Practical Software and Systems Measurement

Objective Information for Decision Makers

Applying Measurement to Software Architecture

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Workshop´s Agenda

- *Intros and expectations*
- *Objectives of the Workshop*
- *Integration of SA with Software Life Cycle*
- *Concerns about SA Design*
- *Measures for Software Architecture: Discussion*
- *Synthesis and Conclusions*

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Objectives of the Workshop

1. ***Identify measurement categories and specific measures for SA Design***

2. ***Write measures specifications for candidate measures***

3. ***Outline a white paper about SA Design Measurement***

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Workshop participants

- ***Joe Dean**, Air Force, Cost Analysis Agency*
- ***Joanne Arias**, US Army RDECOM-ARDEC*
- ***Harpal Dhama**, MITRE*
- ***Alain Picard**, Benchmark Consulting*
- ***Kuen-Young Park**, Samsung SDS*
- ***Mike Bandor**, SEI*
- ***Bill Curtis**, CATS Software*
- ***Alejandro Bianchi**, LIVEWARE IS SA*

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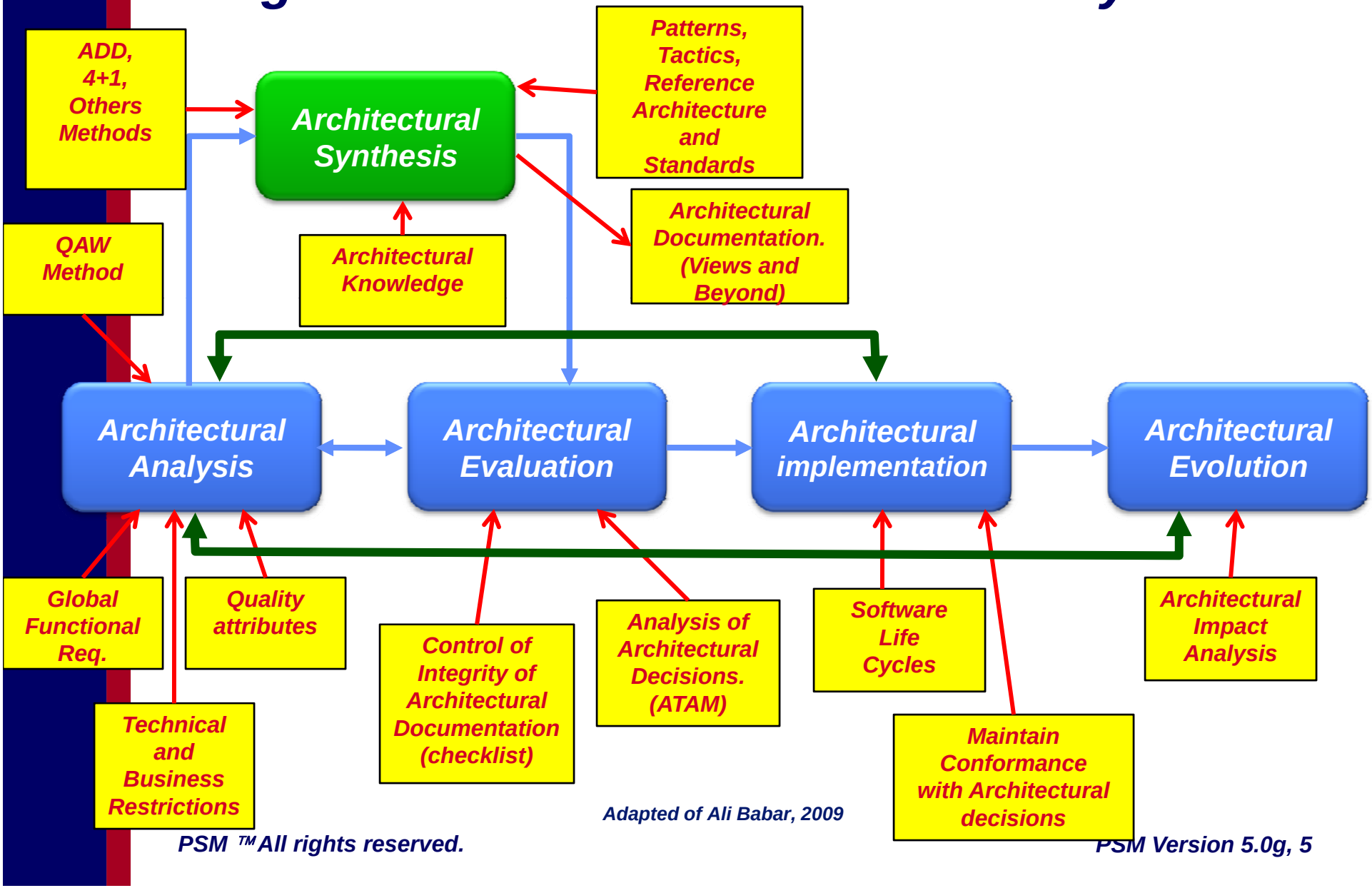
Integration of SA with Software life Cycle



Adapted of Ali Babar, 2009

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Benefits of SA Centric Life Cycles

- ***Allow to achieve the quality attributes required by business objectives.***
- ***Help define a strategy to achieve the development process objectives.***
- ***Help make and organize development teams in order to work in a more efficient way.***

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Benefits of SA Centric Life Cycles - 2

- ***It's a basement for strategic reuse of:***
  - ***Requirements***
  - ***Development techniques***
  - ***Source code***
  - ***Components***
  - ***Standards***
- ***Establishes main concepts to support the development of paradigms as a Product Line***

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New methods are hard to introduce

- ***Organizations must figure out:***
  - ***If new methods are useful***
  - ***How transition and use them***
  - ***How to make them fit with other process and methods***
  - ***The estimated cost for adoption***
  - ***The return on investment***

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Actor	Concerns/issues	Measure Category Process Products	Candidate Measures
Senior Manager/Organization	Cost of Implementation of SA Methods Time to Market Productivity Market positions ROI of SA Others?....		
Project Manager	SA Design Estimation, (time and effort) Trade off between Project Schedule and SA Design process Impact in Processes and methods Project Performance Product quality Others?.....		
Software Architect	SA Design Estimation Stakeholders satisfaction Robustness of SA Design Reuse at different levels Quality of SA Design Artifacts, (Views, perspectives and decisions) Adherence to Architectural decisions Demonstrate the value of SA Design Others?...		

Practical Software and Systems Measurement

Actor	Concerns/issues	Measure Category		Candidate Measures
		Process	Products	
Software Developers	Impact in the “creativity” Relationship with the Architect Impact in the schedule Conflict with “Agile Fashion” Others?...			
Testers ?				
Infrastructure ?				
Marketing Team ?				

Conclusions and Results

- ***The objectives of the workshop were ambitious. Partially completed the 1 and 2.***

- ***Interesting discussions about SA, Methods, tactics, value of SA and concerns***

- ***Specific topics could be goals in future workshops:***

  1. ***Limits between SA and the rest of Software Development activities***
  2. ***Software Architect 's competences***
  3. ***Service Oriented Architecture***

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Conclusions and Results - 1

- ***The seven information categories of PSM are enough to measure the Software Architecture Design***

- ***We identified, (until now):***
  - ***14 concerns and/or Information needs about Software Architecture Design***
  - ***27 candidate measures***

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Conclusions and Results - 2

CONCERN/ISSUES	MESUREMENT CATEGORY	MEASURE CANDIDATE
ROI	Resource and Cost	Market Share, Time to Market, current saved cost, future saved cost, cost of quality
	Schedule and Progress	time to architectual review, time to delivery
Agility of Product, to respond to market changes	Technology	Cycle time, number newly injected defects
Security	Product Quality	Security scenario and the depth of the scenario, compliance to security standards
Reliability	Product Quality	Scenario and the depth of the scenario, compliance to reliability standards
Cut the cost of IT Investment	Resource and cost	reuse of reference architecture, amount of reuse from existing systems, # of systems reused within the architecture, maturity of technology used within the architecture, effciency of the investment (sunk cost)
Performance	Product Quality	Scenario and the depth of the scenario, compliance to performance standards
When is the architectual design good enough	Schedule and Progress	Scenario coverage, integrity of architectual structure or views, # of TBDs

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Conclusions and Results - 3

CONCERN/ISSUES	MESUREMENT CATEGORY	MEASURE CANDIDATE
Scalability		
Quality of Software Architectural Design		
Organizational Change Process		
Ease of understanding of Software Architectural Design		
Functional Allocation of Hardware and Software		
Completeness of Software Architectural Design		
Maintainability		
Estimation of Software Architecture Design		

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Conclusions and Results - 4

- ***Software Architecture Design is an critical activity for achieving Product Quality and Productivity***
- ***We need objective information to demonstrate the value of SA Design and improve methods, Architects and tools***
- ***PSM can incorporate new measures to evaluate the SA Design***

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Next steps

- ***In the next two weeks we will complete the list of measure candidate with question addressed***

- ***Over next two months:***
  - ***We assign each one a set of candidates for its specification measurement***
  - ***Prepare outline of White Paper***

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