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## Inexpensive ATAM-Peer Review Detects and Fixes Architecture Problems Early

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*Engineered for life*

### Why use Architecture Trade-off Analysis Method (ATAM)

- From SEI ATAM Evaluator Training Slides copyright 2007
  - The purpose is to discover risks created by architectural decisions.
  - Find trends – correlations between architectural decisions and predictions of system properties.
  - Discovered risks can then be made the focus of mitigation activities.
- To produce more reliable software
- Because our customers are requiring ATAM



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## Why ATAM-Peer Review

- Finds architecture problems earlier while it is easier and cheaper to fix
- Ensures preparation of artifacts to support full ATAM is complete
- Enhance team communication
- Use for early risk mitigation
- Get team focused on Quality Attributes (QA) rather than only on functional requirements

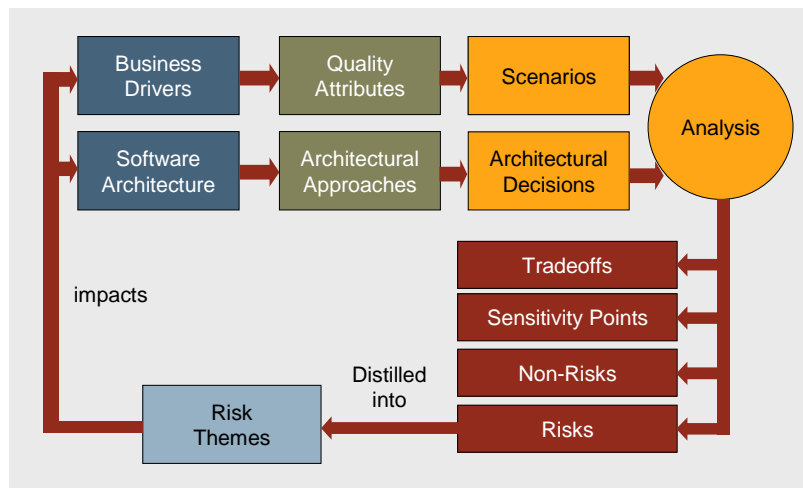


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## ATAM-Peer Review Overview

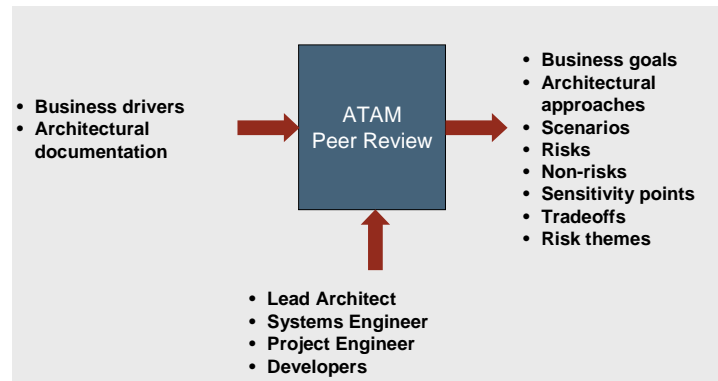


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## ATAM-Peer Review Inputs, Outputs, and Participants



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## ATAM-Peer Review Steps

STEP		Time (min)
1	Present the ATAM (Review of Team Training)	10
2	Present the Business Drivers (from Project Launch)	10
3	Present the Architecture	20
4	Identify Architecture Approaches	10
5	Generate QA Utility Tree (from Project Launch)	30
6	Analyze Architecture Approach	30
7	Brain Storm and Prioritize Scenarios	10
8	Analyze Architecture Approach	10
9	Present the Results	10



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## Keys to the ATAM-Peer Review

- Focused, Streamlined and Specific
  - Informal, fast, cheap
  - Look to surface 80% of the issues
  - Use system and project engineer to represent stakeholders
  - well suited for spiral/incremental/iterative projects
- Leverage prior team ATAM training, business drivers, architecture and quality attributes presented during the project launch.



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## How is the ATAM-Peer Review Used?

- Follow the ATAM process using abbreviated times. This is only possible if QA and business artifacts are available as a starting point.
- It is easy to get consensus on what is hard to do when your customer and management are not present. This review is to find problems and highlight risk not to evaluate individual performance
- Growth scenarios are the most important and lead to the best team discussions.
- Focus on the BIG issues first. Otherwise the team will go off on tangents.
- Use existing team members to speak for external stakeholders.



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## ATAM-Peer Review Team

- ATAM Evaluator – Senior Software Architecture with ATAM Evaluator Training
- Software Architect
- Software Developers (1 or 2)
- System Engineer (stake holder representative)
- Project Engineer (represents the business side)



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## Piloting the ATAM-Peer Review

- Piloted ATAM-Peer review on a moderate size IRAD project.
- Project chosen was a component of a large Software Oriented Architecture (SOA) project.
- Provided the team experience using SOA and Object Oriented (OO) design principles.
- Provided new team members experience with tools, process and new technologies.
- Prepared team to work on much larger SOA project.



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## Results of ATAM-Peer Review

- Several patterns were used implicitly rather than explicitly which added design risk.
- Team did not know all of the quality attributes that are needed for success.
- Review showed that by using a frame pattern changes could be isolated to a single class. This is easy to do now but hard when a traditional ATAM would have been required.
- Review showed 8 defects (2 risk categories) that were able to be eliminated before detailed design or coding started. These were identified long before a full ATAM would have been performed.



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## What worked

- Starting with single manageable threads.
- Utility tree gave team members key insights into what was important but not a “requirement”
- It only took a few hours
- It did not require a lot of preparation. We used the artifacts already available from the team.



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## Lessons Learned

- Assign good note taker to capture all points
- The build planner is an important stakeholder
- Build plan provides an important source of scenarios
- Model alone does not provide enough details for ATAM-Peer review. Need to use Software Architecture Document (SAD). Notes on white board is insufficient.
- Scenario prioritization provides the team valuable insight into project priorities
- New, less mature projects, tend to yield wide ranges of estimates of risk, complexity and time when looking at quality attributes and growth scenarios.



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## Conclusions

- ATAM-Peer Review works. It identifies architectural weaknesses and risk very early in the process.
- ATAM-Peer Review does not cost a lot of money or time. Only 10 to 12 man hours.
- The ATAM-Peer Review is being built into ITT's standard design process. This will be a standard for our software architecture peer reviews.
- Focuses the team on attributes that would have otherwise been overlooked until it was too late when errors are very expensive to fix.



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## Additional ITT Participants

- Larry Doyle
- Jim Tracy
- Rich Sarrubi
- Sue Rajan
- Tara Solorzano
- Himanshu Patel
- Mike Hand
- Mark Mikolajczk
- Steve Verga



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## References

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- Clements, P etal *Evaluating Software Architectures: Methods and Case Studies*. Addison-Wessley, 2002.



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