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Software Engineering Institute
Pittsburgh, PA 15213-3890

Consortium for Performance Measurement and Benchmarking

July 26, 2006

PSM User's Conference
Vail, Colorado

David Zubrow
Oksana Schubert
Mark Kasunic

Sponsored by the U.S. Department of Defense

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Presentation Outline

- Status
  - Overview
  - Motivation for this work
  - Team members
  - Ground covered
  - Near-term goals
- Results of survey
  - Description
  - Population studied and sampling approach
  - Were subpopulations different?
  - Results

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What is Benchmarking?

Term	Description
Benchmark	To take a measurement against a reference point.
Benchmarking	A process of comparing and measuring an organization with business leaders anywhere in the world to gain information which will help the organization take action to improve its performance.

The Benchmarking Management Guide
American Productivity and Quality Center

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Types of Process Benchmarking

Term	Description
Internal studies	Compare similar operations within different units of an organization.
Competitive studies	Target specific products, processes, or methods used by an organization's direct competitors.
Functional or industry studies	Compare similar functions within the same broad industry or compare organizational performance with that of industry leaders.
Generic benchmarking	Compares work practices or processes that are independent of industry.

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Overview

During April 2006, SEI launched a vendor and industry collaboration on benchmarking software project performance.

Objectives

- Provide tools and credible data for goal-setting and performance improvement
- To combine benchmark data from multiple repository sources thereby creating a superset of information for benchmark and/or performance comparison

Value

- Establish specifications for the collection and comparison of benchmark data
- Allow companies to leverage existing data for achieving their business goals

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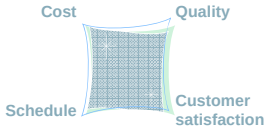
Motivation

Organizations want a way to gauge their performance and to compare their performance with others in their industry.

Data on project performance is needed to demonstrate the impact of process improvement.

Benchmarks

- provide a reference point for interpreting performance
- facilitate interpretation by setting specifications for how performance measurements are collected



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Team Members

Consortium members are leaders in software measurement and benchmarking from consultancies, industry, and academia.

Peter Hill	ISBSG	Thomas Lienhard	Raytheon
Lynn Penn	Lockheed Martin	Anita Carleton	SEI
Bob Weiser	Lockheed Martin	Bob Ferguson	SEI
Larry McCarthy	Motorola	Dennis Goldenson	SEI
Kristal Ray	Oracle	Mike Konrad	SEI
Arlene Minkiewicz	PRICE Systems	Oksana Schubert	SEI
Eric Finch	PRTM	Dave Zubrow	SEI
Suresh Subramanian	PRTM	Michael Bragen	SPR, STTF, ISBSG
Doug Putnam	QSM, Inc.	Pekka Forselius	STTF
Robert Floyd	Raytheon	David Garmus	The David Consulting Group
		Khaled El Emam	University of Ottawa

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Ground Covered

Kick-Off Workshop at SEI [April 19-20, 2006]

- 14 presentations by workshop attendees; Discussion of current benchmarking issues and ways to address them
- Brainstorming issues on how to proceed
- Initiative to conduct survey to obtain community input on factors most likely to affect software project performance
- Initiative to write a Technical Note co-authored by participants
- Performance Benchmarking Consortium (PBC) is born

Meeting at SEI [June 28-29, 2006]

- Status on actions from kick-off workshop
- Chartering and team member guidelines
- Planning and goal-setting

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Key Focus During PBC Start-Up

Obtaining a common and shared understanding of

- What makes a benchmark *good* and *useful?*
- What is performance measurement?
- What constitutes valid data if you are interested in learning about your range of results in comparison to other benchmarking companies?
- How should performance measurements be categorized?

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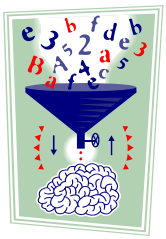
Near-Term Goals

The PBC will

- create a set of process specifications for the consistent and meaningful collection, analysis, and dissemination of comparative performance benchmarks for software projects
- develop a data model that will facilitate the aggregation and comparison of data from different sources



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The Survey

We used a structured, self-administered questionnaire that was available both via the World Wide Web and in paper form.

The questionnaire 30 questions (with 22 two-part questions) phrased in close-ended format. Several questions allowed for short open-ended responses.

Stratified random sampling was used to select candidate respondents from a population comprised of members from two different subpopulations.

As an incentive, candidate respondents were offered early access to the survey results.

The survey opened on June 13 and closed at midnight on June 25.

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The Approach

1. Each consultancy identified the ten top factors that affect software project performance.
2. Affinity grouping was performed to combine like factors.
3. A list of 22 factors resulted from this exercise.
4. Each of the factors were defined using existing standard definitions (*ISBSG Glossary of Terms* and *COCOMO II Definition Manual*).
5. Questionnaire items were prepared based on the list of 22 factors.
6. Questionnaire was pilot tested.
7. Final revisions were conducted before fielding of the instrument.

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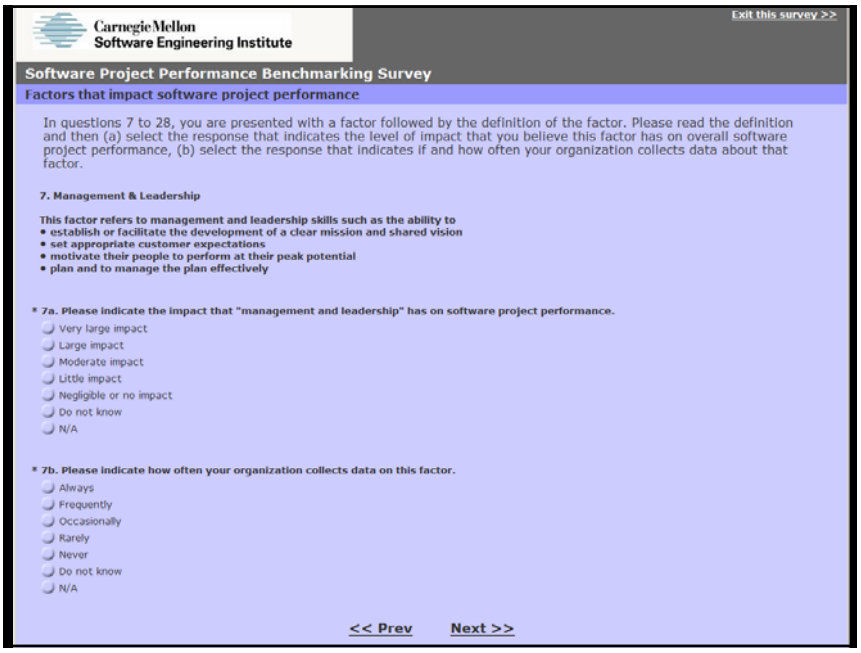
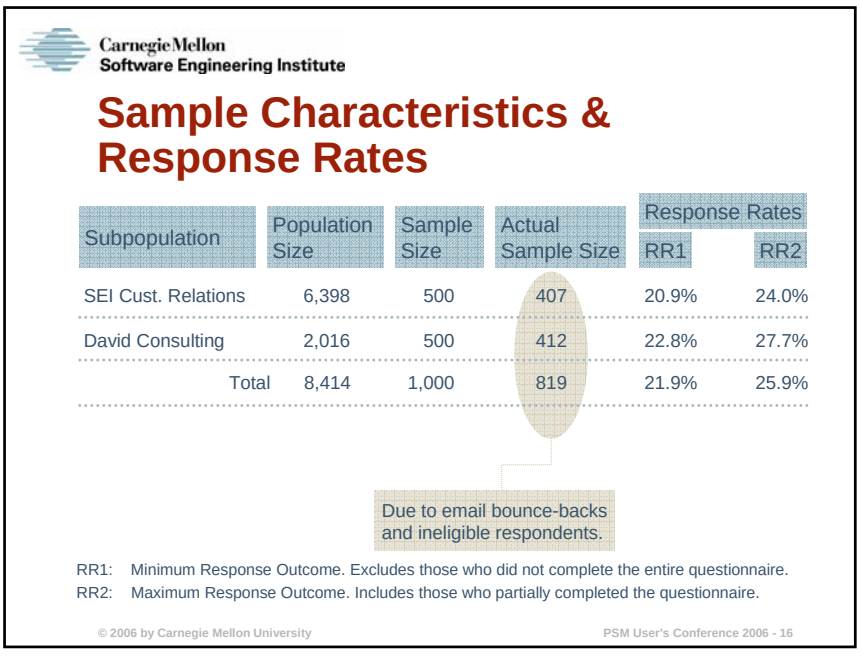
Factors Affecting SW Project Performance

- Management and leadership
- Project organization environment
- Analysts' functional knowledge
- Developer skill level
- Process maturity
- Team dynamics
- Team size
- Volume of staff turnover
- External customer relationship
- External integration complexity
- Business domain
- Project types development
- Application domain
- Technical complexity
- Use of development methodology
- Product architecture
- Project risks
- Project technology – language & tool effectiveness
- Newness of development platform
- Platform volatility
- Project technology – familiarity with
- Size





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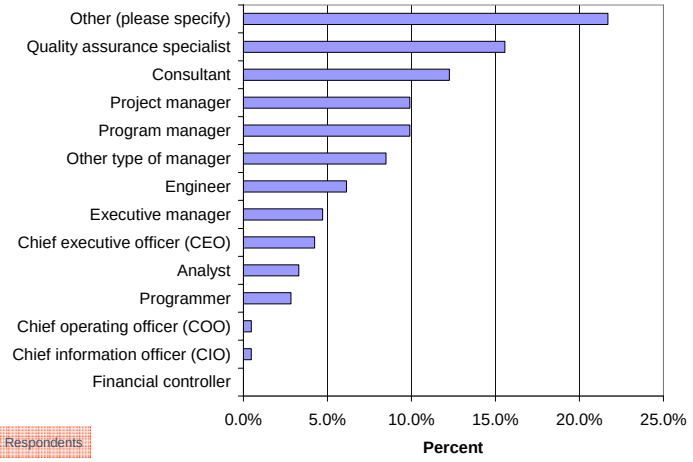
Who Participated?



212 Respondents

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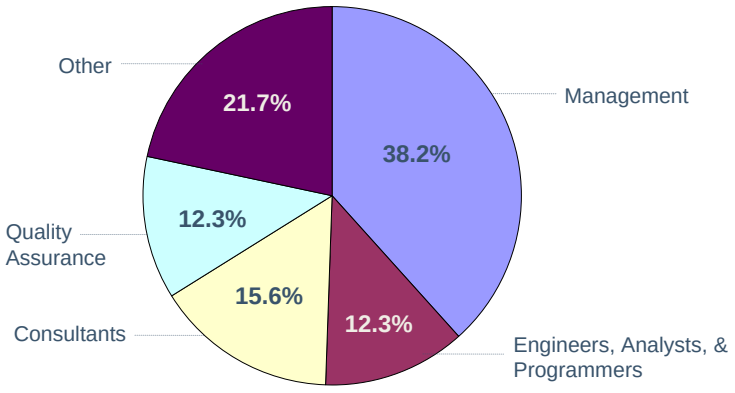
Organizational Roles



212 Respondents

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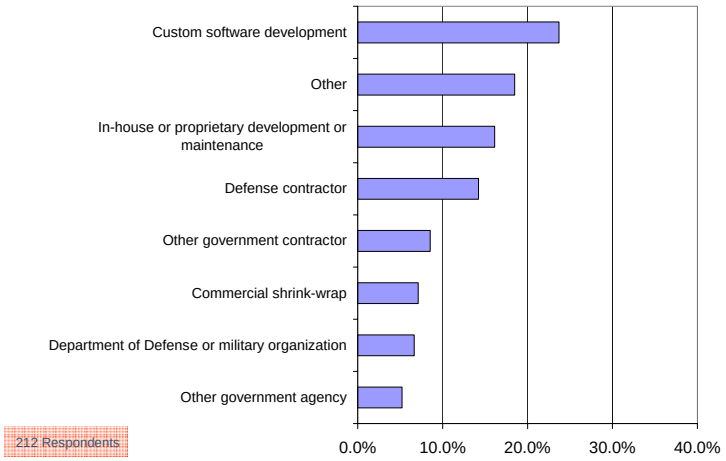
Organization Type



212 Respondents

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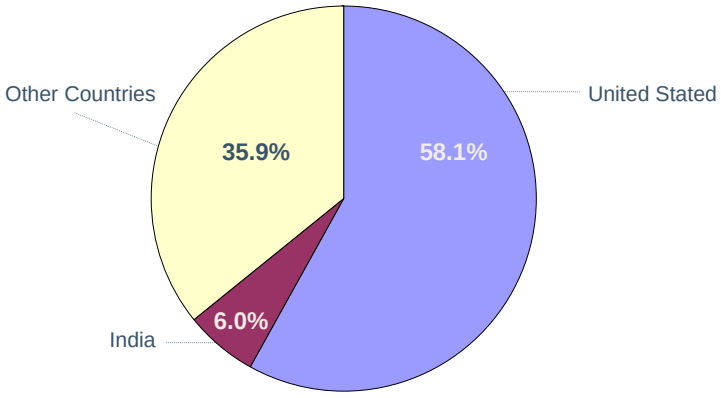
Country



212 Respondents

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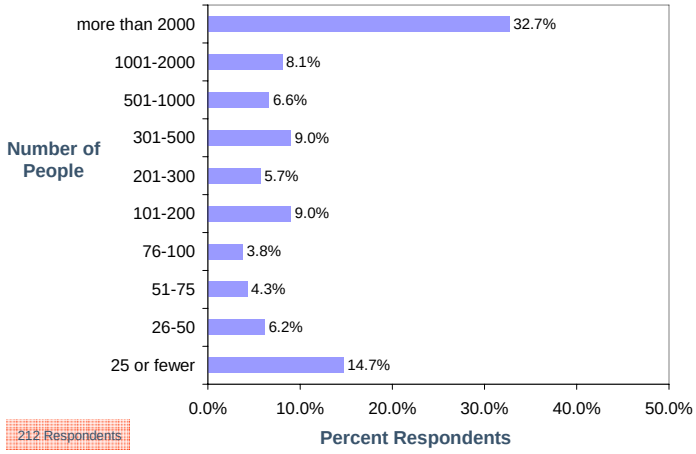
Organization Size



212 Respondents

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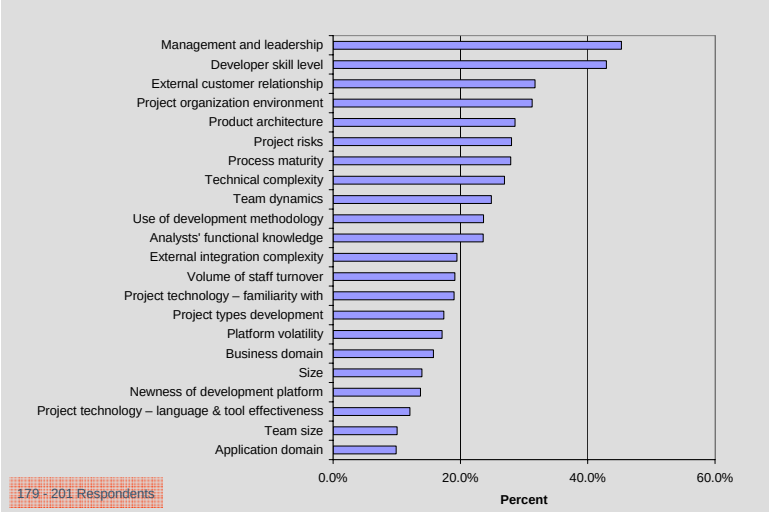
Very Large Impact



179 - 201 Respondents

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Top-10 Factors

"Very Large" Impact		"Very Large" or "Large" Impact	
45.3%	1 Management and leadership	87.6%	1 Management and leadership
42.9%	2 Developer skill level	83.6%	4 Project organization environment
31.7%	3 External customer relationship	79.9%	9 Team dynamics
31.3%	4 Project organization environment	77.2%	2 Developer skill level
28.6%	5 Product architecture	74.7%	3 External customer relationship
28.0%	6 Project risks	74.5%	5 Product architecture
27.9%	7 Process maturity	74.2%	7 Process maturity
26.9%	8 Technical complexity	73.6%	6 Project risks
24.9%	9 Team dynamics	72.1%	10 Use of development methodology
23.1%	10 Use of development methodology	65.9%	8 Technical complexity

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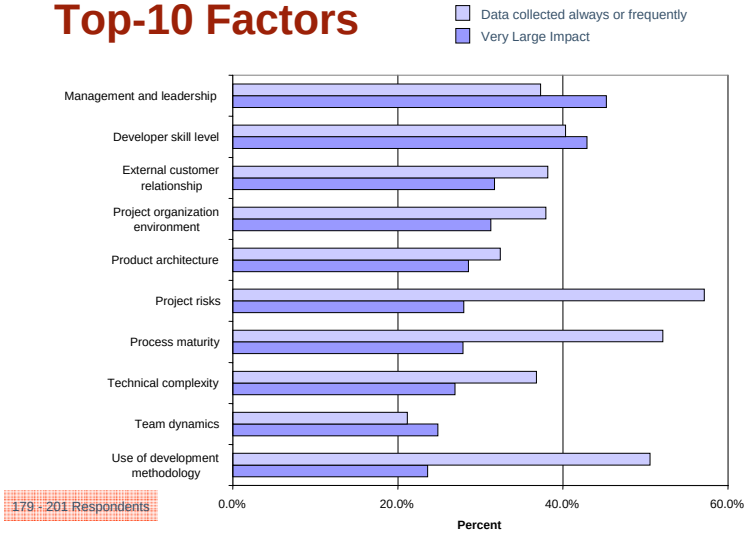
Top-10 Factors



179 - 201 Respondents

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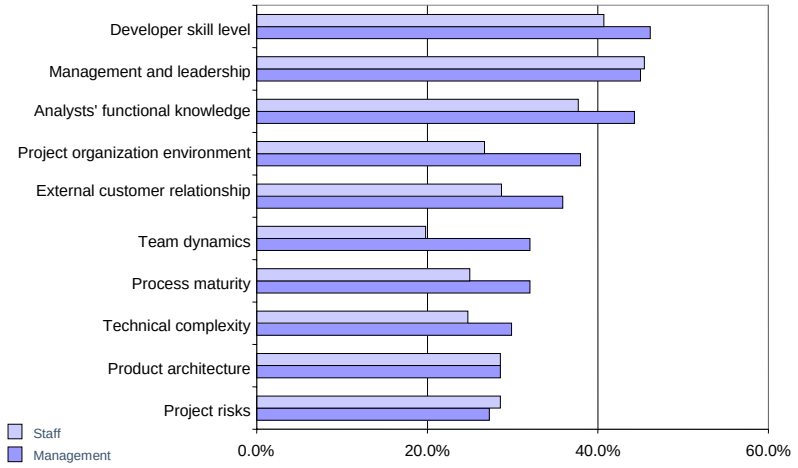
Top-10 Factors - Very Large Impact



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Top 10 "Very Large Impact" by Role

Management Perspective		Staff Perspective	
46.2%	Developer skill level	45.5%	Management and leadership
45.0%	Management and leadership	40.7%	Developer skill level
44.3%	Analysts' functional knowledge	37.3%	Analysts' functional knowledge
38.4%	Project organization environment	28.4%	External customer relationship
35.5%	External customer relationship	28.5%	Product architecture
32.6%	Process maturity	28.6%	Project risks
32.1%	Team dynamics	26.7%	Project organization environment
29.8%	Technical complexity	25.8%	Process maturity
28.6%	Product architecture	24.9%	Technical complexity
27.1%	Project risks	22.1%	Use of development methodology

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"Very Large" or "Large" Impact

Management Perspective		Staff Perspective	
90.1%	Management and leadership	90.4%	1 Analysts' functional knowledge
88.2%	Analysts' functional knowledge	86.0%	2 Management and leadership
87.3%	Project organization environment	81.0%	3 Project organization environment
87.2%	Team dynamics	75.2%	4 Project risks
84.5%	Developer skill level	75.0%	5 External customer relationship
77.6%	Product architecture	74.1%	6 Process maturity
74.7%	External customer relationship	72.6%	7 Developer skill level
74.8%	Process maturity	72.4%	8 Product architecture
71.9%	Project risks	71.4%	9 Use of development methodology
67.5%	Technical complexity	64.8%	10 Technical complexity

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Willing and Able

14 can authorize sharing of organization's performance data

&

assigns a high degree of value to software project performance benchmarks

12 out of 14 or 8[illegible]%

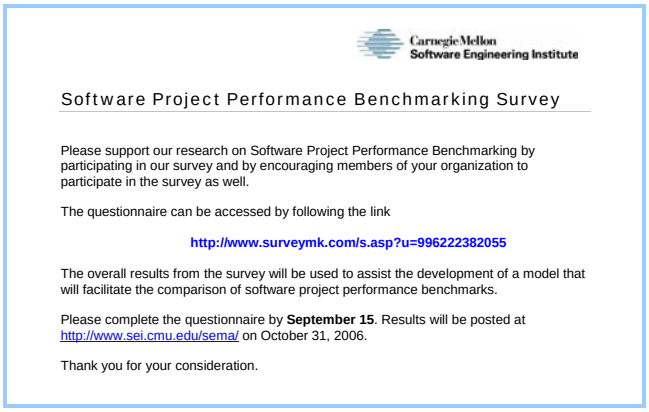
63 part of a team who can authorize sharing of organization's performance data

&

assigns a high degree of value to software project performance benchmarks

57 out of 63 or 90.5%

Please Participate



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Software Project Performance Benchmarking Survey

Please support our research on Software Project Performance Benchmarking by participating in our survey and by encouraging members of your organization to participate in the survey as well.

The questionnaire can be accessed by following the link

http://www.surveymk.com/s.asp?u=996222382055

The overall results from the survey will be used to assist the development of a model that will facilitate the comparison of software project performance benchmarks.

Please complete the questionnaire by **September 15**. Results will be posted at http://www.sei.cmu.edu/sema/ on October 31, 2006.

Thank you for your consideration.

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For More Information

For additional information about the Performance Benchmarking Consortium, contact either:

Oksana Schubert [os@sei.cmu.edu]
David Zubrow [dz@sei.cmu.edu]

Please consider attending the workshop on Wednesday. The workshop results will serve as input for our work in this area.

Workshop #5: SEI Performance Measurement and Benchmarking

Thank You,
Mark Kasunic
mkasunic@sei.cmu.edu