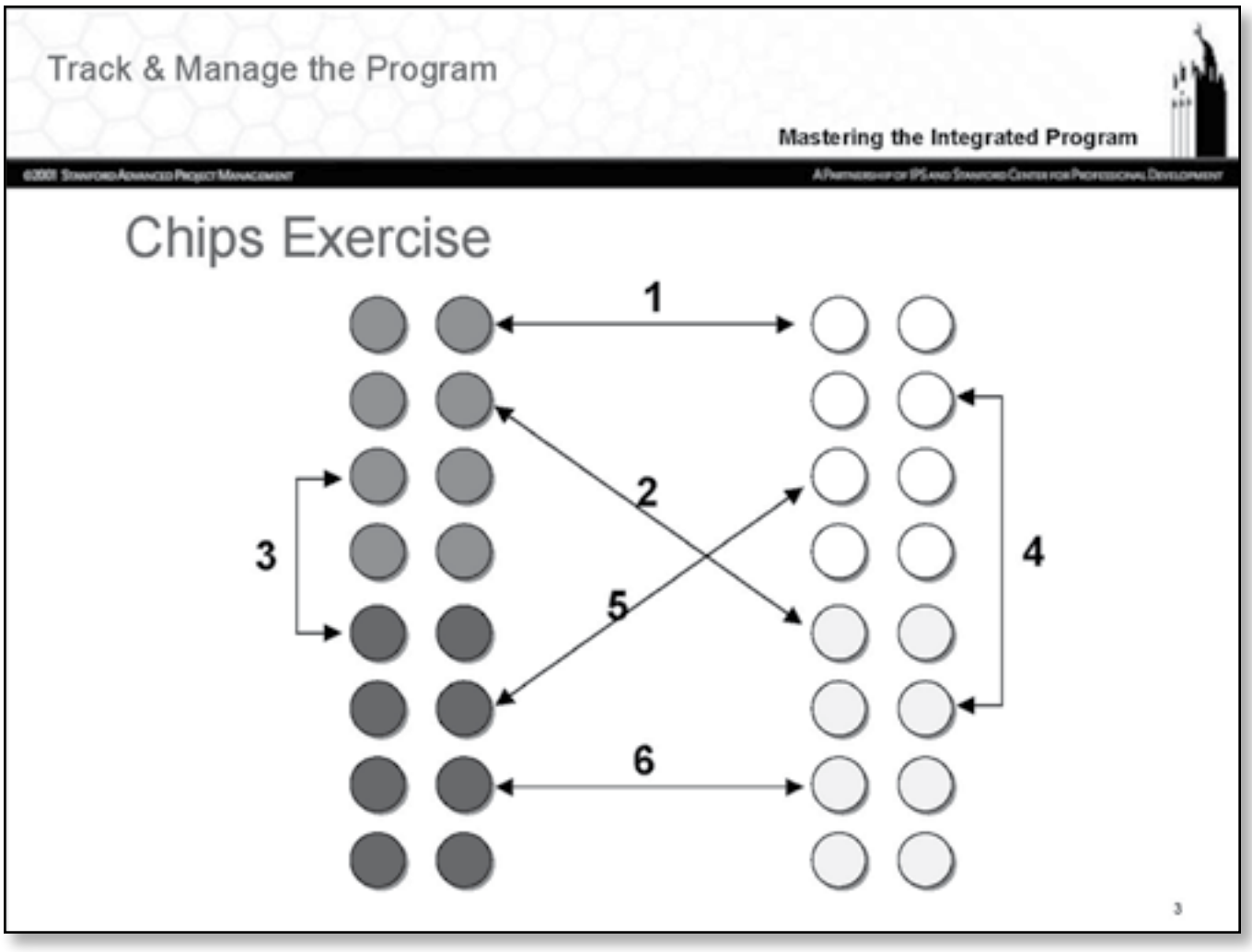

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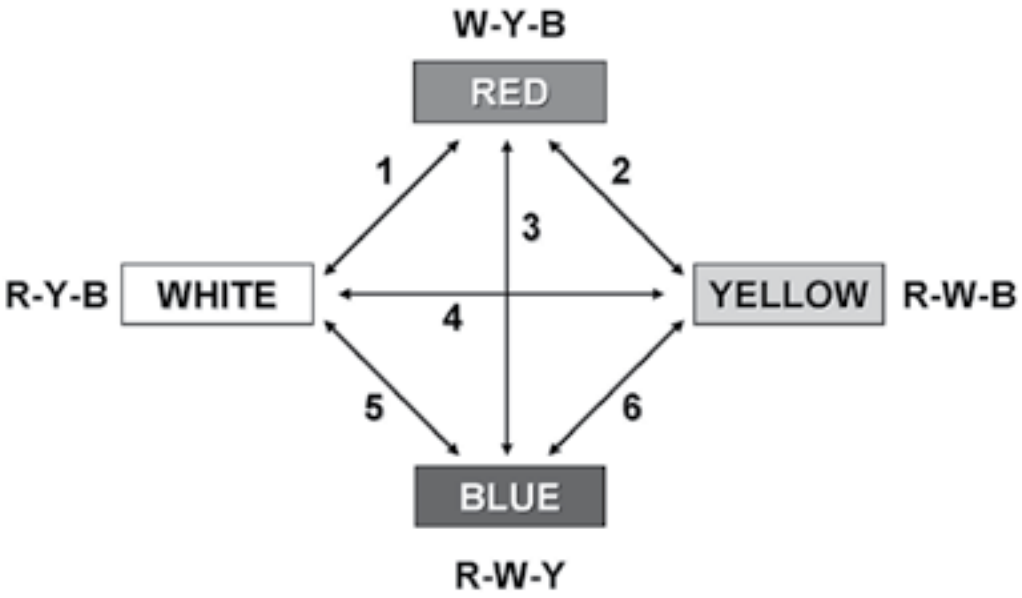
Chips Trading Sequence Diagram



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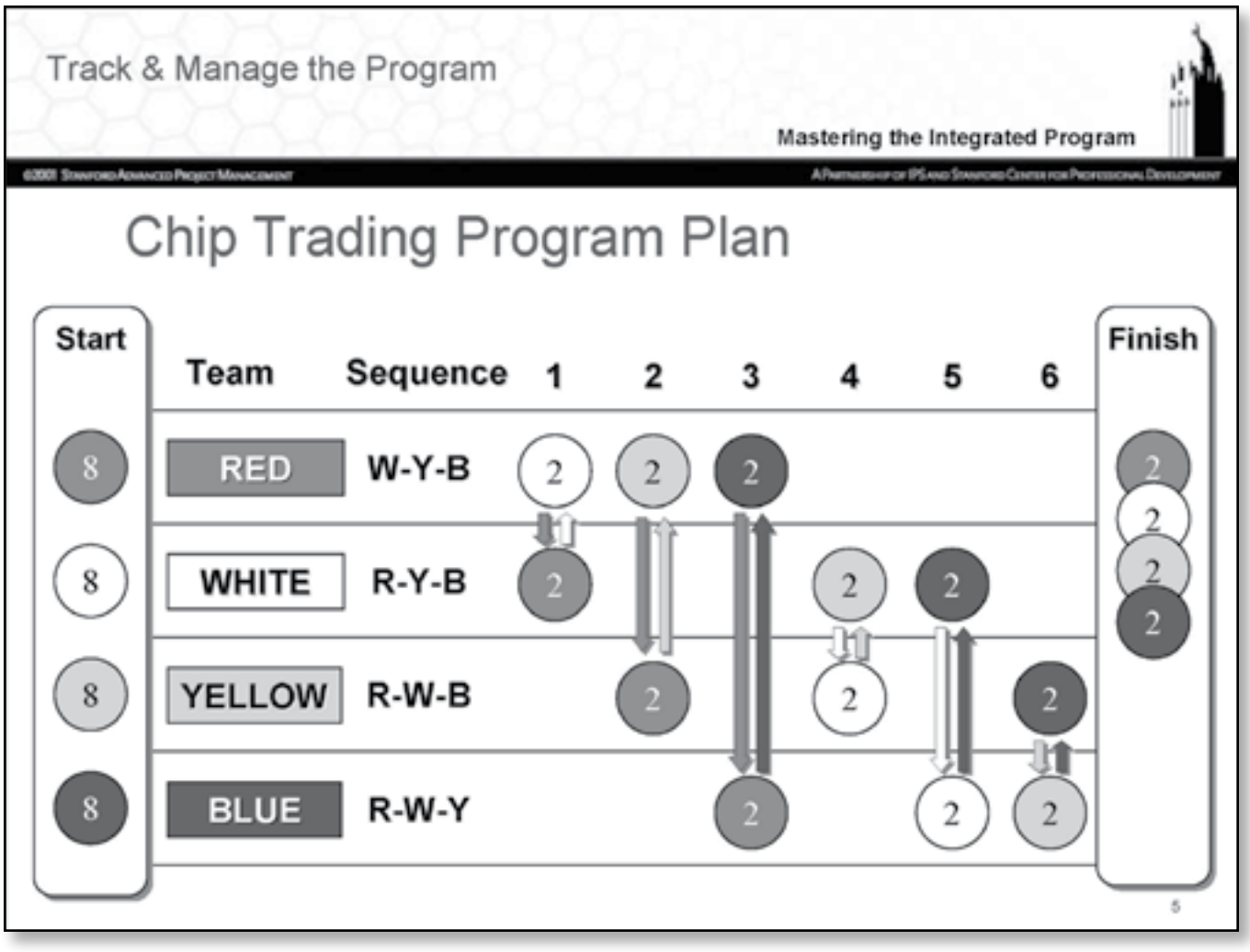

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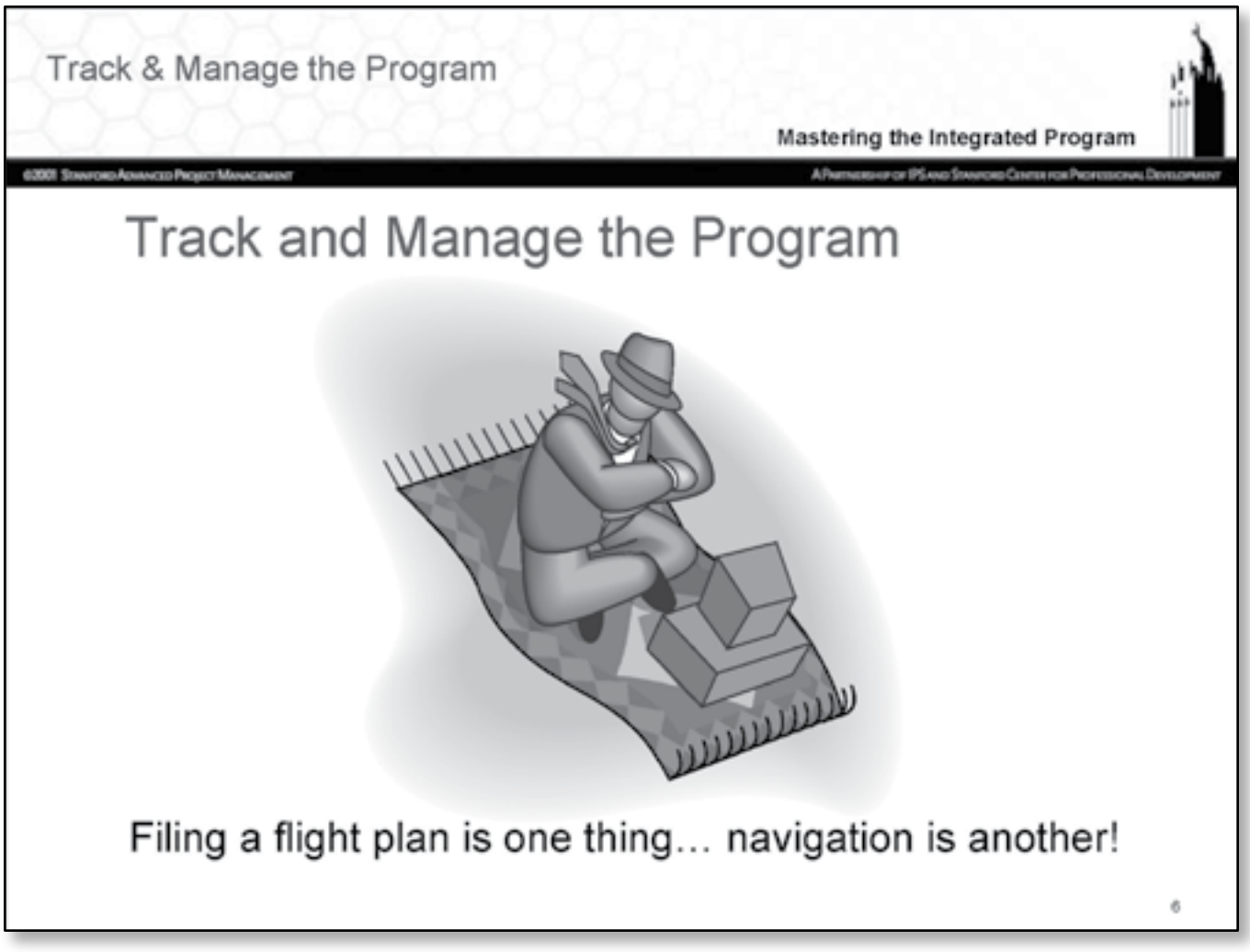

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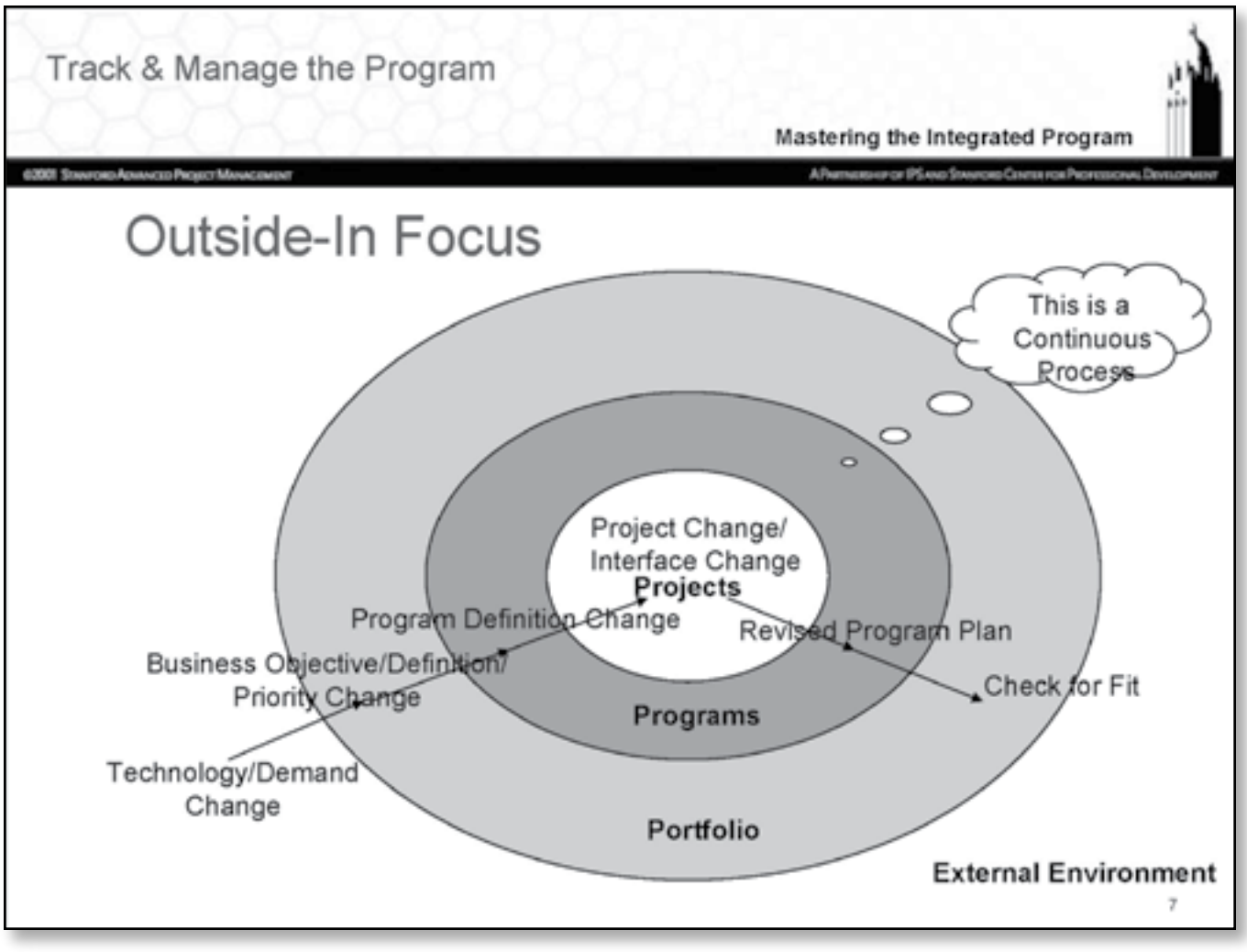

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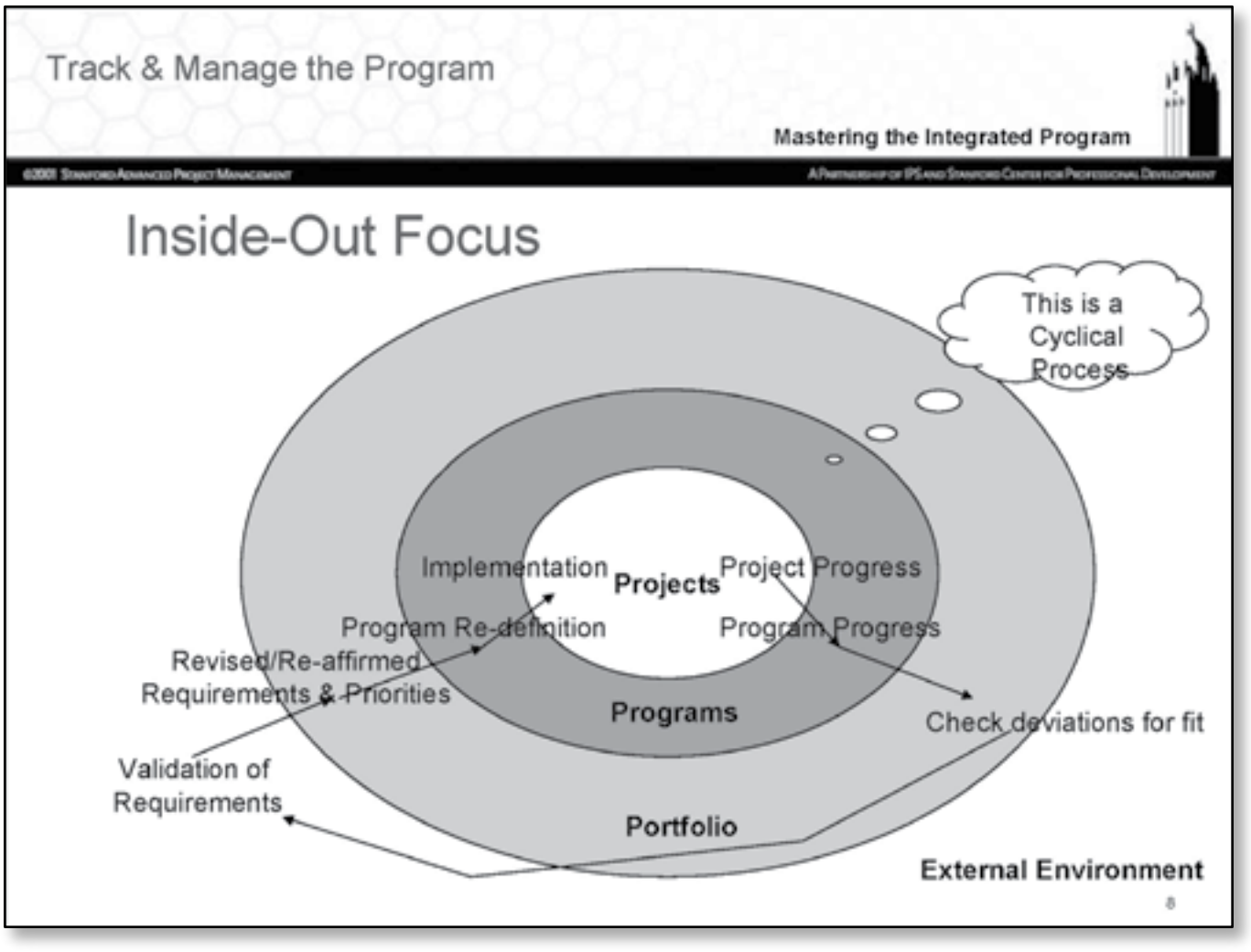

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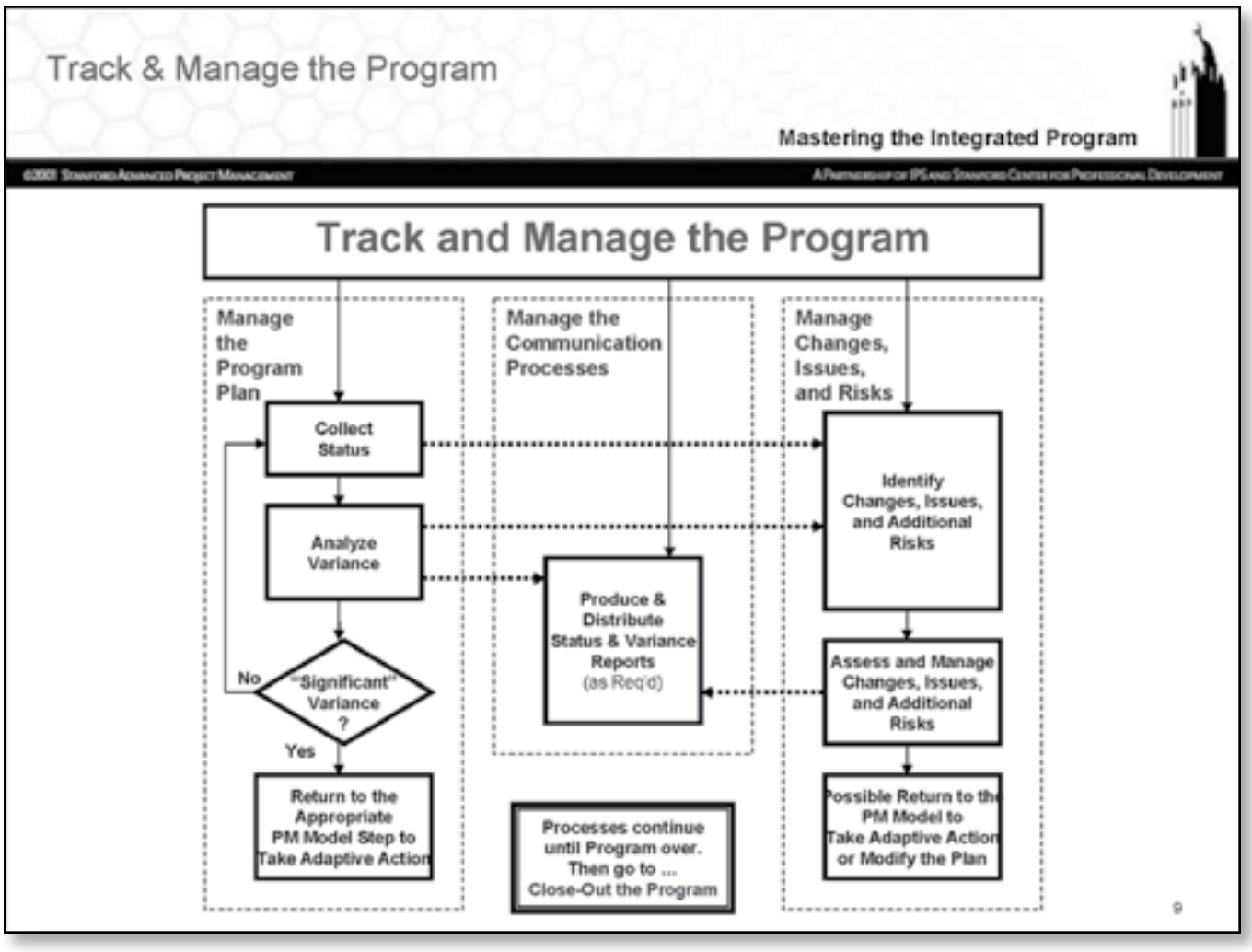

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Tracking Choices

Low Intensity — **High Intensity**

Low Control
Low Overhead

High Control
High Overhead

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Tracking Intensity Variables

- **Status Frequency:** How often status is collected
- **Status Window:** How far back and ahead of the current date is status gathered
- **WBS Level:** The level of tasks for status collection
- **Interface Level:** The level of interfaces you status
- **Project Methodology:** The level of standardization of project planning, tracking and reporting
- **Change Management:** How rigorously you manage changes
- **Program Reviews:** Frequency and formality of program reviews

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Tracking Assessment

	High	Medium	Low
Program cost			
Potential revenue			
Importance in market			
Centrality of program			
Technology risk			
Public visibility			
Politics			
Time-To-Market			
Etc.			
Existing tracking processes			
Overall tracking intensity			

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Decision-Making Styles

Need for Quality Decision	Low Need for Acceptance	High Need for Acceptance
High	**Command** Leader decision Time may be critical • Safety Issues • Security Issues • Legal Issues • Ethical Issues • Emergencies	**Consultative** Leader and Team make the decision • Reorganizing the team • Changing the work team
Low	**Convenience** Arbitrary decision • Type of coffee • When to go to lunch	**Consensus** Team decision • Work Schedules • Defining Options • Some changes

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Geographically Dispersed Teams

- Communication Delay
- Time Mismatch
- Hardware / Software Mismatch
- Cultural Differences
- Language Differences

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Collaboration

- Internet tools
  - Interactive meetings
  - Central PM sites
  - Combinations
- Internet collaboration tips
  - Limit sessions to less than 2 hours
  - Complete tasks between sessions
  - Educate and support

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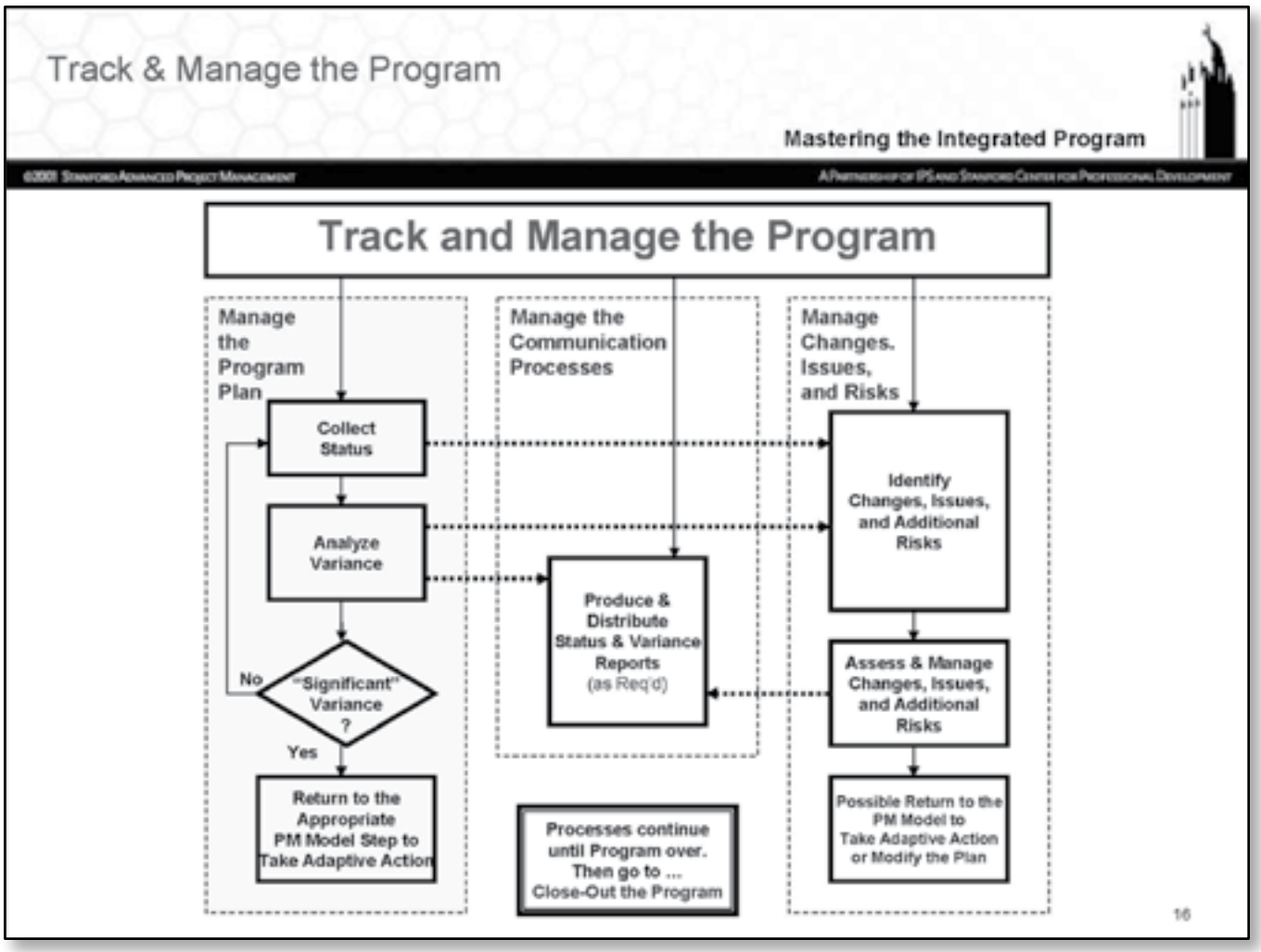

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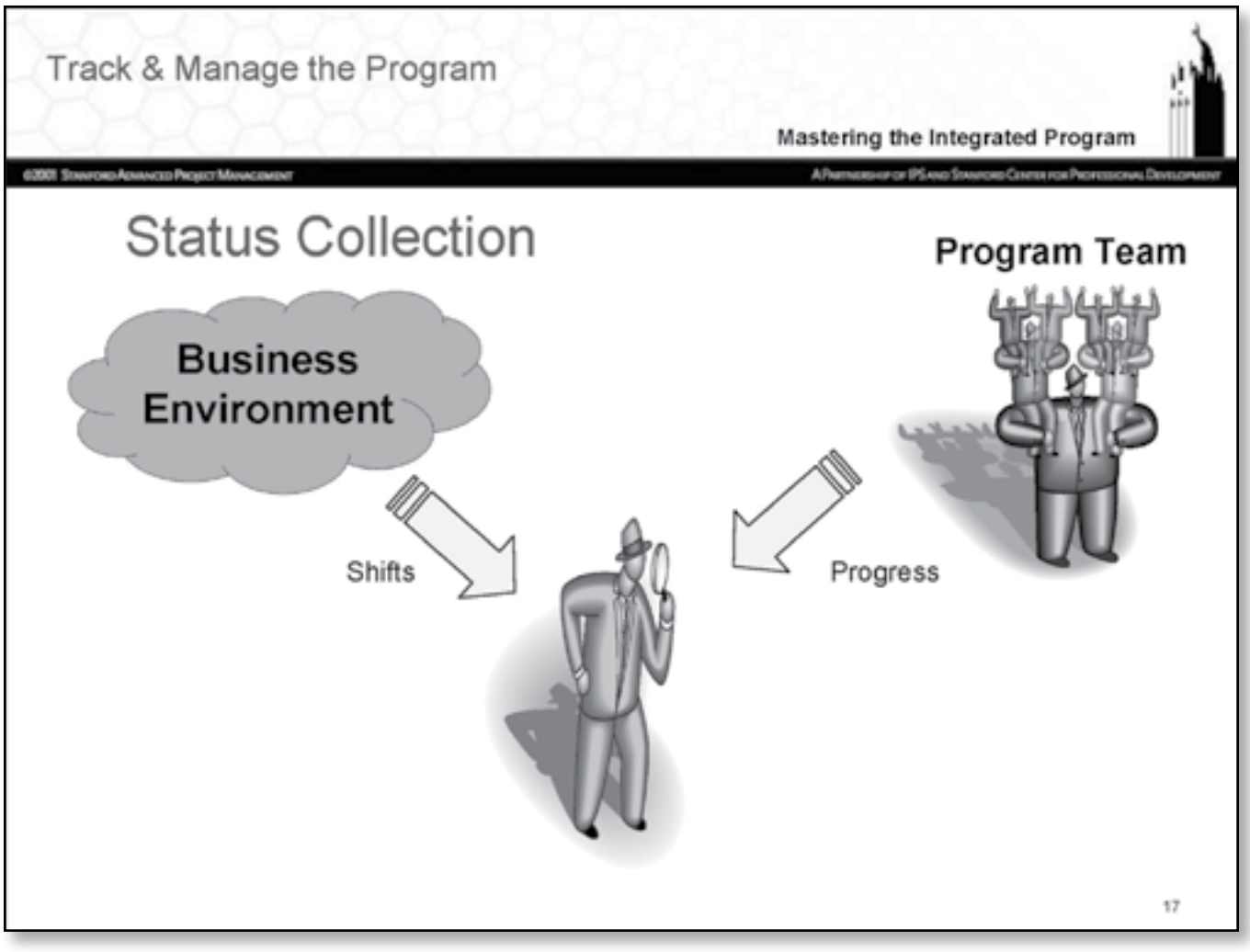

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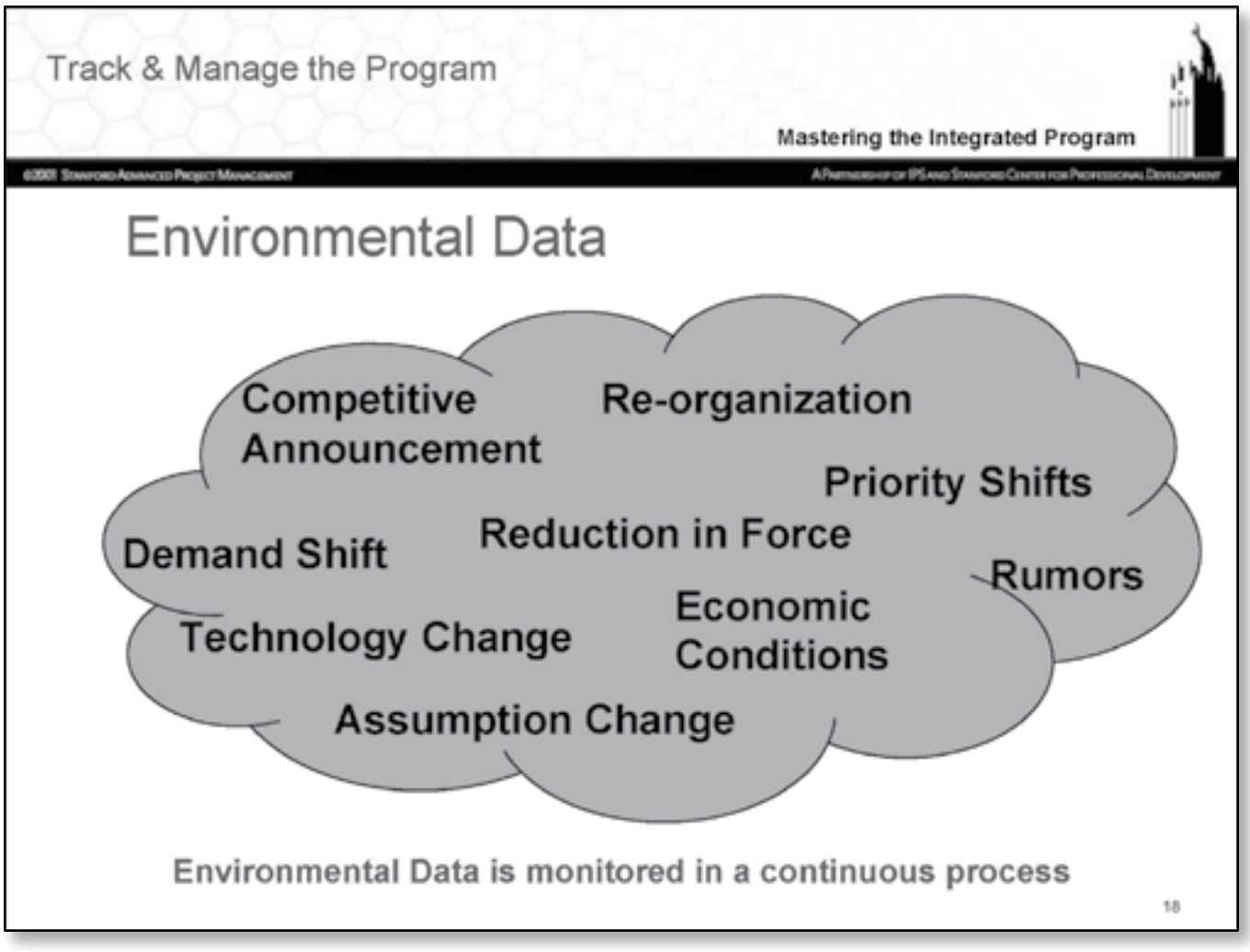

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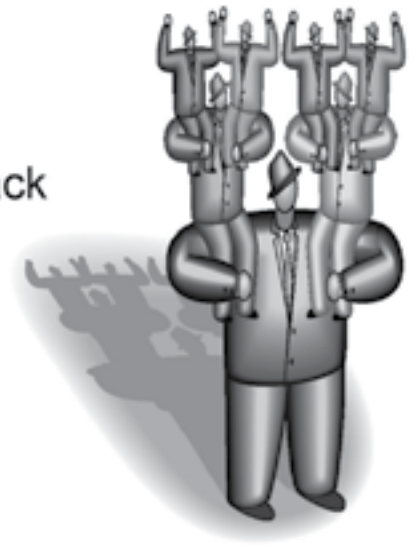
Program Team Data



- Interface Data
  - Are individual projects on track with regard to interfaces?
- Program Critical Path
  - Are tasks on program critical path on track?
- Issues
  - What is the status of open issues?
- Changes

Program Team Data is monitored in a cyclical process

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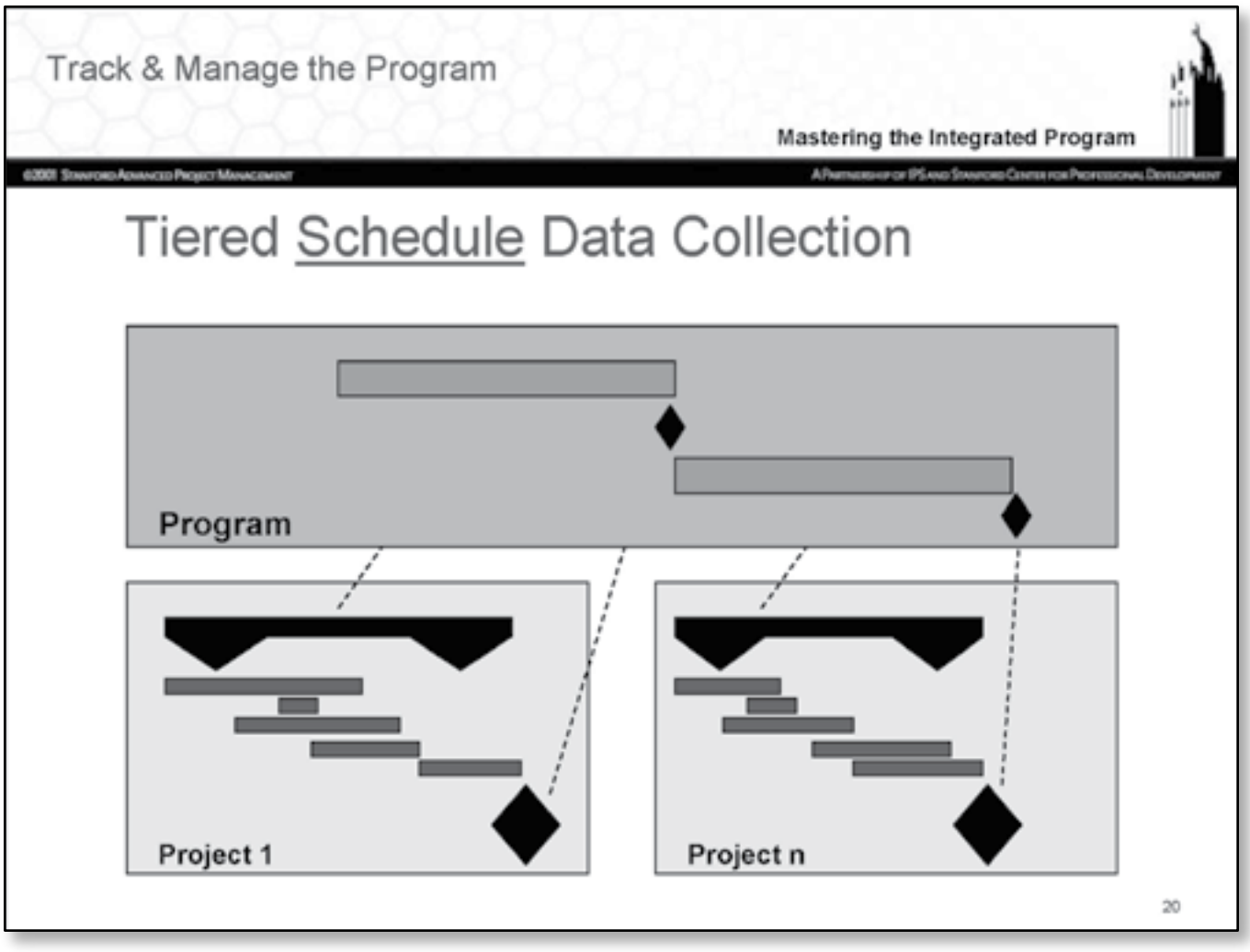

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Other Considerations in Tiered Data Collection

- Resource Utilization
- Project/Program Costs
- Process Objective Status
- Quality Status
- Success Measures

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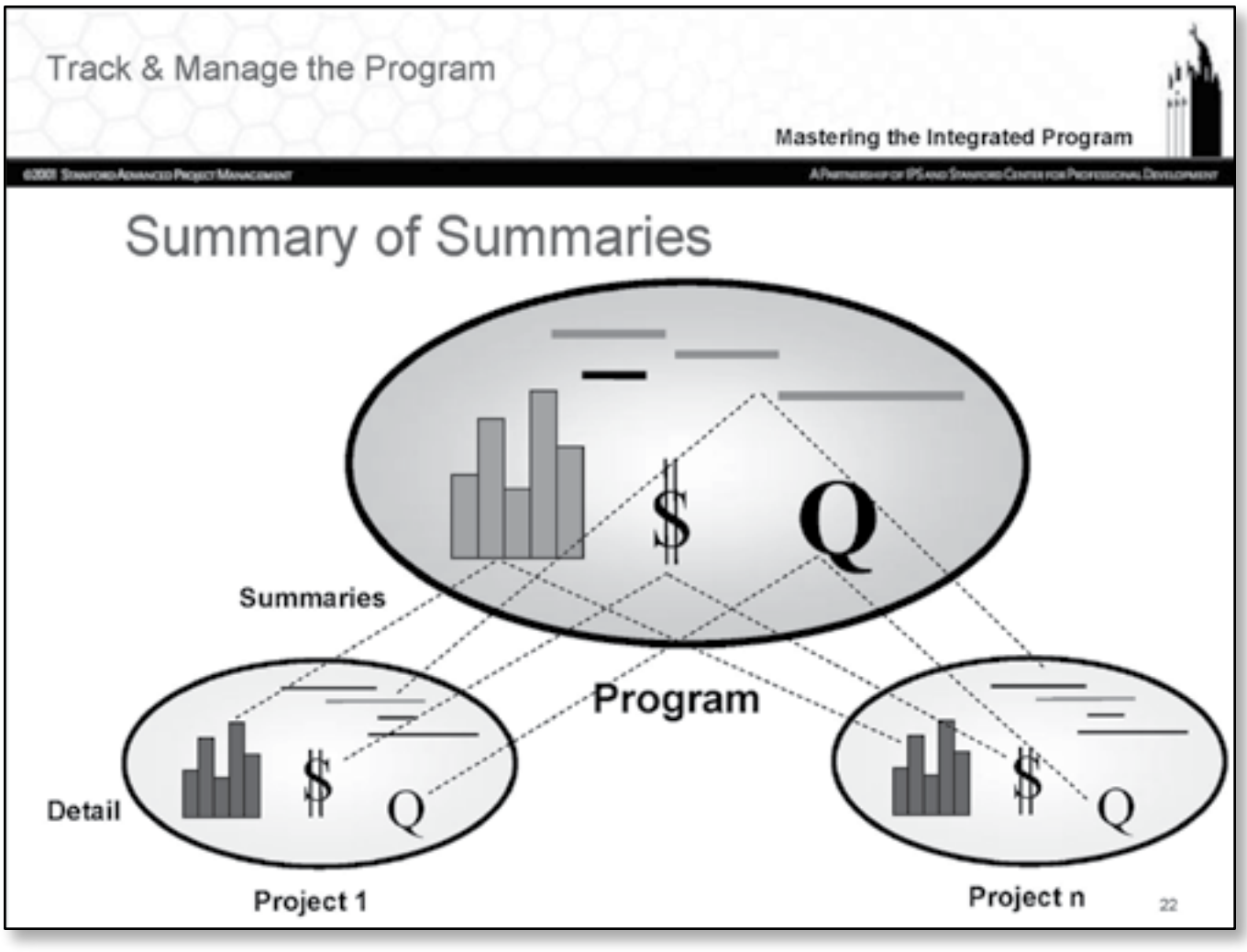

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Interface Status

Interface Status						
Interface	ID	IF Owner	Baseline Finish	Current Planned Finish	Actual Finish	Notes
Biz Requirements	A	JW	12Sept04		15Oct04	
Alpha Software	D	FB	15Dec04	15Jan05		

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Tracking Lab Instructions

- Design a Tracking Process for Case Study
- Determine "outside – in" and "inside-out" tracking measures you will use
- Prepare a short presentation that includes
  - What is tracked (the parameter)
  - How it is tracked (the mechanism)
  - What metric will be used (the measuring stick)
  - Frequency of measurement (how often)

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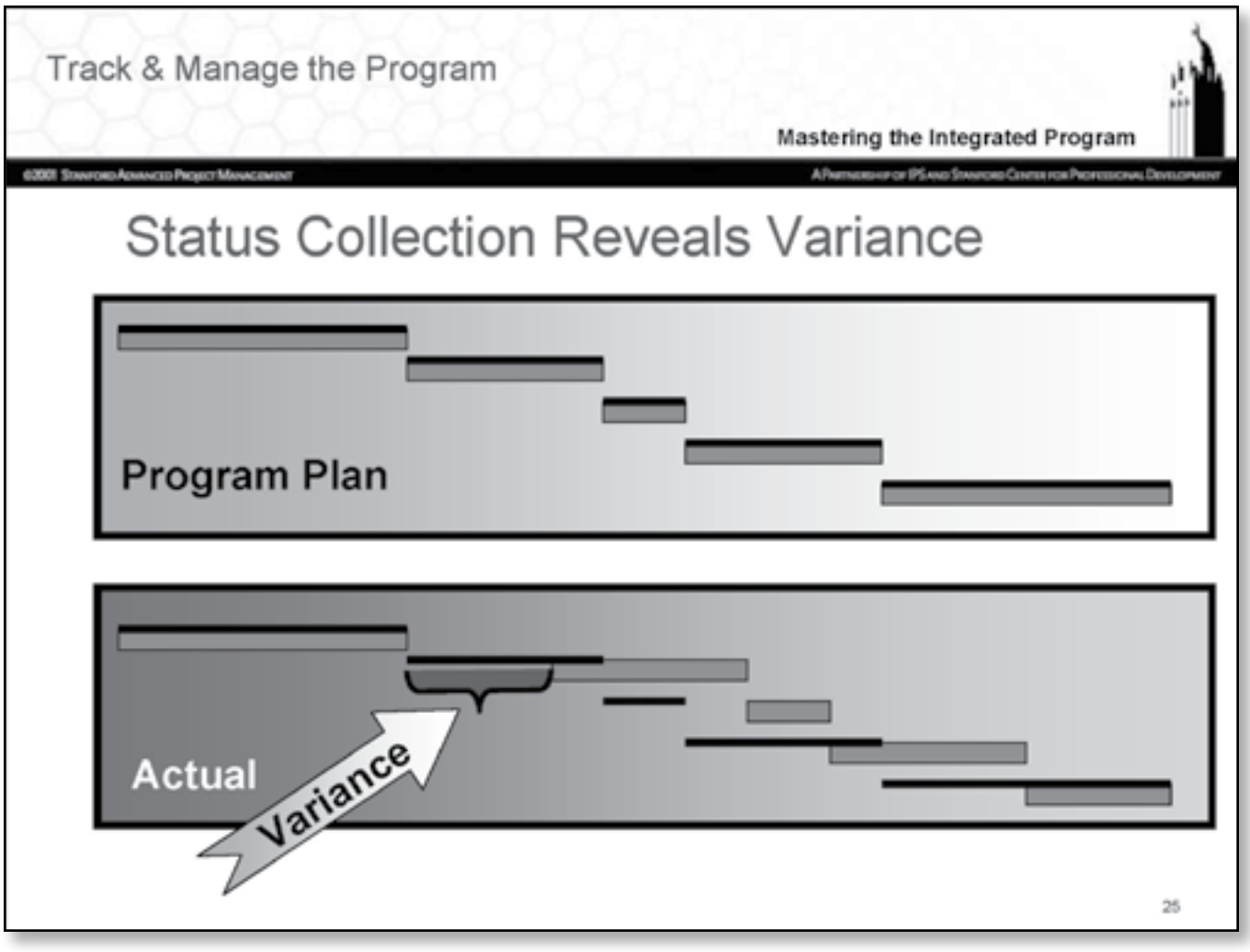

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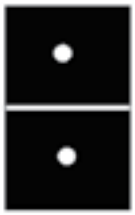
Analyze Program Variances



A single instance or….

multi-project impact?

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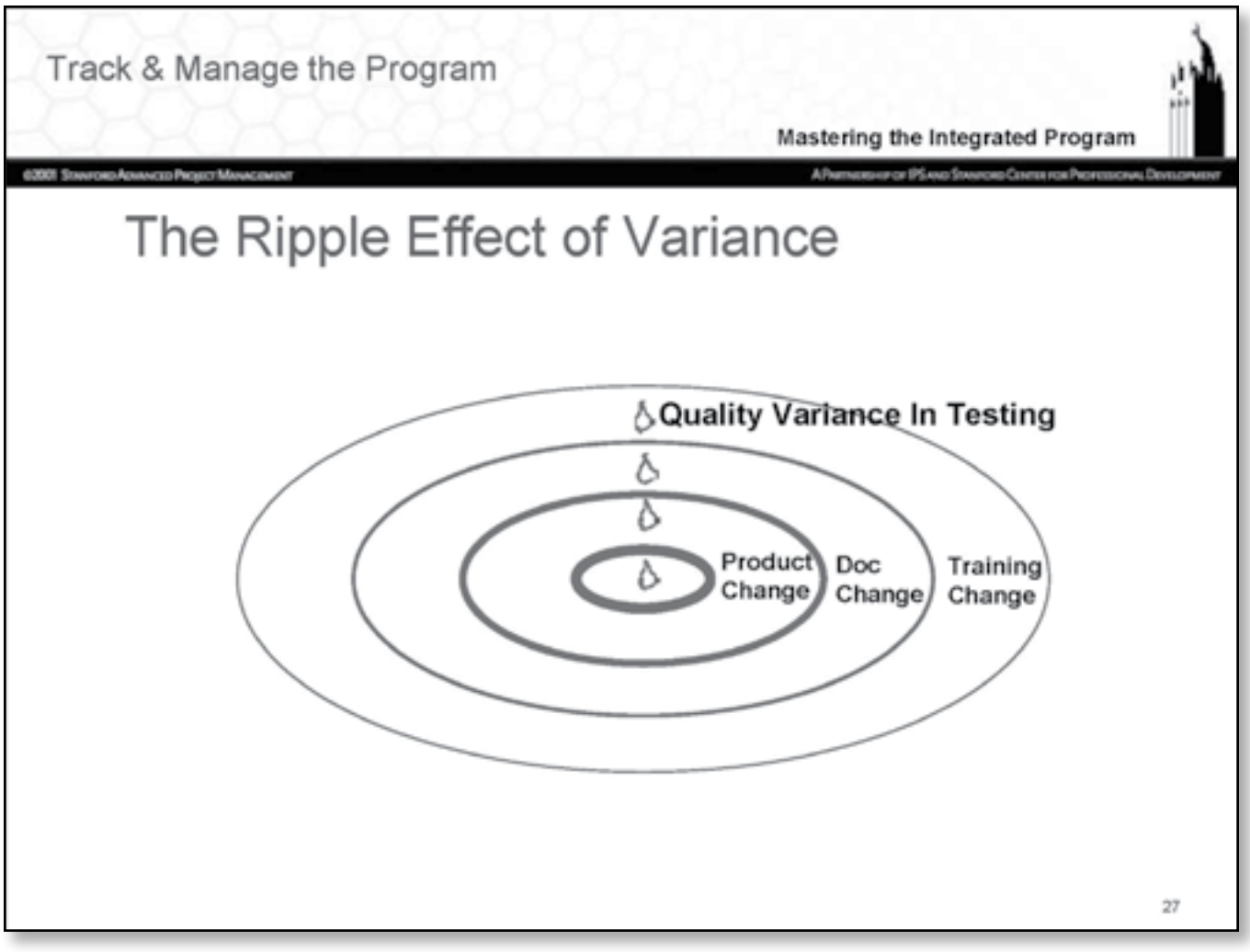

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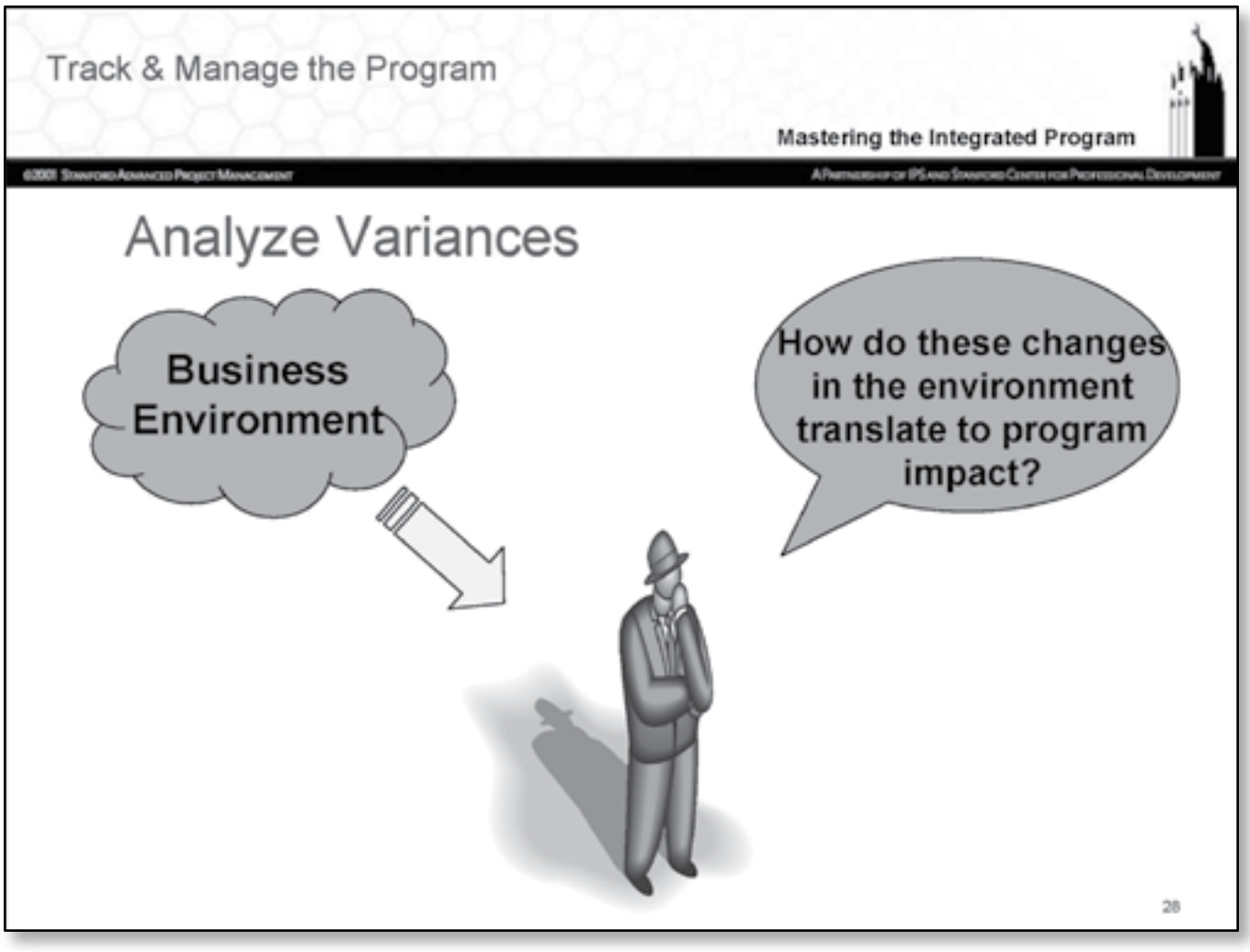

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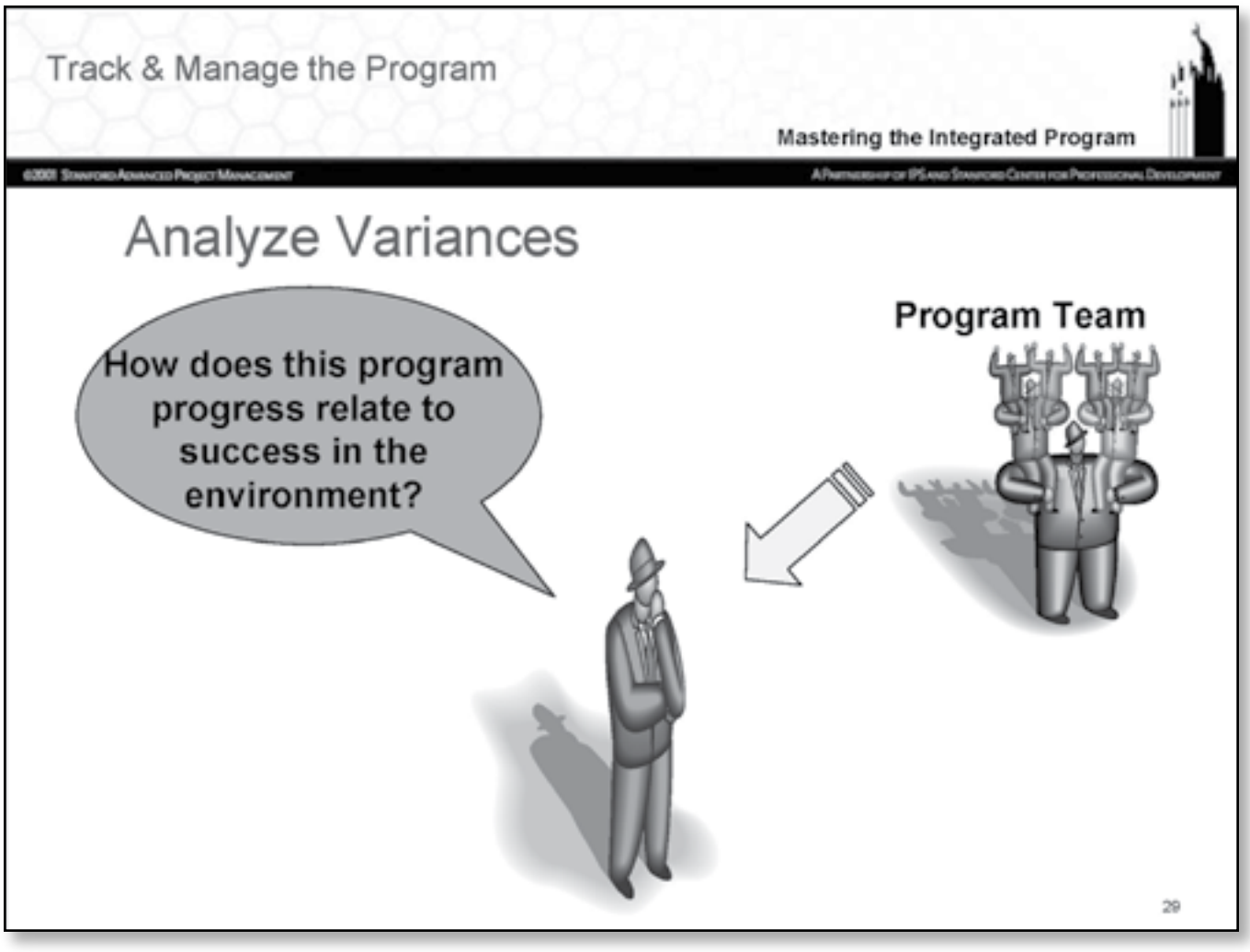

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Maintain an Open Environment

It's not about who dropped the ball

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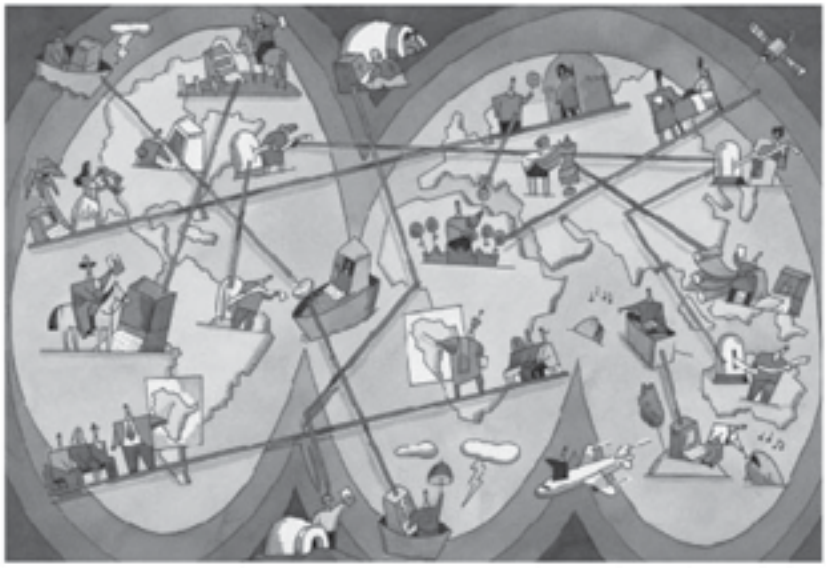
Adaptive Action in Integrated Programs



Adaptive action may affect the entire program organization

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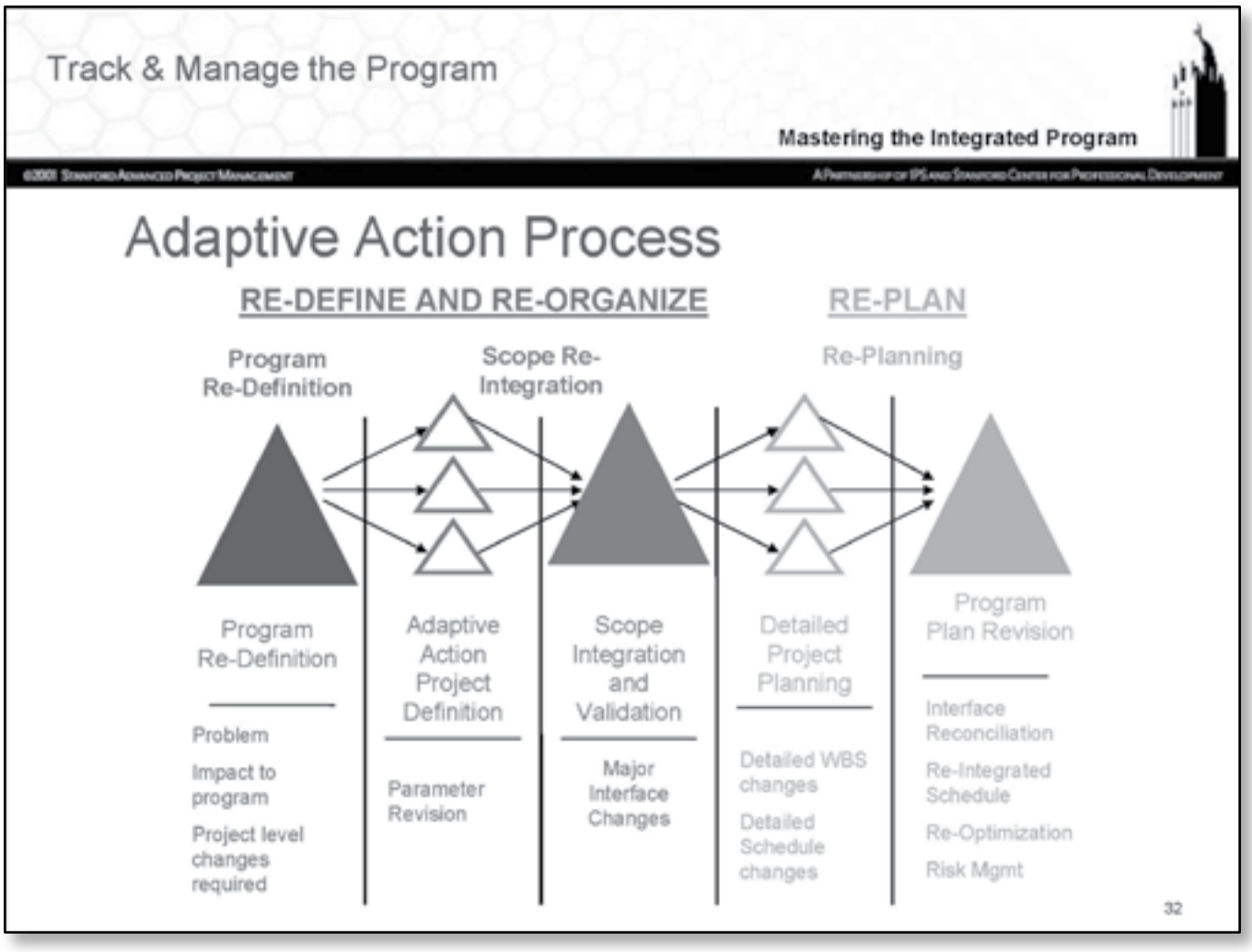

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Consider the Changes to Interfaces

Interface Status						
Interface	ID	IF Owner	Baseline Finish	Current Planned Finish	Actual Finish	Notes
Biz Requirements	A	JW	12Sept04		15Oct04	
Test Software	D	FB	15Dec04	~~15Jun05~~ 23Feb05		
User Prototype	H	OH	02Feb05	~~07Mar05~~ 16Apr05		
Program Finish	Z	PgM	06Jun05	06Jun05		

Effective Adaptive Action Preserves Objective Date

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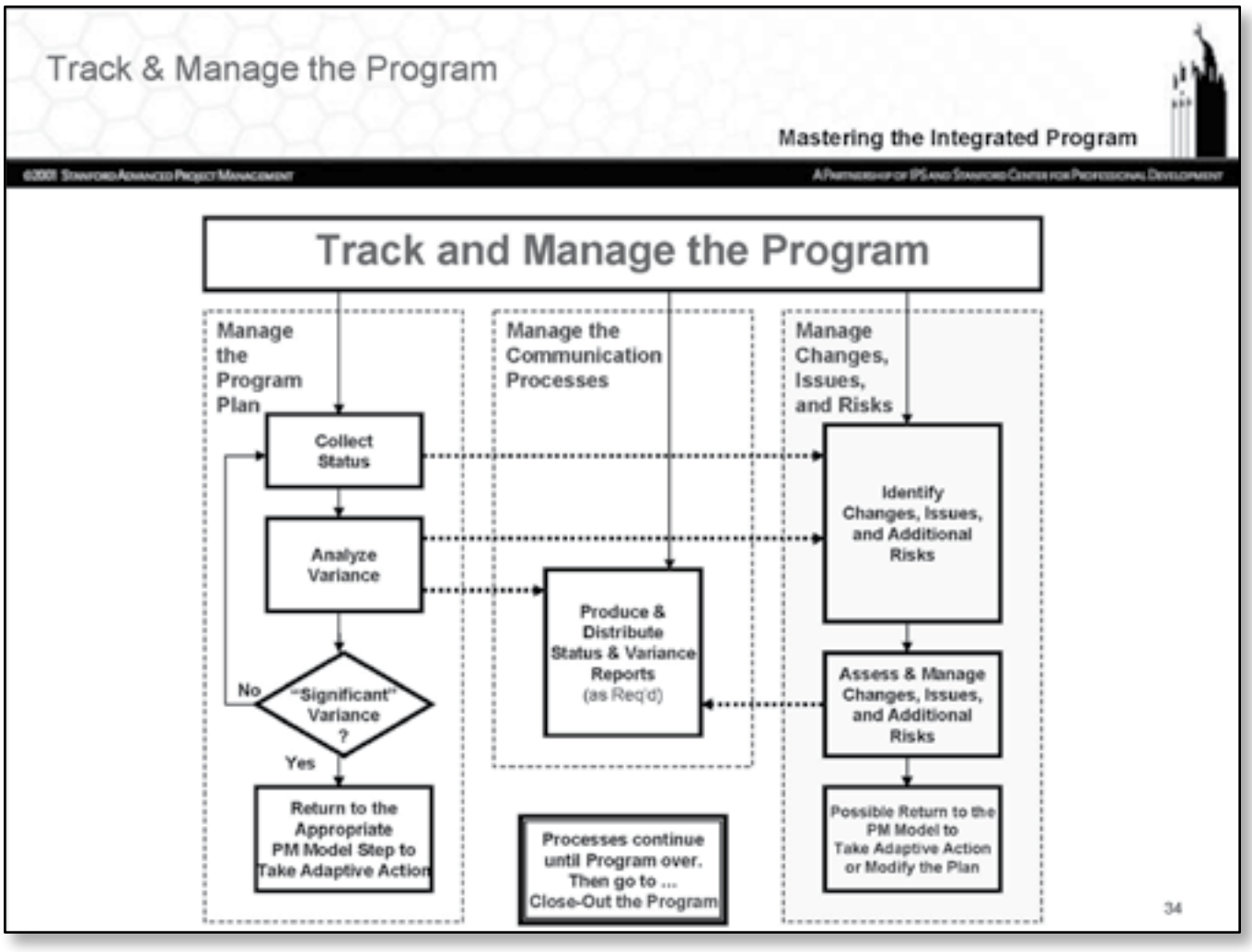

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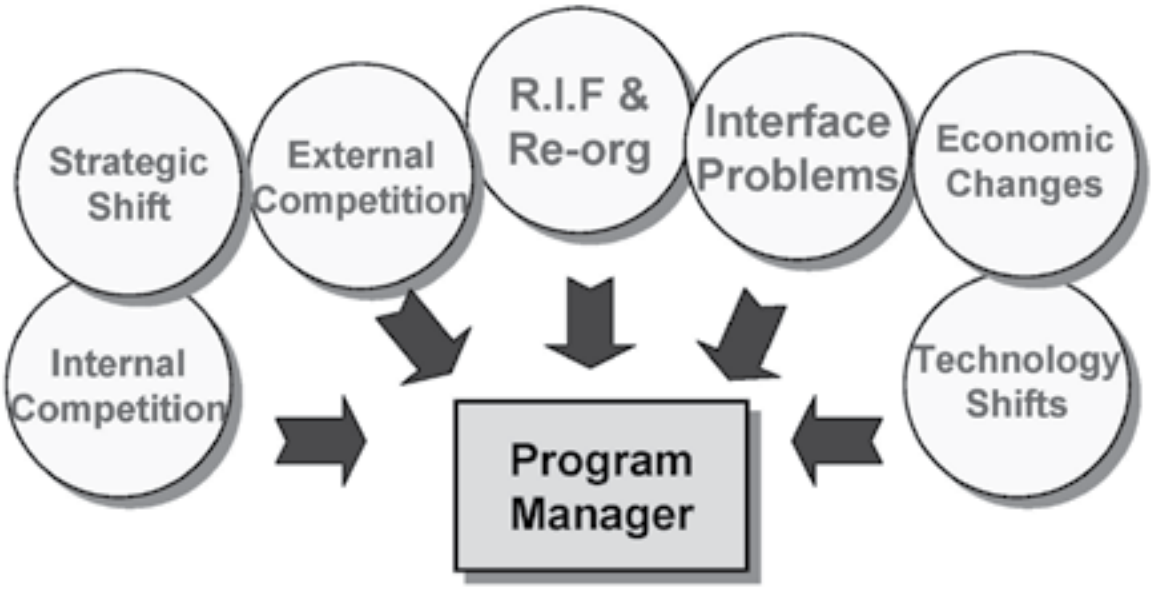
Identifying Changes, Issues, and Risks



Are these program or project level?

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Issues/Action Log

Issues and Actions						
No.	Date	Issue/Action	Owner	Due Date	Status or Resolution	Close Date
1	12/12/xx	PDA will be withdrawn from market	PgM	12/25/xx	Quote from new vendor due 12/15/xx	
2						
3						
4						
5						
6						
7						

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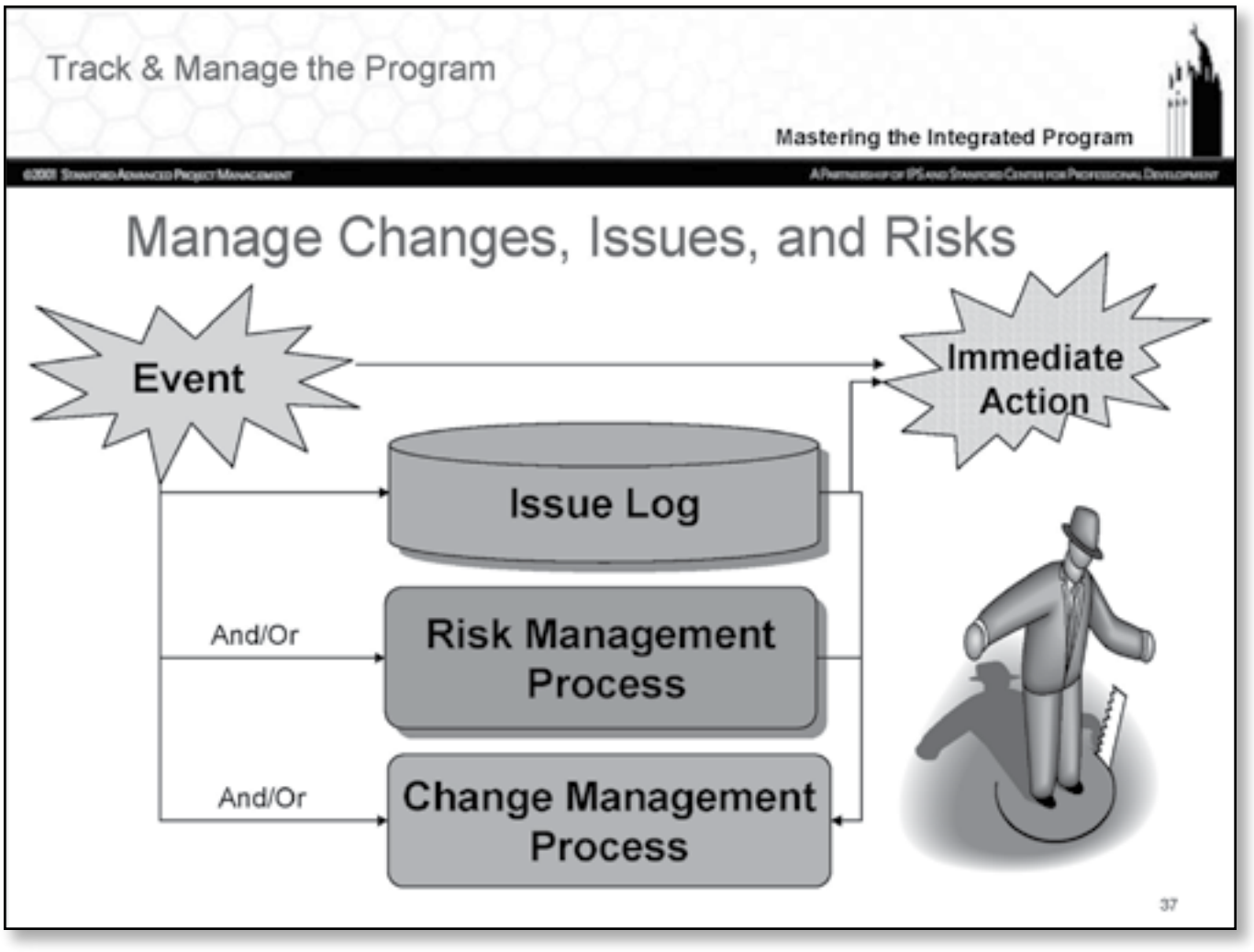

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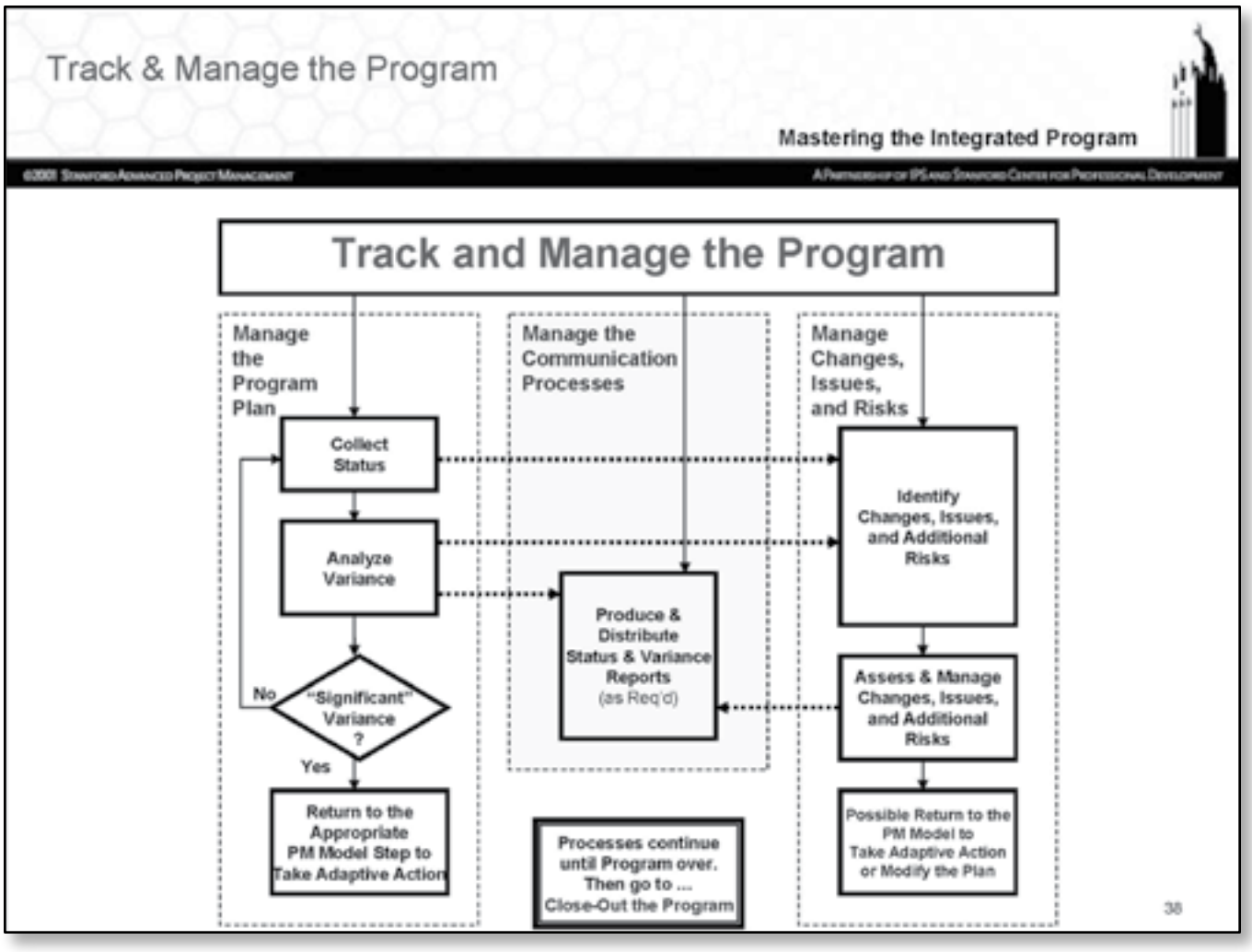

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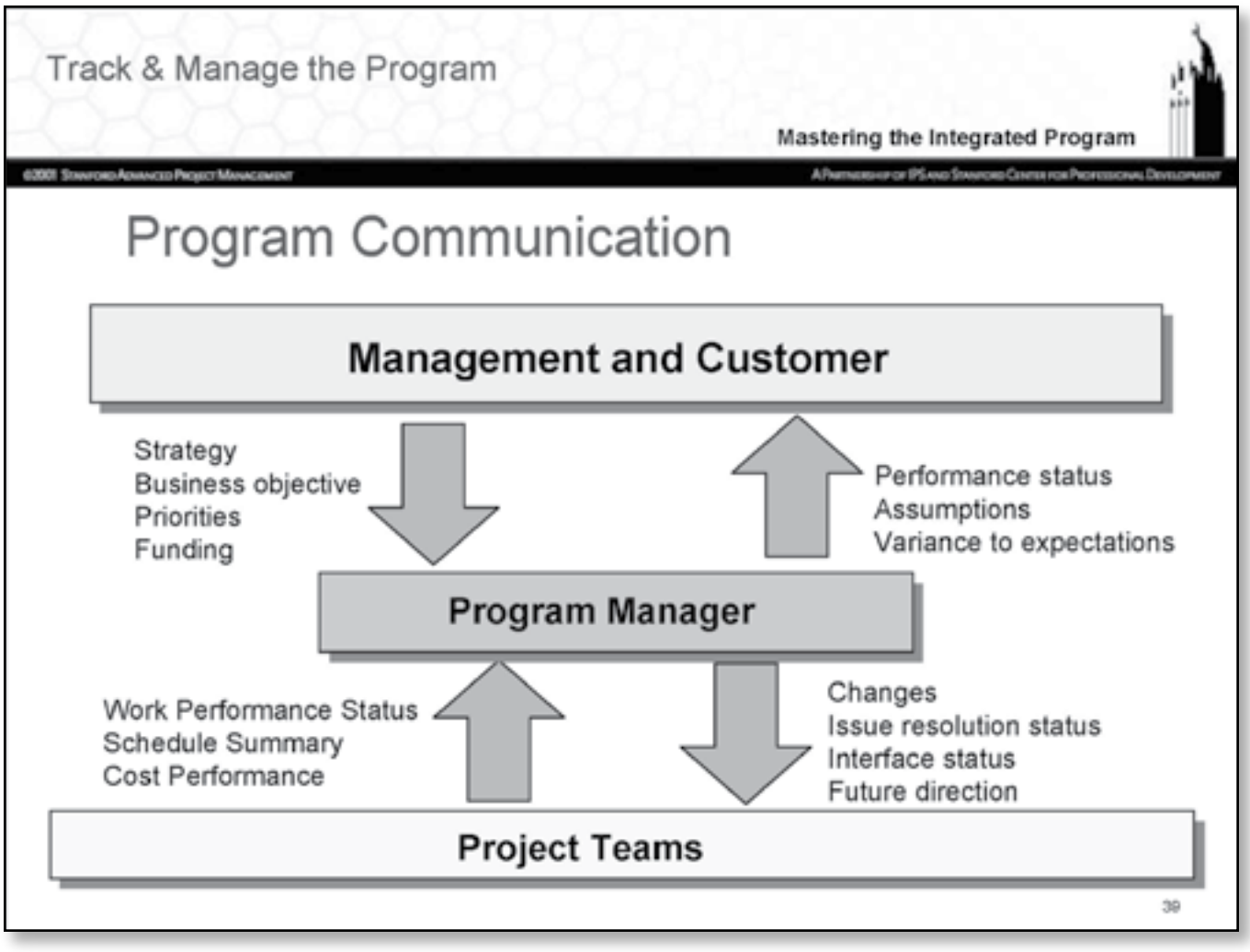

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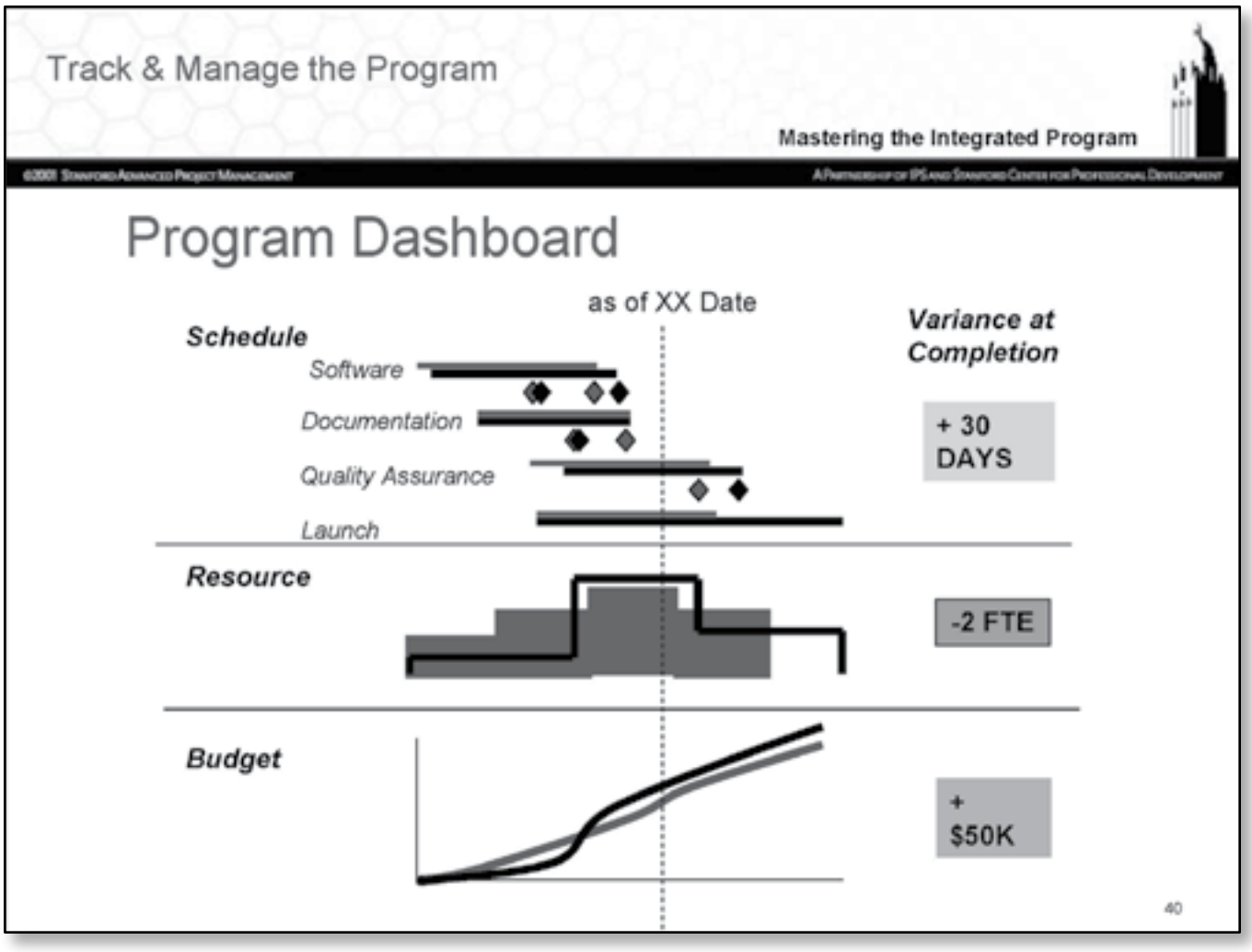

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Green-Yellow-Red Summary

- High level summary of status - typically, of scope, schedule and resources

Scope	Green	Understand and buy-into the scope
	Yellow	Understand but disagree with the scope
	Red	Don't understand nor buy-into the scope
Schedule	Green	Plan on-track for MM/YY launch
	Yellow	Plan within 2 weeks of MM/YY launch
	Red	Plan greater than 2 weeks of MM/YY launch
Resources	Green	Sufficient resources to deliver scope on schedule
	Yellow	50% - 80% of sufficient resources
	Red	Less than 50% of sufficient resources

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Program Dashboard

Project	Metric	Status	Trend	Problem Statement	Corrective Action
POS Deploy a xxx service and supporting information backbone infrastructure worldwide by April 30, 2xxx for $4M **Flexibility Matrix**	*Scope*	G	Steady		
	Schedule	Y	Concern	Schedule is exposed by 1 week.	Team is assessing ways to pull in the schedule weekly.
	Resource	G	Steady		
	Quality	G	Steady		
	Overall Health	Y	Improving	On track for a Go Live date of 5/1/xx, but due to potential schedule slips in the Test phase, date could move to 5/8/xx.	Have implemented daily tactical conference calls so that potential problems surface earlier and areas to bring the schedule back in are constantly discussed. As the project moves from development to testing, other team members will become involved. Each week a formal review of the schedule will be conducted to look for ways to insure a 5/1 Go Live date.

Executive Summary

RESULTS	• Integration has begun • Production Support Strategy milestone pulled in by 3 weeks to 5/3/xx • System Test Plan Rev 1.1 released • Package built for ABC Connector and ready for submittal to IT 1.4 Integration Testing • SAP Connector Moved to System Test Environment • Small set of test cases exist on I04, for opportunistic testing • Code Walkthru of the SAP WorkFlow Agents was done on 3/16/xx	• Completion of all core components • Completion of Phase 1 of system test • Complete fail-over strategy • Schedule support training • Complete the ITRC connector	NEXT STEPS
WORKING	• IT connector development • Performance assessment report • System test • Support deliverables	• Delivering to a tight schedule • Personnel transitions in two domain teams	CHALLENGES

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Business Review

- Used to examine program performance versus business objectives
- Covers:
  - State of the program versus program objective and success criteria
  - Identifies alternatives if objectives will not be met
  - Aligns expectations
  - Recommends future action

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Program Review

- Used to evaluate project performance versus program objective

- Covers:
  - Program issues and changes
  - Project performance versus program deliverables, interface schedule and budget
  - Project optimization plans for interfaces not met
  - Future actions

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Informal Communication

- Check In, Stay in Touch
  - Provide/gather latest information
  - Uncover Issues
  - Provide support, motivation
- Ad hoc meetings on hot issues

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Reporting Lab Instructions

- Design a dashboard for Case Study Program assuming no limit on how it could look
- Include the measures you have created in the tracking lab
- Consider your management reporting
- Consider your program team reporting
- Prepare to present to the class

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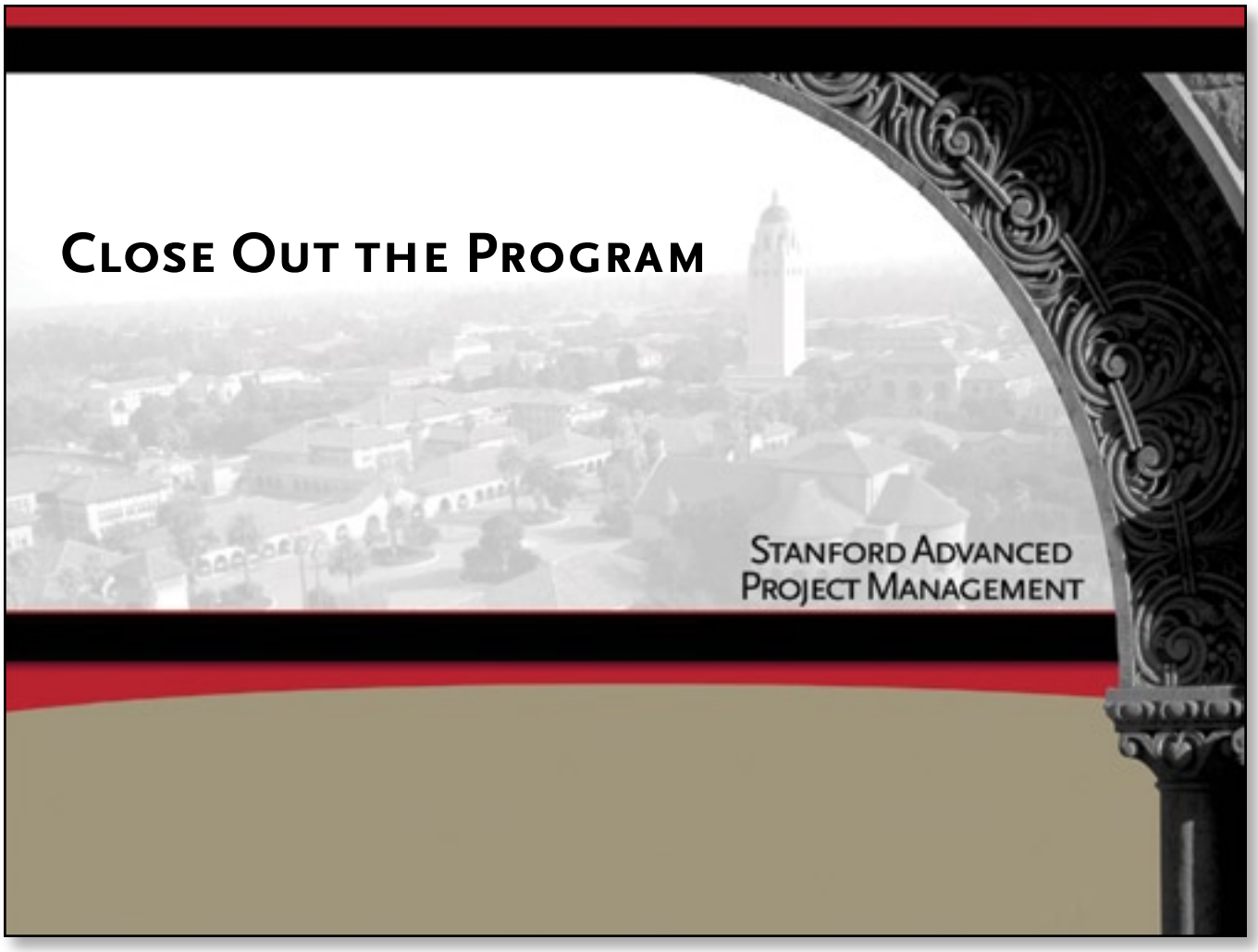

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It's been a long program…

…but before you move on..,

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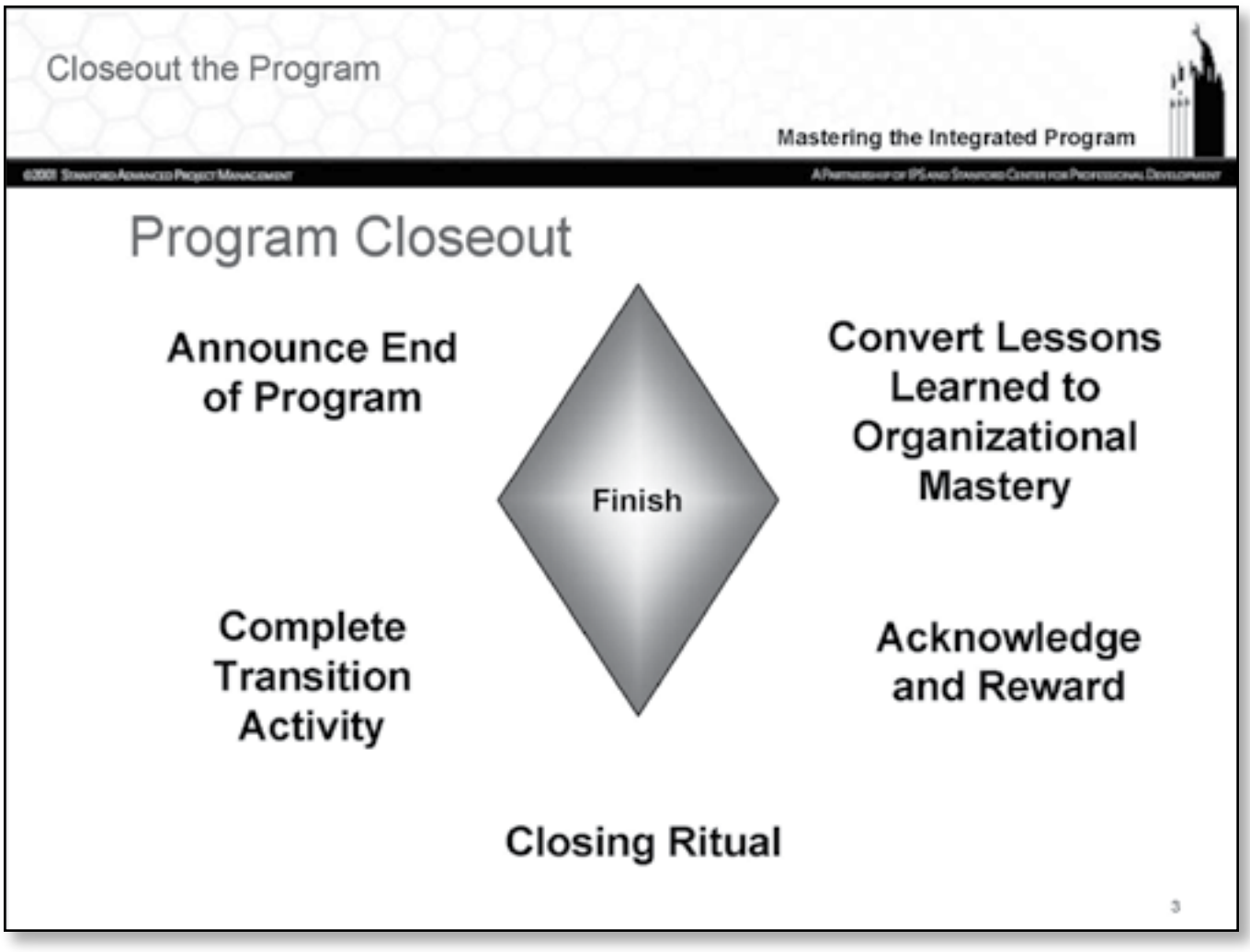

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Complete Transition Activities

- Begin early
- Conduct review with receiving organization
  - Use punch lists
- Obtain sign-off
- Don't let it drag out
- Conduct final hand-off review

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Converting Lessons Learned

- Collect lessons learned incrementally
  - Phase reviews
  - Program reviews
  - Program status points
- Convert observations to action
  - Anything not acted upon is not learned
  - Strive for closure on prevention
    - Tools, templates, processes, training

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Program Closeout Review

- Review project closeouts
- Hold program review session
  - What worked/What can we do better
  - Lessons Learned
  - Reward/Recognition
- Archive program information

May hold a Closeout Review at the end of each phase

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Complete the Program Closeout

- Verify all contracts are closed
- Archive program information

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